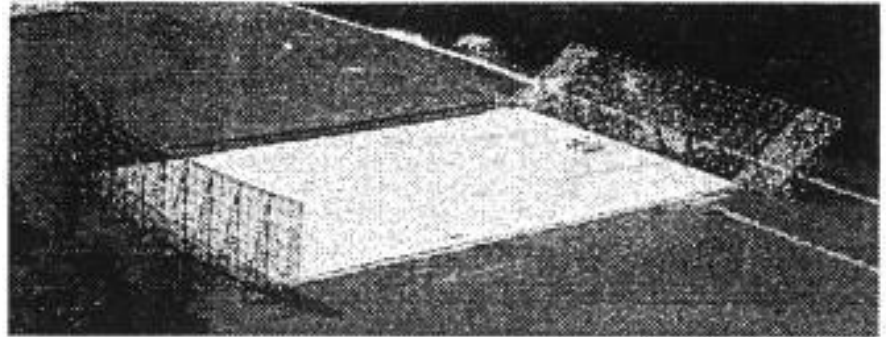




## NAAPO (North American AstroPhysical Observatory)

"Signals"  
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# SIGNALS



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## SUBSCRIPTION POLICY

As a result of publicity in SetiQuest and the WWW, we have begun to receive more inquiries about our efforts & the newsletter. For our new friends, we would like to spell out our *Signals* subscription policy once again. 10 yrs. ago we started a simple newsletter to keep the expanding group of volunteers informed of the happenings at the RO. Copy & mailing costs were donated. We continue to send *Signals* without charge to active volunteers, notable donors, friends of the SETI project and interested parties who request information. A minimum donation of \$25 (formerly used entirely to support the research, educational and facility maintenance goals of NAAPO – but now to also defray publishing & mail costs) will assure the name remains on the list for about a yr. To prevent unnecessary publishing costs, names of non-responsive readers are retired from the mail list on an irregular basis. As we try to continue supporting the SETI effort, donations of \$500 or more will ensure a newsletter subscription for the lifetime of NAAPO. If you have not supported our efforts materially and wish to continue to receive *SIGNALS*, please consider a substantial, tax deductible contribution to: NAAPO/OTTERBEIN; Dr. Philip E. Barnhart; Dep't. of Physics/Astronomy; Otterbein College; Westerville, OH 43081.

**ed. note:** Due to the increasing costs of copying and mailing *SIGNALS*, we will begin publishing every 2 months, beginning this volume.

## CHIEF OBSERVER'S REPORT

January 13, 1996

by Russ Childers

The survey continues... The declination is now -01 degrees, 20 minutes. Approximately 64 percent of the current survey is complete.

The telescope crossed the celestial equator at the time of the winter solstice. Thus, while **Big Ear** had a 12-hour day, the rest of us had the shortest day of the year. This is important for many reasons. First, the telescope split the maximum angle between the sun at its lowest and highest points in the sky. Second, geostationary satellites could be detected sending holiday greetings to all beings. Third, and most importantly, this cosmic coincidence allowed one to balance two eggs – one on top of the other – at Big Ear at the precise moment of the winter solstice. Wow!

The snow is about 18 inches deep at the observing site. I would like to thank the groundskeeper from Perkins Observatory for plowing the snow from Big Ear's driveway. This person – whom I have never met – must have a heart of gold. The drive is very long (about 1/4 mile) and is not easy to find under the snow. I have been saved many a long walk.

The **SERENDIP** observing program has been suspended while hardware is being configured. Bill Brown, the graduate student working with Prof. Klein, has reported that part of his equipment is being re-claimed by the University. He is now constructing his own hardware.

