NAAPO (North American AstroPhysical Observatory)

"Signals"
Volume 4 Number 7
The NAAPO Newsletter
(October 20, 1988)

Edited by: John Ayotte, 528 Whitson Drive, Gahanna, Ohio 43230 [614-476-3834]

NAAPO Coordinator: Dr. Philip E. Barnhart, Dept. of Physics/ Astronomy, Otterbein College, Westerville, Ohio 43081 [614-898-1516]

SETI: Should Earthlings Tackle It?

The following letters appeared in *Physics Today*, and were forwarded to me by Walt Mitchell of the OSU Astronomy Department.

Although they take up a lot of space in this Signals, I think that the issues raised are ones that we should be prepared to respond to. Personally, I feel that questions about the very likelyhood of the existence of ETI cannot be ignored. The possible existence of ETI seems likely enough to me to warrant our search. I want to examine the logic and reasoning of respected scientists who disagree. It seems to me that those of us who remain open to the possibility of eventually discovering signals generated by extraterrestrial intelligence are closer to the true scientific spirit than those who have made up their minds that it will never happen. As a side issue, at least for us at the OSURO, our SETI research is also leading us into technological advances that are significant to the whole field of radio astronomy. These developments should not be overlooked in this debate.

-ja-

Now on to the letters:

A comment on Frank Tipler's review (December 1987, page 92) of *The Search for Extraterrestrial Life: Recent Developments*, edited by Michael D. Papagiannis. Does bioastronomy resemble parapsychology, as Tipler contends? Is it fair to conclude that bioastronomy should not remain in the International Astronomical Union? I say no to both questions.

This issue of membership in the IAU could be considered in light of the comparison of the so-far-fruitless search for extraterrestrial intelligence with the so-far-fruitless search for gravitational radiation from astronomical objects. In both cases, detectors are constantly being improved. Gravitational radiation is firmly predicted to occur by a well-founded physical theory if the numerical values of astronomical parameters fall in a certain range. Although the physics of ETI signal processing and transmission is well founded, the astronomical parameters that would guarantee generation of such signals are far less certain than are those for gravitational radiation. This makes searching for ETI a much more risky enterprise than searching for gravitational radiation, but astronomers believe that the rewards of

contact would have an even wider impact on science in general.

Such considerations led the National Academy of Science-National Research Council Astronomy Committee, which I led from 1978 to 1982, to "recommend an astronomical Search for Extraterrestrial Intelligence (SETI), supported at a modest level, undertaken as a long-term effort, rather than as a short-term project, and open to the participation of the general scientific community.'" I believe it is too early to give up the search on the basis of the negative evidence so far.

Reference

1. Astronomy Survey Committee, National Academy of Sciences and National Research Council, *Astronomy and Astrophysics for the 1980s*, vol.1, Natl. Acad. P., Washington, D.C. (1982), p.150.

George Field
Harvard-Smithsonian Center for Astrophysics
Cambridge, Massachusetts

In response to Frank Tipler's review of *The Search for Extraterrestrial Life:* We know that, at one location in the universe, carbon atoms form compounds of sufficient complexity to allow intelligence. And if that phenomenon exists in one place, it is at least conceivable that it may exist elsewhere, so the proper scientific procedure is to look for it.

We are faced with two hypotheses: Intelligent life exists only here; or it exists elsewhere. Either one may be true, but the first can never be proven; the second can at least be tested. So far, we have examined less than 1 percent of the electromagnetic spectrum's multidimensional search space (of direction, frequency, polarization and so on). If, after searching more than 50 percent of this space at reasonable sensitivity, we still have no evidence for the existence of others, then perhaps we should begin to take seriously the idea that intelligent life is rare.

Let's not be like Galileo's colleagues, who refused to look into his telescope because they were certain that Venus couldn't have phases, Jupiter couldn't have moons, and the Sun couldn't have spots.

Thomas R. McDonough
The Planetary Society
Pasadena, California

In Frank Tipler's review, he embraces Brandon Carter's interpretation of the "weak" anthropic principle to support his view that extraterrestrial intelligence does not exist and that the search for ETI should be abandoned. However, his reasoning is no clearer than that of Carter himself (in *Philos. Trans. R. Soc. London, Ser. A* 310, 347, 1983). A summary is as follows:

• The time it took for intelligent life to evolve on Earth is about half the main-sequence lifetime of the Sun; that is, they are of the same order of magnitude.

