



## NAAPO (North American AstroPhysical Observatory)

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## **PERKINS OBSERVATORIES THREATENED**

In what may very well portend the beginning of the end for Perkins Optical Observatory, yet another auto dealership has been allowed to build near the observatory. The newest one, Quality Chevrolet, owned by **Carl Nourse**, president of QNP Corporation, may begin construction by mid-August. The Cadillac & Chevrolet dealership will go in at the patch of land directly across from the intersection of Cheshire Road and US Highway 23, just south of Chapman Road. There is also a new dealership trying to go in at Stratford Road and US Highway 23 just south of the new Toyota dealership by the State Police station.

**Nourse's** dealership was allowed in despite much public opposition to the dealership. The area that the dealership is to go in was zoned as FR-1, farm/residential. **Carl Nourse** applied for a rezoning to Planned Commercial very shortly after Liberty Township changed their zoning regulations to allow for new lighting restrictions, among others. The Liberty Township Zoning Committee held a series of public meetings where they heard from numerous residents of that area, as well as a cadre of amateur and professional astronomers representing Perkins Observatory.

The residents' concerns were varied. First and foremost among their worries was that of safety. They reasoned that if a dealership was allowed in here, the increase in traffic along the already overused country roads due to the test-driving of new cars would be translated into an increase in danger to the residents and their children.

Another concern for the residents was one of aesthetics. They felt that if the dealership was allowed in, others would soon follow, and the increase in commercialization of the area would result in the loss of the country atmosphere of the area. Many residents stated this to be a prime reason for their moving into the area.

A third issue of contention among the residents was the deviation from the township's "Master Plan" for use of Liberty Township's land this deviance of zoning would represent. It was pointed out that the township had just spent approximately \$50,000 on a study to determine the best possible use of the township's land. Calling it the "Comprehensive Plan", the study listed this area as residential.

Chief among the astronomer's concerns were, of course, light pollution. It was pointed out that a dealership in this proximity to the observatory would render the observatory useless due to the severe lighting inherent to auto dealerships.

After everyone had the opportunity to speak their mind, the Zoning Committee wisely voted 3-1 against the application. When the issue came before the Liberty Township Trustees, however, it rapidly became a different situation. In a short series of public meetings regarding the matter, the applicant presented an entirely different proposal to the Trustees. The redrawn proposal called for different architecture in their building with more attention paid to aesthetics. Additionally, the applicant promised a 12 acre buffer zone of land to the township, pending approval of their application.

The changes and promises seemed to turn the tide against the residents and astronomers, for the Trustees voted unanimously to approve the application, while imposing some restrictions on the applicant. The Trustees also voted unanimously to change the record to reflect that their Zoning Committee recommended to approve the application, with restrictions. The restrictions include the closing of the dealership at 8pm, with all but security lighting shut off. The security lights are to be restricted to his one building and one pole lamp not to exceed 30 feet. All must be of the fully shielded cutoff type, pointing straight down. Additionally, he must deed over to the township the 12 acres to be dedicated as a no build site, and plant Scotch or other type pine trees around the building to soften the direct lighting that may affect the residents. Additionally, the Ohio Department of Natural Resources has agreed to donate indigenous hardwoods and the labor to plant them around the building.

Though these restrictions may soften the affect the dealership will have on the observatory, it clearly sets a dangerous precedent for other developers, who may feel it's a bit easier to get into the area now. There is currently in the works by the residents an effort to bring this issue to referendum, then a ballot vote. Having 30 days in which to gather enough signatures, a group of residents, marshalled by **Mr. and Mrs. Day**, residents of the area, have already begun the signature gathering. They have also spoken to attorneys regarding the language of a referendum, and met with other citizen's groups who have successfully brought issues to referendum previously in Liberty Township. Should the effort succeed, area residents will have the opportunity to vote down the approval in special ballot.

There is also currently in the works an effort to ask the rest of the surrounding local governments to include lighting restrictions in their zoning codes. One of them, Berlin Township, will hold a series of meetings to hear public opinion regarding changes to their zoning regulations, beginning July 31st. **Earl Phillips, Jr**, a local amateur deeply involved with Perkins Observatory, will spearhead the effort to introduce lighting restrictions to the surrounding local governments. Assistance is needed, in the form of attendance at the public meetings, to voice your opinion regarding the necessity of such lighting restrictions. Letters to the various government's Trustees could also give a positive boost to the effort. Such letters could be mailed to **Earl Phillips**, in case you didn't wish to mail them directly to the Trustees, and he'll read them into the public records of any public meetings he attends.