This is the time of year when I bring my three turtles to Big Ear to hibernate. For the past three years, I have kept my Mississippi Red Eared Sliders in a 50 degree F room for 2 months during winter. Herpeteculturists (as turtle experts are called) recommend that these turtles are more likely to mate when they come out of hibernation. So far, I have not been blessed with clutches of baby turtles, despite all my efforts. It could be that they are not yet mature enough to, well... you know. Apparently, females can bear offspring after they are four or five years old, which is at least how old my one female turtle is. If all goes as planned, she should lay her eggs in late May, and continue through the summer. I can only hope that the hibernating turtles pick up good vibrations from the proximity of radio waves, and do not become radioactive. Perhaps this is the start of a breed of glow-in-the-dark turtles?

## **LOSS OF AL GOELZ FELT BY ALL**

**By: Phil Barnhart**

All of us on the Radio Observatory staff wish to extend our deepest sympathy and condolences to our fellow volunteer Marilyn McConnell-Goelz on her recent loss. Al Goelz was a local jazz musician who has performed in a variety of locations and groups.

Al suffered a massive heart attack in December. He will be missed by many in the central Ohio community.

## **COORDINATOR'S CORNER**

**By: Phil Barnhart**

### **A FABLE**

In a faraway kingdom where wisdom reigns, the problem of allocation of resources was raised on a regular basis. "Where is our wealth most effectively spent", is a question always before the Stewards of the Exchequer.

The King insisted the answers to the continually rising new problems is always more knowledge, not less. Therefore, among the highest priorities to support should be the increase of knowledge for the sake of knowledge: Education, Research, Curiosity. As the King grew old, the Stewards sought his council less and less. They decided that the guiding principle should be "spend our resources in order to increase resources. Do not waste it on knowledge we do not yet need".

Needless to say, the kingdom soon fell victim to too many people simply gathering money to raise more money and the great questions of society went unanswered. The people lost their desire to know and the kingdom disappeared.

There is a moral here, but the drive for greater riches blinds the moral seeker to see it.

## SATURDAY, 12/16/95 MEETING REPORT

By: Tom Hanson

Attending were: Phil Schumacher, Dave Schumacher (*one of Phil Schumacher's sons*), Ang Campanella, Don James, Dr. Dixon, Joe Mitchell, Steve Brown and Russ Childers.

Joe Mitchell brought a card for us to sign, in sympathy for the loss of Al Goelz. The signature of Herb Johnson was added as he had requested via email. Joe will forward the card to Marilyn McConnell-Goelz's home address.

While waiting for one or two expected attendees, we discussed Homenet, variations of the software, plans for the future, and problems running Homenet on Windows 95. Dr. Dixon subsequently posted a message pointing to a document which contained 99% of the solution.

Dr. Kingsley's new citizenship was applauded by everyone present, and Dr. Dixon explained that his offer of a free class was **\*\* not \*\*** on how to speak English Correctly. I failed to record the actual topic, and consider the wording too important to guess.

Dr. Dixon began the rotation of topics today with Joe Mitchell's report. Joe has been quietly accomplishing a variety of tasks with exceptional skill. In this paragraph, I would like to focus on the fine new Radio Observatory handout which Joe brought to the meeting. Anyone who would like to have a copy may request one from Joe via email or regular mail. The cover page includes two color scenes. The familiar postcard scene fills the center of the page, dating back to before the addition of the outside bays. The lower left hand corner is occupied by the *Great East-West Railroad* horn cart, and the **Big Ear** logo is centered at the top of the page. Inside page one includes Introduction, The Telescope, and The Program. Pages 3,4 and 5 comprise Dr. Dixon's article, "*A History of the Ohio SETI Program*". Page 6 contains a summary of the components of the telescope, with diagram. Topics include the Tilttable Flat Reflector, Parabolic Reflector, Aluminum Ground Plane, Feed Horns and Focus Room. Page 7 and 8 contain an excerpt from "*Cosmic Search*", Vol 1 No 1, by John Kraus. Page 9 includes "*A Brief History of SETI*" from the **SETI Institute**, and a brief article on "*The Future of the OSU Radio Observatory*", with mention of **ARGUS**. Page 10 is 2/3's blank, for mailing purposes. The top section contains a paragraph describing **NAAPO**, and campus addresses for

Dr. Barnhart and Dr. Dixon. This is certainly a handout of which Observatory members can be proud.