• The former time scale, being biological, should be expected to be of a quite different order of magnitude from an astrophysical time scale.

• Therefore the time needed for an Earth-like planet to evolve ETI is much longer than the main-sequence lifetime of a G2 star! Therefore intelligent life on Earth is a fluke.

The reader might be puzzled as to why the third point should follow from the first and the second, or why the second should necessarily be the expectation. He or she may consider the above a good example of highly biased, or forced, reasoning by a non-ETI-believer. It may be contrasted with the logical view that a spectrum of ETI evolution times around 4.5×10^9 years is to be expected, ranging from perhaps 1×10^9 to 12×10^9 years. This view is supported by the fact that the first life on Earth was initiated relatively quickly, after only some 7 percent of a G2 star's lifetime. Espousal of a weak anthropic principle does not mean that relevant information like this must be ignored.

James W. Deardorff
Oregon State University
Corvallis, Oregon

The book review by Frank Tipler is actually a list of Tipler's objections to a search for extraterrestrial intelligence.

First, says Tipler, he would have emphasized "Brandon Carter's new 'weak' anthropic principle argument for the nonexistence of ETI," which is of "revolutionary significance." Carter's lengthy treatise (*Philos. Trans. R. Soc. London, Ser. A* 310, 347, 1098) points out that "biological theorists run the risk of error in the interpretation of the evolutionary record unless they take due heed of the astrophysical restraints under which evolution took place." This seems self-evident. Carter, an astrophysicist, then presents "a new application" of "the ordinary ('weak') anthropic principle to the problem of the evolution of terrestrial life," showing evidence suggesting that the evolutionary chain included at least one but probably not more than two links that were highly improbable in the available time interval. Examples of such steps are the original establishment of the genetic code and the final breakthrough in cerebral development. Carter's final message is that "one should steer a moderate course between the Scylla of anthropomorphism and the Charubdis [sic; correct spelling is "Charybdis"] of unjustifiable neglect of anthropic selection effects."

Tipler writes that "Carter observes that the time it took to evolve intelligence on Earth is within a factor of two of the main-sequence lifetime of the Sun," which is well known. Tipler then says, "Now, the former is a biological time scale, and *a priori* we would expect it to be quite different from the latter, which is an astrophysical time scale." There is no basis for Tipler's assumption. Both time scales embrace events that are measured in minutes or days — the explosion of a supernova, the rhythm of a Cepheid variable, the budding of a yeast cell, the pregnancy of a mouse — and also events that span eons — the formation of a galaxy or a planetary system, the evolution of hemoglobin or thymidylate synthase. Sadly, he fails to perceive that the story of our planet is a commingling and succession of various forms of evolution: astrophysical, planetary and geological evolution, the existence of the hadean Earth, followed by slow cooling, great rains, boiling oceans, the early atmosphere, the beginnings of life and its protracted march through billions of years of increasing complexity. This was what Charles Darwin, building on James Hutton and Charles Lyell, began to see as a replacement for the old superstition of a 6000-year-old universe. Is Tipler a creationist?

Tipler then says that the "average length of time needed to evolve intelligence on an Earth-like planet is actually much longer than the main-sequence lifetime of a G2 Star," so that "we would expect approximate equality between the Sun's lifetime and the time needed to evolve intelligence." But intelligence has evolved on the Earth, and the Sun has another 5 billion years of "lifetime." So, say the searchers for ETI, since this all has happened, it can happen again elsewhere.

The Fermi paradox is explained, apparently, by Tipler when he says that Ben Finney's "picture of Polynesian evolution is exactly what I predicted would be the behavior of colonizing ETI," namely, that various moral objections of social mechanisms would prevent interstellar travel. He then says, correctly, that "we have one extremely significant experimental result: They aren't here." But if "they" were here, we wouldn't need to search elsewhere for them! Tipler complains of the expense of SETI, and likens bioastronomy to parapsychology. He says that more money is being spent on ESP research than ever before. The same is true of expenditures on most human activities. He also says that "bioastronomy resembles nothing so much as parapsychology." This is quite untrue. SETI uses scientifically sound methods in an attempt to detect radio signals. Radio waves are authentic natural phenomena. Parapsychology looks for unnatural events by dubious methods such as dowsing, spoon-bending and levitation.