Increased development of the area will also have a dramatic affect on the radio observatory, in the way of increasing RFI, or radio frequency interference. The increase in traffic alone will be picked up by the radio telescope, raising the threshold of continuum noise the telescope must deal with. Other, more narrow band RFI is sure to influence the radio scope as well.

Though commercial development may be inevitable, a point frequently brought up by the Liberty Township Trustees during their meetings, must it come at the cost of science? In these days of overbooked observatories, why must we make it easy for developers to seriously affect them? And as for radio observatories, the range of frequencies that radio astronomers have available shrinks every year with increasing frequencies being leased by the FCC for commercial use. Add to this the RFI allowed near existing radio installations, and radio astronomy is pushed out. The NRAO, with it's radio protected area in West Virginia, is proof of the need for radio protection.

The closing of the 100 inch telescope at Mt. Wilson, as well as many others all around the country, is certainly glaring proof of the need to protect optical observatories. When will government, local and federal alike, see the handwriting on the wall, and start helping, rather than hindering, astronomy? The one science that deals with the ultimate question, the fate of the universe, is in trouble, both locally and world-wide. This is just the local manifestation of that trouble, lest we feel too far removed from it. If you've had enough, get involved. Attend meetings. It's up to all of us.

## COORDINATORS CORNER

We welcome a new participant in the newsletter field as a NAAPO volunteer. **Paul Hurm** in Hamilton, Ohio has agreed to put the newsletter in photocopy form so that we can run it off here with good clean copy. This issue is the first one he has composed for us.

We all welcome comments and suggestions from all our readers. We will see the criticisms get to the appropriate parties and the praise will appear in the next copy of SIGNALS.

**Earl Phillips** will continue to crank out the copy and select the material for **Paul** to compose and print out. There will be opportunity to send **Paul** a supply of filler material to use in composing each issue. He will also be encouraged to do editorial work as he sees fit. Feel free to send material of all sorts to us for possible inclusion in SIGNALS. We are again striving to get this document on a monthly basis.

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My apologies again for minor slips on the mailing list. Having lost the volunteer 'Keeper of the List' I have had some difficulty in identifying the current list. As a result some of us are not getting the latest issues.

My standard summer appeal remains: If you are not reading this let me know so I may get your name back onto the mailing list. On the other hand, should you be reading this after telling me to remove you from the mailing list, let me know.

**P. E. Barnhart**

## MEETING NOTES FOR JULY 6, 1991

The meeting began at roughly 10:10am. Those in attendance were **Dixon, Janis, Barnhart, Schumacher, Phillips, Brown, and Childers**.

Dixon reports he is feeling better since his foot surgery. He has sent the proposal to NASA, and hasn't heard from them yet. He states he is going to a joint USA/USSR SETI conference on August 3-9 in Santa Cruz, Ca. He and **Chuck Klein** will author a paper on the KL transform for the conference.

**Brown** reports that he has repaired the focus room A/C. There was too much coolant in it, which brought the pressure too high. He also hooked up the Lonc signal squirter for testing, and it seems fine. He has found an address to the manufacturer of the Marksman chart recorder, and will contact them for information on repairing ours correctly. He has been familiarizing himself with the 11/23. Since **Jim Bolinger** has expressed an interest in volunteering his services again, he will be able to help **Steve** with learning the 11/23s.

Arrangements were then made to pick up the 11/23 that Houseman Steel wants to donate.

**Childers** reports that he has gotten his SETI software operational and picking up RFI; he's collecting data on it now. **Phillips** will try to identify some of the RFI sources.

**Childers** reports that there is a window out in the garage that needs repair.

**Barnhart** brought a group of teachers for a tour, so the meeting broke at roughly 11:30, with most attending the tour.

## MEETING NOTES FOR JULY 20, 1991

The meeting began at roughly 10am. Those in attendance were **Dixon, Phillips, Bollinger, Barnhart, Schumacher, Leeseberg and VanCleaf**.