Don James has been keeping an eye on the battery in the crane, and he said that it is fine at this point. He went on to express concern for the condition of the truck battery, in which **NAAPO** invested during 1995, along with repair of the radiator. Don said he would check the truck battery after the meeting. Dr. Dixon reassured us that to the best of his knowledge, the electric heater in the garage is working, which should protect the battery and truck from sub-freezing temperatures.

Dr. Dixon informed us that there is progress in implementing a wireless computer network on campus, thanks to the support of a staff person who unfortunately is leaving. The architects have approved mounting of small antennas at the top of buildings on campus. Apparently these antennas will be hard to see in the first place, and they will be painted so as to blend in with their surroundings.

Steve Brown announced that, after spending a great deal of thought as to his report, he would limit it to the subject of the Hallway toilet, which is still working after Steve primed the wellwater pump two weeks ago.

Russ Childers expected to cross the threshold from positive declinations to negative on Thursday. He was planning to spend 48 hours at 1 degree, 20 minutes. Russ is hoping that his software will continue to run properly as negative declinations enter the system.

Raul Ordonez is a graduate student who came to Ohio State from his home in Latin America. Raul took an interest in the Observatory, and he did an extraordinary job of overcoming many obstacles, to record the output of four years of punched card reading on a CD-rom before the University pulled the plug forever on the card reading capability. We have not heard from Raul much since that time, because he has become totally immersed in his studies. However, Russ Childers contacted Raul to see if he might be willing to try to make a CD using backup tapes of data collected during the current survey. Russ provided 6 backup tapes of data, and Raul devoted an entire day to accomplishing the writing of 3 CDs of 2 tapes each. Raul has indicated that he cannot devote this amount of time in the future.

During the Saturday meeting, there was discussion of how other Volunteers might assist in preparing the backed up data for CD-rom writing. If the data could be staged

by other Volunteers, then Raul's expertise would be needed only for the actual CD-rom writing operation, and at that, only for the initial setup and launch.

## **THE CARD PROJECT LIVES!**

Joe Mitchell accepted responsibility for managing Phase II of the Card Project, which is intended to result in writing of a CD-rom of fully reconciled and annotated data from the Card Project. Joe has been quietly working on the first 150 boxes of reconciled data for a number of months, and Dr. Dixon accepted Joe's recommendation that the actual boxes be discarded, since the output diskettes are safely stored. Joe is moving soon, so eliminating the first 150 boxes at this time will save a great deal of work. Joe said that he was asked to return a VGA monitor to the Observatory, since a monitor in the focus room had failed. While Steve Brown said that Joe could have the monitor back, I am hoping the Observatory can find a way to avoid having to pull equipment away from Joe in the future. His leadership of Card Project Phase II is about to face the realities of married life, and I hope the Observatory can avoid adding any additional burden. The planned completion data for Phase II is to coincide with the closing of the **Big Ear** Observatory. During 1996, Volunteers will be asked to once again assist with the reconciliation process. I am interested in the possibility that Volunteers with CD-rom drives can assist with some aspects of the reconciliation process. It would be necessary to make additional copies of the Phase I CD. In addition, it would be necessary to provide Volunteers with the software to perform the automated and manual portions of reconciliation. Finally, a means of coordination of effort would be required. Theoretically, Volunteers with access to the CD-rom could be located anywhere on earth, and they could prepare a reconciled data set, for transmission back to Joe Mitchell, who would compare the result to the actual cards, and add notations before writing a diskette for input to the final CD.

## HAPPY BIRTHDAY FOR PIONEER

It's nice when your friends remember to call, especially when you're turning 30 and you're 31 million miles from home. Pioneer 6, a spacecraft launched on a journey through the solar system on Dec. 16, 1965, and expected to be long burned-out by now, got a slightly early happy birthday call today and answered back.

*"The signal is very solid, transmitting at 16 bits per second, which is not very fast (but) which is state of the art 30 years ago,"* said **Brooks McKinney** at spacecraft-builder TRW Inc. in Redondo Beach.