George Gaylord Simpson (*Science* 143, 769, 1964), as quoted by Tipler, was referring to exobiology, not to "bioastronomy." It is true that Simpson argued against the possibility of two-way space communication and against the possibility of extraterrestrial humanoids. Simpson said that we can "learn more about possible extraterrestrial life by studying the systematics and evolution of earthly organisms... my plea is that we invest just a bit more of our money and manpower, say, one-tenth of that now being gambled on the expanding space program, for this sure profit." NASA's planetary biology program provides significant support for the study of evolution.

Against SETI is that its success is only remotely likely, but for SETI is that it seeks to cast light on one of the greatest challenges of the unknown: Are we alone in the universe?

Thomas H. Jukes
University of California, Berkeley

Until the December 1987 issue of *Physics Today*, I did not realize that the Books department of the magazine was a approved forum for presenting late conference papers under the guise of a book review. What Physics Today chose to publish as a review of *The Search for Extraterrestrial Life* had absolutely nothing to do with the merits or faults of the volume and, with the exception of two short direct quotes, could have been written whether or not the book itself existed!

In addition, Frank Tipler is misinformed. There is no "present NASA-funded radio search," only a SETI R&D program that is trying to develop the technology to conduct a *comprehensive* search of the available microwave spectrum, something that has never before been attempted. I for one am hopeful that NASA will receive fiscal year 1989 funding to initiate such a systematic search. Following an extended search effort, it may be necessary to interpret negative results — always a tricky business. Interpreting those results before the data are even collected is preposterous!

Jill Tarter
University of California, Berkeley

Tipler Replies:

Both James W. Deardorff and Thomas H. Jukes seriously misunderstand Brandon Carter's argument. It involves a very subtle and ingenious use of probability theory, and I could not provide a derivation of Carter's inequality, together with a discussion of how it depends crucially on modern evolutionary theory, in a short book review. Therefore, in the review I referenced my book with John Barrow,[1] which discusses the points raised by Deardorff and Jukes at length in section 8.7. In brief: Because, as Jukes says, biological and astrophysical time scales each embrace a huge range of numbers, there is no reason to expect two numbers taken at random from each set to be equal to within a factor of 2. (Random selection is justified in my book with Barrow.) In fact, Carter shows mathematically that if intelligence were selected for from the very beginning, we would expect the evolutionary time scale to be much less than the main-sequence lifetime (details in the book).

Therefore, says Carter, let us account for the approximate equality by two assumptions: first, that the time scale for evolution of intelligence is Gaussain [sic; correct spelling is "Gaussian"], distributed over Earth-like planets with the peak much larger than the main-sequence lifetime and with the Earth's age lying many standard deviations away from the peak; and second — this is the crucial assumption omitted by Deardorff and misunderstood by Jukes — that there is a *least* upper bound to the length of time evolution can proceed on an Earth-like planet. One can then calculate[1] that it is *probable* (*how* probable can also be calculated[1]) that we evolved near this least upper bound. How near depends on n, the number of highly improbable links. Two important points; Carter's argument computes a *least* upper bound, while the 5 billion years of additional lifetime cited by Jukes provides merely an upper bound; and the actual remaining lifetime will be much less than this upper bound if n»2. Carter was actually unhappy with the n is approximately equal to 2 value. He adopted it only because he assumed the least upper bound to equal the Sun's lifetime. But there is no real evidence for this equality.[1] The fact, emphasized by Deardorff, that life on Earth was initiated relatively quickly *may* itself be an example of weak anthropic selection: Perhaps only on those planets where life begins does intelligence have time to evolve before the least upper bound. It is not known[1] if the start of life is one of the highly improbable links counted by n. Steven Weinberg has recently used essentially the same logic as that of Carter's argument to obtain an upper bound on the cosmological constant.[2]

The Fermi paradox is *not* explained by Ben Finney's contention that, in Jukes' words, "various moral objections or social mechanisms would prevent interstellar travel." I claim, on the contrary, that Finney has misinterpreted his own data, which indicate that motivation flagged only after the other three barriers (ecological, technical and opposition of those in the way) made further expansion difficult. But I pointed out in my review that those three barriers don't exist in interstellar travel. Finney's picture is exactly what I predicted[1,3] would be the behavior of colonizing ETI: An r-strategy, characterized by rapid expansion, would be typical of those on the frontier; while a K-strategy, characterized by fluctuations around an equilibrium, would be typical of those in the interior. (K-strategy and r-strategy are technical terms in evolutionary biology, and refer to the two most basic reproductive strategies a species can adopt. The r-strategy emphasizes rapid reproduction. It is used, for instance, in environments where it is crucial to exclude competitors by occupying niches as quickly as possible. The K-strategy, by

contrast, emphasizes quality reproduction: fewer descendants, but more resources spent per descendant. It is used, for example in environments where niches are already occupied by members of the same species and there is competition within the species for the occupied niches.)

The crucial point, emphasized in my review, is ignored by the above authors: *Virtually any motivation we can imagine that would lead ETI to engage in interstellar radio communication with us would also motivate them to engage in interstellar travel*. In particular, radio communication is colonization of other inhabited star systems by memes (idea complexes) from alien star systems. If one opposed on moral grounds colonization by genes (via interstellar travel), one would also oppose colonization by memes (via radio). Interstellar colonization either by genes or by memes necessarily implies biological evolution on an interstellar scale: The first intelligent species to originate will occupy all ecological niches available to it, a behavior pattern adopted by all species that ever existed on the Earth. If Deardorff's distribution were correct, many intelligent species would have arisen billions of years ago in our Galaxy. What have they been doing these billions of years? In the view of Jukes and Deardorff, evolution apparently stops when it reaches intelligent life; theirs is the creationist view, which envisages stasis. The most solid experimental fact we have — they aren't hear [sic; "here"] — is flippantly dismissed, or repeatedly ignored.

Also explained away are the 120,000 hours of radio searches for ETI. I have, so to speak, looked through the telescope, and the ETI simply aren't there. Thomas R. McDonough's explanation is that "we have examined far less than 1 percent of the *most likely* portion... of the search space... If, after searching... this space at *reasonable sensitivity*, we still have no evidence... then *perhaps* we should begin to take seriously the idea that intelligent life is rare" (my italics). What exactly are "most likely" and "reasonable sensitivity"? Thirty years ago we were told that the searches that have since been conducted (with negative results) met those standards. As the above letters indicate, the ETI believers are already prepared to explain away any negative results of any comprehensive search. McDonough's response to possible negative results is loaded with weasel words (for example, "perhaps"), and Jill Tarter puts it thus: "It may be necessary to *interpret* negative results — always a tricky business" (my italics). One "interpretation" I predict will be used is the "zoo hypothesis": Advanced civilizations talk only to themselves; they don't want to interfere with the cultural development of primitives like us. How does this differ

from a favorite excuse of parapsychologists, that paranormal phenomena like ghosts will not manifest themselves to non believers? True, contact would have a wide impact on science in general, as George Field says. But the same could be said for ESP detection. In both cases, there are good theoretical and experimental reasons for believing that the phenomena — ESP and *intelligently generated* radio signals (not merely radio signals, as Jukes claims) — don't exist.

The hallmark of a true scientific discipline is its willingness to consider criticism. When doubts were recently expressed about the validity of the quadrupole formula, the gravitational radiation researchers immediately organized debates between the believers and the critics at conferences. Why was there no debate on the likelihood of ETI evolution at the Boston conference? Only evolutionists who believed in ETI were present; disbelievers like the famous evolutionists George Gaylord Simpson and Ernst Mayr were not invited. (My Simpson quote was from *Communication with Extraterrestrial Intelligence*, C. Sagan, ed., MIT P., Cambridge, Mass., 1973, page 362. Simpson agrees with me that the current work referred to by Tarter is a waste of funds; he refused to sign the famous Science letter written by Sagan, which was instrumental in getting money for the current project!) Why was Michael Hart not invited to debate the Fermi paradox and to criticize Finney's interpretation? I was told by a member of the conference's Scientific Organizing Committee that the committee felt debates on the question of the very existence of ETI might attract too much media attention; this would interfere with the acceptance of "bioastronomy" as a true scientific discipline. ETI critics like Simpson, Mayr, Hart and myself are not welcome at ETI conferences, just as ESP critics like James Randi are not welcome at ESP conferences. Any discipline that puts public relations ahead of getting at the truth is not a science; should a pseudo science remain in the International Astronomical Union?