The call came from NASA's Ames Research Center in Mountain View, Calif, via a ground station in Australia.

*"It looks nominal. The spacecraft after 30 years is still ticking,"* said **David Lozier**, Pioneer flight director at Ames. Controllers expected to track the craft for about four hours.

The primary interest in the 140-pound spacecraft these days is its engineering value; *"how long the darn thing will last,"* as McKinney put it.

Designed to last just six months, Pioneer has now circled the sun more than 35 times, chalked up more than 18 billion miles and is NASA's oldest operating satellite, according to TRW.

The spacecraft is aging, however. Its solar cells have deteriorated and can now generate enough power to operate only two of its six instruments, a plasma analyzer and a cosmic ray detector. Those instruments would be turned on later today.

The decreased scientific value and limited availability of NASA's Deep Space Network tracking system allow Pioneer 6 officials to check up on it only twice a year.

The last contact, prior to today, was on July 29 when the spacecraft was 89 million miles from Earth.

*"It's just a matter of longevity,"* said Lozier, *"Just check in every six months, see if its still there."*



## **TUESDAY MEETING NOTES**

**By: Bob Dixon**

The meeting was sparsely attended, perhaps due to the bad weather. Bill Brown and I held forth by ourselves.

I left a good book for review by Steve Brown/Chuck Klein; it is about Fourier Beamforming. I have it checked out of the library, and suggest we buy a copy.

Also found a note for Steve B. in the mailbox, now left in 805.

Bill reports his observations are temporarily on hold, pending location of a 5vdc power supply.

We received a very nice Arizona Highways 1996 calendar from Motorola, as a result of our discussions with them about RFI from their satellites.

We received a Christmas card from the SETI foundation.

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### **SETIQuest: The Magazine of SETI and Bioastronomy** **SETIQuest Volume 2, Number 1 is now mailing!**

The following is a list of articles, reviews, and columns from our fifth issue (*Volume 2, Number 1*):

**POLYCHROMATIC SETI: THE COSMIC ARPEGGIO** by *Nathan Cohen*  
SETI scientist Nathan "Chip" Cohen details his theories of how polychromatic techniques used to detect microwave signals may provide the best solution for dealing with the challenges posed by the multipath effect created by the interstellar medium.

**ASTEROID SEARCH LEAKAGE RADIATION AND SETI** by *Carl Helmers*  
Carl Helmers, SETIQuest's Editorial Director, takes an indepth [...] provides theories on how current and future technology designed to search for hazardous, planet-threatening asteroids and comets might benefit SETI.

**AN APPRECIATION OF BARNEY OLIVER** by *Nathan Cohen*  
Chip Cohen shares some history, personal experiences, and insights into the life of Barney Oliver — the famous SETI pioneer, prolific inventor, and Hewlett-Packard

executive who passed away on Thanksgiving Day, November 23, 1995.

**SETIQuest MERGES ONTO THE INFORMATION SUPER-HIGHWAY** by

*Tim Walsh*

SETIQuest has a new Webpage! (<http://www.setiquest.com>)

**OPTICAL SETI CONFERENCE** by *Dr. Stuart Kingsley*

Dr. Kingsley chairs the Second International Conference on Optical SETI at Photonics West '96 on January 31 - February 1, 1996.

**THE DRAKE EQUATION: AN OVERVIEW** by *Alfred A. Aburto, Jr.*

Although originally written 35 years ago to determine the probability of life elsewhere in the Cosmos, Alfred Aburto explains why Frank Drake's famous equation continues to be both used and debated today by many SETI scientists.

**UP AND RUNNING AT 4 GHz: THE SETI-CAPABLE BAMBI RADIO TELESCOPE** by *Bob Lash and Mike Fremont*

Personal experiences, details, and a parts list for building a sensitive, 4-gigahertz BAMBI (*Bob and Mike's Big Investment*) radio telescope.