References

1. J.D. Barrow, F.J. Tipler, *The Anthropic Cosmological Principle*, Oxford U. P., New York (1986)
2. S. Weinberg, Phys. Rev. Lett. 59, 2607 (1987). See especially the first paragraph in the second column on p. 2609.
3. F.J. Tipler, Q.J.R. Astron. Soc. 21, 267 (1980).
4. G.G. Simpson, letter to F.J. Tipler.

Frank J. Tipler

Institut fur Theoretische Physik
Universität Bern
Bern, Switzerland

Volunteer Programmer Need in Evidence

In the past few months a glaring need for a FORTRAN programmer has become evident. There is still much to accomplish in realizing the implementation of the SETI program on the 11/23 in the focus room.

With the added responsibility of being Acting Director of the IRCC at OSU, Bob Dixon has lost the freedom to carry out the programming himself. He is very much interested in directing the project if someone would take on the responsibility of doing the programming and debugging needed to get the observations under way.

If you are interested or know someone who might be willing to devote some valuable time to this project, the qualifications are:

1. Competence in FORTRAN programming.
2. A willingness to become familiar with the system as it now stands.
3. A commitment to follow through to the completion of individual tasks.

Anyone interested or knowing of someone interested in this kind of involvement please call Phil Barnhart at (614) 898-1515 or Bob Dixon at (614) 846-4226 (his home number, available evenings.)

NAAPO Acknowledges Gift from Herb Johnson

NAAPO has just received a low-noise 1.0-1.4 MHz [should "MHz" have been "GHz"?] amplifier and a TRS Printer/Plotter from **Herb Johnson** in Colorado Springs. After evaluation we will attempt to place these items into our operation.

The Micro-Group is assessing the plotter, while the LNA will go to the electronics group. NAAPO acknowledges with thanks the donation and will make every effort to involve these items in our program.

-peb-

Working Session Notes 15 October 88

Those Present: **Barnhart, Dixon, Bolinger, Huck, Mitchell, van Horne, Ellingson, Koch, Janis, Foster**

General Announcements:

Dixon and **van Horne** reported on their general impressions of the Toronto meeting of the Planetary Society. Several important points were made and suggestions tendered for the Radio Observatory.

1. **Dixon** noted that many speakers were referring to work of the RO and the Ohio group. After he started counting, eleven contributors made reference to the Ohio work and both **Phil Morrison** and **Paul Horowitz** made reference in summary statements about the meeting. This is significant name recognition for work carried out under extreme fiscal limitations.

2. **Thomas McDonough** chastised the Planetary Society for not picking up publication of Cosmic Search when the opportunity presented itself. He maintained it was "...a BIG MISTAKE."

3. We should establish a pre-print service to distribute summaries of texts of papers or presentations before they are finally published or proceedings of conferences are issued. This will be taken up with the publications group.

4. We are encouraged to ask the Planetary Society to grant free membership to nominated volunteers and friends of the observatory in recognition of their contributions. This is the "...least the Planetary Society can do."

5. We should seriously consider requesting the Planetary Society to support Bob Stephens to come to Big Ear.

Status Reports:

Software Group:
(**Dixon**) No progress to report. We could use a volunteer FORTRAN programmer willing to learn the system and carry out the various tasks under the supervision of

Bob Dixon. This is a condition necessitated by Bob's increased load as Acting Director of IRCC.

Electronics Group:
(**Bolinger**) The office heaters at the RO are all off. (**Dixon** and **Barnhart** activated them at the start of the meeting. Sparks, smoke and noise issued from the south strip control box twice during the meeting. The circuit breaker was blown, so repair is now necessary for this particular circuit.)

The 11/44 SYSGEN is nearly complete. There are definite problems with the peripherals for this machine. Much trouble shooting will have to be carried out in the next few weeks.

We could use the donation of considerable QUALITY (!) test equipment. The list should include:

Multichannel Logic Analyzer
Multichannel Oscilloscope
Test Media for Tape and Disc Drives
Good Digital Multimeter(s)

George Foster offered to donate to NAAPO a sizable holding of components, parts, and a back-up PDP 11/23 computer.