**SETI RESEARCHERS TO GATHER FOR SYMPOSIUM AT AAAS** by *Dr.*

*Lori Marino*

SETI is well represented at the upcoming AAAS (*American Association for the Advancement of Science*) annual meeting in Baltimore, Maryland on February 11, 1996. Dr. Frank Drake, Dr. Kent Cullers, Dr. Paul Horowitz and other SETI experts will present papers.

This issue also offers a sneak preview of the upcoming report on **Project BETA** (*Billion-channel Extraterrestrial Assay*) located in Harvard, Massachusetts. BETA was developed by a team headed by Dr. Paul Horowitz at Harvard University with funding provided by The Planetary Society. It went into operation on October 30, 1995.

Publications Watch in the V2N1 issue includes a review of the book "*Big Ear Two: Listening for Other Worlds*" by John Kraus. We also present a variety of SETI-related articles from journals such as Ad Astra, Astronomy, Final Frontier, Scientific American, and many others.

SETIQuest is a quarterly journal dedicated to **SETI** and bioastronomy. One-year subscriptions are \$29, and a two-year subscription is only \$54. Send inquiries to:

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## **SATURDAY 1/6/96 MEETING NOTES**

**By: Tom Hanson**

This report starts at 10:30. Since the parking lot was full when I arrived, I allowed myself to be misled by four wheel drive vehicle tracks into thinking the focus room parking lot was also cleared. Unfortunately, that was not the case, and I got stuck trying to turn around.

Dr. Dixon's opening monolog was coming to an end, with discussion of the question of finding funding for the several trips he would like to make on behalf of **Big Ear** and **Argus**.

Attending today's meeting were: Dr. Dixon, Dr. Barnhart, Earl Phillips, Ang Campanella, Cindy Brooman, Steve Brown, Bill Brown, Joe Mitchell, Russ Childers, Al Horton, Jerry Ehman and Dan Fleisch.

Dr. Barnhart began the circle of reports with Bill Brown. Bill is looking for a 5 volt power supply, and there were several suggestions of available supplies in stock at the Observatory site. Al Horton agreed to assist Bill in locating one of them. The power supply will be used in connection with the Serendip equipment.

Joe Mitchell brought a stack of the latest "*Signals*" and 100 more of the new **Big Ear** Handouts. Joe said he had found Marilyn McConnell-Goelz' home address, and had mailed the card signed at the last meeting.

Russ Childers announced that the antenna is collecting from -1 degree, 0 minutes.

There was no mention of crashing programs or outlandish data items, so Russ' code must be working properly in the negative regime. Russ then asked for our consideration of a minor problem. The Colorado Tape Backup device which was purchased in order to preserve data being collected on the Lobes PC turns out to be inadequate for the intended purpose. It is too slow, and it requires the attention of an operator throughout the backup period. Worst of all, observing cannot take place during the backup activity. Several alternatives were offered, and Russ will research them. It is possible the tape backup device can continue to provide valuable backup service, if a way can be found to move the critical data to another PC, so the backup can be run there.

Al Horton is back in good health, and he is working at *CompuServe*. He was welcomed back by all.

Dan Fleisch gave us two items today. At work, he has been working on a new antenna design for radar applications, and he believes there may be some useful similarities to the Argus concept. He is exploring the possibility the new design might provide general aviation with greater resolution in radar display. An interesting difference between the scenario Dan described and the 'traditional' Argus concept, is that in the radar application, it should be possible to analyze the echo at different antenna elements separately, due to the uniformity of the transmitted radar pulse. This would reduce processing requirements. As a volunteer activity, Dan has agreed to try to assist an historical society in the Cincinnati area in locating a section of pre-Civil War railroad which is believed to be intact. Apparently there was a tunnel building project underway prior to the war, and the work train used to move material out of the tunnel was sealed in when the entrance was blown closed. The discovery of underground objects with radar is exceptionally difficult, according to Dan, so he asked for any ideas which Radobs members might have to assist in the effort. A previous attempt to use magnetic principles was abandoned, after a backhoe was brought in without success, and neighbors objected. Unfortunately, some of the volunteer efforts will be made on the 1st and 3rd Saturdays of future months.

Cindy Brooman is continuing to develop her World Wide Web service. She has removed the distinctive Holiday Decorations display, so anyone who missed that will have to wait until next year to see what may appear.

Ang Campanella brought up issues relating to *Magnus*, *Eudora*, *Homenet*, the new telephone numbers and triggered a general discussion of these and related topics. Dr.

Dixon told us to expect *Magnus* to phase out forever at the end of 1997. We can continue to use the Magnus email address for some time, but we should convert to the Postbox format at convenient times. Ang brought up the **Radobs Home Page**, which shows the famous Russ Childers/Tom Van Horne gas cloud, captured in its massive swirling activity by the **Big Ear** camera. There is no text to explain what viewers are seeing, and suggestions were offered to enhance the display. A suggestion of posting the coordinates of the gas cloud led to another suggestion, of trying to relate the cloud to nearby constellations in addition to providing coordinates.

Earl Phillips has taken a new job which does not require Saturday duty. This was the first meeting he has been able to attend for some time, due to his Saturday assignment.

Steve Brown reported he had been up late last night.

With a little arm twisting, we were able to persuade Dr. Barnhart to say a few words about his recent exotic trip via luxury liner, via the Panama Canal, from the East coast to the West, including stops in various Latin American countries. As a reminder for those who may have missed previous reports, Dr. Barnhart was approached by a cruise line some time ago, in hopes he would agree to provide lectures on Astronomy for the passengers on a luxury cruise. Upon his retirement from a full teaching career, he and Esther decided to give the line a call. The line provided a room and food, but the Barnharts were responsible for transportation to and from the docks, for gratuities for the stewardess and waiter assigned to them, and for their bar bill. "A glorious Way to Celebrate Retirement" was Dr. Barnhart's opening remark, as he gave us a thumbnail sketch of his several weeks adventure with Esther. Item: the food! An Austrian chef managed the ship's cuisine, and he was assisted by 36 assistant chefs. Each guest on board was attended by an individual stewardess and waiter. Item: the food! there is too much detail to offer here, but there was an 11 PM buffet which took care of anyone's needs until breakfast. Esther and Dr. Barnhart were bumped up a notch in their accommodations, so they had a 'large' porthole and generous space in their stateroom, which normally goes for just under **\$8K**. A number of employees on cruise liners apparently take this duty to improve their English. The Barnharts were served by a Swedish stewardess and a Turkish Waiter, each of whom engaged their clients in idiomatic expressions at every opportunity. Dr. Barnhart was responsible for giving four lectures, and for leading stargazing efforts from the deck of the ship. Unfortunately, it turned out that the

Cunard line kept lights on throughout the night, and the only viewing platform of any value was directly under the Bridge, where the 25 knot breeze tended to ward off star gazers. More disappointing than the light pollution, however, was the unwanted presence of cloud cover and just plain \*\* rain \*\* in Panama. In Costa Rica the Barnharts joined a tour group which journeyed to the top of a NOT-inactive volcano, from which it was said the observer could see both the Caribbean Sea and the Pacific Ocean. Unfortunately, it turned out that the top of the volcano was right at the level of a permanent cloud layer, so no one could see anything. In Acapulco, the dynamic duo was 'pleasantly fleeced', and I encourage attendees of future Radobs events to ask for a recounting of this adventure. It was pointed out that 40 years ago there was almost no one in Acapulco, and now there are 4 million people, all evidence of the steady tourist trade. There are 382 pictures and a few noteworthy bedraggled postcards which attendees of future Radobs events may have an opportunity to see.

Following the meeting, a band of hearty Radobs Volunteers gave a mighty shove, and put my wagon back on the four wheel drive vehicle track, upon which I successfully backed up to escape the drifts of the Blizzard of 1996 (phase 1). Many thanks to one and all.

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Designed by Jerry Ehman

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