RFI Group:
(**Ellingson**) Work continues on the Reflector/Direction finding project. Two antenna rotators were provided by **Dixon** at the meeting this morning.

Work is continuing on the Big Ear diffraction analysis. Care must be taken in trying to shield the horns that we do not direct more RFI into them by diffraction than they receive normally from ambient signals that tend to be higher strength some feet off the ground.

Koch is gathering data on air traffic density to correlate with the RFI patterns detected with the discone.

The RFI paper is in the final write-up stage. Conference will convene immediately following this meeting.

Publications Group:
(**Ayotte**-absent) Publications Group is urged to become involved in the process of establishing a pre-print service. Suggestion was made that pre-prints be mailed with issues of Signals.

Mechanical Group:
(**Huck**) Original inking setup does not work. **Huck** has created a flow regulator which uses a full ink bottle mounted on top of the cabinet and feeds the pens by gravity and a valve system.

Alarm system is down. **Barnhart** will contact the Alarm people and follow up.

Chief Observer:
(**van Horne**) Volunteer activity has been curtailed due to overtime at work. Hope is that he will be back on-line soon.

Headquarters:
(**Barnhart**) Current financial report: Fluid cash on hand (after outstanding commitments) $2300.00. This is not alarming, but it requires very careful stewardship.

Gould recorder gift is still in the run around stage. Commitment to donation continues to be re-iterated, but excuses are still forthcoming.

A shipment of an LNA (1.1 MHz to 1.42 MHz) [should "MHz" have been "GHz"?] and a printer/plotter has been received from **Herb Johnson** in Colorado Springs. The LNA has been turned over to the Electronics Group for evaluation.

New Business:

Dixon requested that the heaters be turned on in all the rooms of the office building — even if it means moving equipment to reach them.

Van Horne and **Barnhart** furled the Flag of Earth in a quasi-permanent configuration having greater than normal theft prevention index.

-peb-

Oberlin Computer Center Makes Gift

NAAPO is the recipient of 13 terminals donated by the Houck Computer Center at Oberlin College. The gift consists of several each of Perkin-Elmer Model 1200, Perkin-Elmer Model 550, and Hazeltine Esprit terminals. Two multiplexers were also included in the gift.

This donation was arranged through **Art Ripley** who is the networking manager of the Oberlin College Computing system. **Art** recently became a Friend of the Observatory. We are looking forward to more cooperation from his group in the Oberlin area.

-peb-

Barnhart Visits Nova Scotia Branch of NAAPO

As a part of the fall activities in connection with the Radio Observatory, Coordinator **Barnhart** paid a three-day visit to the campus of St. Mary's University in Halifax, Nova Scotia in late September. In addition to discussions with **Fr. William Lonc**, he spoke to a class in electrical measurements, an Astronomy Department colloquium and a public lecture sponsored jointly by the St. Mary's University and the Maritime Provinces chapter of the Royal Astronomical Society of Canada.

Publicity for the public lecture got out fairly late, but the local affiliate of the CBC (Canadian Broadcasting Corporation) requested an interview to be aired Tuesday morning, and a local newspaper sought a long interview which used up a morning of time and one class presentation. Following the broadcast of the radio interview, two competing television stations put in requests for current events news program interviews. These ate up a full afternoon.

The visit was very interesting, though time was not all that free, and certain progress was achieved. Details will be included elsewhere in this newsletter.

-peb-

OBOS Computer User's Group Makes Gift to NAAPO

Through the good offices of **Art Ripley** the OBOS Computer User's Group in the Oberlin, Ohio area NAAPO has received a Xerox Model 820-11 Personal Computer. The principal feature of this system is that it operates with 8-inch disc drives and may provide a translating medium for our data discs from the PDP 11/23.

We are most grateful for the consideration of this group in helping out with hardware that might be useful in solving some of our immediate problems.

-peb-

RADOBS Notes

1 Sep 88 21:49:21-EDT
From: Ron Huck
Subject: strip chart recorder

I got the analog continuum on the strip chart recorder working again. The galactic center starts to appear at about 2015 now.

Congratulations on the Masters Jim.

3 Sep 88 6:01:48-EDT
From: Bob Dixon
Subject: Observatory Problems

I tried to do software work today, but could not because:

1. Floppy drive dy0: does not work. It claims it cannot find the home block when you try to mount a disk. Yet the same disks work fine in dyl:. Therefore I could not archive any of the log and continuum files that are piling up on dyl:, so it will overflow soon. Then all will stop and data may be lost. It is not practical to use dy1: as all the software assumes that dy0: is being used. That was a deliberate design choice.

2. The terminals are labeled wrong, apparently because they have been connected differently. This means you cannot run a program on the terminal of your choice,

including the one you are on.

3. The a/d converter continues to be overloaded, so it is impossible to run the SETI program. This problem has existed for a long time, and must be fixed now. It is the highest priority for all staff. There is simply too much signal going into the a/d converter.

There is a leak in the focus room hatch that must be fixed. Rain drips in, and someone put a dewar with funnel below it to catch the water. But nobody thought about ever emptying the dewar or what happens when it gets full. It floods the focus room. We emptied it, but the leak must be fixed or it will flood all the time.

4 Sep 88 10:51:38-EDT
From: Bob Dixon
Subject: Opportunities

1. When we showed the slides of the tracking feed in Baltimore, I was embarrassed at its poor appearance. The rust is very obvious. We need to paint it and get new slides, to improve our image.

2. The discussion among Ohio Wesleyan, OSU and the Columbus Astronomical Society concerning future public uses of Perkins Observatory is good, but we need to be involved as well. Clearly we have much to offer of interest to the general public so we should be part of this planning effort. We must seize such opportunities for public visibility. This would be a good activity for the Publicity Committee to have a rep at these meetings. Walt Mitchell would be the person to provide more details of who to contact, etc.

6 Sep 88 08:55:33-EDT
From: BOLINGER-J
Subject: opportunities

As far as the rust is concerned, we should do something more than slop on a coat of Kmart Blue Light special. The surface should be properly prepared, primed, double primed, etc, before the final two (or three) coats. I remember reading about some new stuff that chemically bonds the rust and can be painted over. That should be thoroughly investigated.

12 Sep 88 11:30:29-EDT
From: BOLINGER-J
Subject: floppy disc

DYO: on the 11/23 is about to have a catastrophic failure. There is a bearing going bad. I will attempt to repair or replace it in the near future. Meanwhile the drive is available for limited use for short time periods. Someone had left some floppies in the drives for several weeks. Although they (the drives) do last for a long time, the motors are running continuously and it is not advisable to leave a disc inserted. This will cause premature wear of both the drive and the disc. (To be more specific, the upper spindle is spring loaded and is designed to put pressure on the disc when it is loaded. The upper spindle bearing is the first thing to wear out, so discs should not be left in, particularly on old drives (which all 8" drives are, anyway). By the way the new 5 1/4 and 3.5 inch drives turn the motor off when not being accessed, so they should last a LOT longer.)

On a related topic: Has anyone seen a head cleaning disc for an 8" drive recently? We could use one.

21 Sep 88 11:06:09-EDT
From: BOLINGER-J
Subject: spectrum analyzer

As those of you that were at the meeting last night know, the spectrum analyzer is currently connected in place of the SETI receiver.

In order to run the spectrum analyzer it must be turned on (note that there is a long turn on delay so don't get excited when it doesn't work right away) and the power cord for the LNA plugged in. The LNA is on top of the analyzer with a long power cord coiled coming from it.

The controls on the analyzer are set so that the continuum band width occupies almost the entire screen width, and the horizontal scale is NOT calibrated so it is not possible to do any direct measurement of relative frequency.

If this is not acceptable the variable spectrum width control can be turned off.

When you turn on the analyzer you will notice that there is a very strong signal present at all times within the pass band. This is the continuum local oscillator at 1450 MHz. There is also some roll-off of the noise towards the high end of the pass band. This is due to the band pass characteristics of the LNAs.

The Icom receiver is also useable at the same time as the spectrum analyzer, and has been connected ahead of the YIG filter. The LNA associated with the analyzer is not connected to the Icom.

22 Sep 88 09:43:30-EDT
From: BOLINGER-J
Subject: spectrum analyzer, part 2

Forgot to mention that the spectrum analyzer is connected in place of the SETI receiver, since we do not have enough wide band power splitters to have everything connected at the same time. As a result the current performance of the SETI program should not be taken as indicative of the true characteristics.

29 Sep 88 09:30:33-EDT
From: BOLINGER-J
Subject: 'Space Observatory' article

A question on the article about the Soviet Space Observatory: The graph makes no sense at all. The horizontal scale is in meters and the vertical scale is in kilometers of altitude. What does this have to do with transmission of electromagnetic energy? With the axis labeled as they are the graph would be a curved line (horizontal scale is logarithmic).

29 Sep 88 10:32:32-EDT
From: AYOTTE-J
Subject: Graph

I should have added the following caption to the graph. "Atmospheric transmission as a function of wavelength. The curve gives the altitude from which you would have to observe to get 50% of the signal."

29 Sep 88 12:10:42-EDT

From: Bob Dixon
Subject: Telephone Poles

The good news:
We can now go and start hauling away the telephone poles. The original deal is now modified such that we can have ALL the poles we want.

The bad news:
These poles carry cable TV wires, in addition to utility wires. The cable TV people are not working in close cooperation with the power contractor, so the TV cables are still on the old poles. To avoid this problem, the power contractor is just sawing off the old poles at the level of the TV cables, where this is necessary to get them out. It may depend on which side the TV cable is mounted. For the affected poles, they end up being somewhat shorter than the others. I do not know how many this affects yet, nor does the power company, as they are still working.

General news:
The power contractor will leave ALL poles and pieces thereof in the ditch for us to pick up. They have been instructed that we may come at any time and do as we wish with the poles. After we have taken all we want, I am to notify them, and they will return to haul off what we do not want. The more we take, the better they will like it, because it is less work for them later. They are still working, and some poles are in the ditch and others are still standing. I will drive around and see if I can measure the ones that are down now. Do we want to get them in phases, or try to get them all at once? If we leave them lay too long, someone else may take them, and nobody will enforce that they are just ours. Perhaps if there are more than we need, we could make them available to other worthy causes, VERY CAREFULLY. After all, these were donated to us for scientific research, and not to end up for sale in some garden center.

30 Sep 88 09:03:02-EDT
From: Bob Dixon
Subject: Telephone Pole Saga

(Why does everything always have to develop into a saga?)

I looked at all the poles last night. All but a few have been sawed off at the top. The

stubs lying in the ditch are from 3 to 6 feet long, so the poles are still of good height. We should probably paint the exposed ends to prevent rot. It appears that many of the stubs are already gone. I do not know if the power crew took them (I doubt it) or if home owners took them. It is clear that the Power company is not totally aware or in control of what the outside contractor's crew is doing. I suspect if ANYONE asked the crew about getting poles, they would tell them yes, because it makes less work for them, and the power company will never know if we took them or if someone else took them. No actual poles are as yet removed from the ground and lying in the ditch. But I think we will need to move fast when that happens. I already know of one neighbor who has been asking about getting some.

This pole sawing is a classic case of disorganization. The cable TV wires were only put up a few months ago. Surely the power company knew then that they were going to replace all the poles. The cable TV people chose to put their cables on the street side of the poles, and the new poles are further away from the road. That means the cable TV wires cannot be moved to the new poles easily without sawing the tops off the old poles. Egad!

Worse (for me), the old poles have been a source of RFI for years. I have complained many times, but they never did much. Now the problem is worse, and they claim it is due to the transition to the new poles, and it will all be fixed when they finish the project. Until then, they say nothing can be done. Argh!

Lonc Agrees to take on 1420 MHz Calibration Proiect

An outgrowth of the discussion held in Halifax last month was an agreement that **Bill Lonc** would take on the design and construction of a calibration source for use at the Radio Observatory. Such a device will allow on-site mapping of the horn response and a direct means of testing the system stability and sensitivity including the horns.

Specifications for the calibrator include frequency stability and amplitude stability along with the characteristic of portability and weather resistance.

We look forward to progress on this project and will begin the testing as soon as the calibrator is in hand.

-peb-

Future Working Session Schedule

5 November
19 November
3 December
17 December
7 January 89
21 January
4 February
18 February

(10-12 @ the RO)

[Back to List of Issues in Volume 4] | [Back to List of Volumes] | [HOME]

E-mail Webmaster

Designed by Jerry Ehman
Last modified: January 16, 2004