**Barnhart** reports that the dealership that applied for a change in the Liberty Township zoning regulations to allow him in across the road from the observatory has won his bid. He may begin building by mid-August. (ed. note: see page one ([i. e., above](#)) for related story).

**Barnhart** has a few more of the teachers here for a tour, left over from the last meeting.

**Dixon** reports that we have been offered a VAX 11/750, which is fully operational. He'd like to acquire it for Dreese Labs, so arrangements were made to pick it up and transfer it to Dreese.

**VanCleaf** mentioned that he has some VMS-OS experience, and volunteered to

assist in setting up the 11/750, and help **Steve Brown** with learning the 11/23s here at the focus room.

**Dixon** also reports that **Chuck Klein** has been busy on the upgrade study, and **Dr. Kraus** has determined that we can resurface the flat and parabola surfaces at a not too unreasonable cost.

**Dixon** reports that there is a security problem with MAGNUS; it seems someone is attempting to acquire people's passwords in order to wreak havoc on the system. Users of MAGNUS with what may be easily guessable passwords are urged to change them immediately. There will be more security measures implemented at OSU regarding their computers in the future, rendering them virtually impenetrable to hackers.

NASA has announced that they will provide funding to small businesses that develop technology useful to their SETI program. **Leeseberg** reports that he has been asked to write an article on SETI in general, and the RO's involvement in specific, for the "*Satellite Operators*" journal.

The meeting broke at roughly 11:30am.

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## **GLEANINGS FROM THE E-MAIL BAG**

From: klein@magnus.acs.ohio-state.edu (**Charles A Klein**)  
Subject: KL Transform.

I made a small piece of progress on the KL transform. By looking at the continuous version of the KL transform, I felt that some insight could be gained on the nature of the eigenfunctions and therefore, insight on the eigenvectors of the discrete form. Numerically we've seen curves that look like sinusoids coming out of the transform and a natural question would be when sinusoids are eigenfunctions. This morning I was able to prove that if the signal is a pure sinusoid, then that sinusoid is a eigenfunction, which is what we expected but had never seen before analytically. I'm hoping that the same techniques can be used to see if for the same signal that the cosine is also an eigenfunction. Also it should show whether if the signal is a sum of sinusoids, that the individual sinusoids are still the eigenfunctions. This seems unlikely because then the KL transform would be a simple Fourier analysis.

## Chuck Klein

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From: klein@magnus.acs.ohio-state.edu (**Charles A Klein**)

Subject: KL Transform

I've done a few more pages of integrals and have more properties of the KL Transform. Specifically what I'm looking at the eigenfunctions of a continuous version of the procedure of multiplying the autocorrelation matrix with a vector. I'm not sure yet how close this the KL transform itself. So at this time I don't want to state conclusion in terms of the KL transform.

1. If the function being autocorrelated is a sinusoid, I can show that that sinusoid is an eigenfunction.
2. If the function being autocorrelated is a sine, then I can show that the cosine of the same frequency is also an eigenfunction.
3. If the function being autocorrelated is a sum of sinusoids that are harmonically related, then each sinusoid is an eigenfunction. (The surprise).
4. For case 3, in general the original sum of sinusoids is NOT an eigenfunction! The explanation of case 4 and the resolution of the paradox that KL would just be Fourier analysis is that the different sinusoids end up with different eigenvalues. This explains why numerically when I put a periodic but non-sinusoidal input into the procedure, I ended up with Fourier components. I'm not completely happy with this conclusion but it does explain several points. I still need to tie this to the official definition of the KL transform so I can say "The KL transform of this is that."

**Chuck Klein**

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From: klein@magnus.acs.ohio-state.edu (**Charles A Klein**)

Subject: KL Transform.

I've done some more work on the KL Transform and have some new results.

1. For the continuous case, suppose some signal causes a particular eigenfunction in the KL Transform. Now if white noise is added, I can prove that the original eigenfunction is still an eigenfunction. Basically this is true because the white noise is uncorrelated with the original signal and its autocorrelation is a dirac delta. It only adds to the diagonal elements and so its contribution is an identity operator. For the discrete matrix case this is only approximately true since the white noise will have some correlation with the signal.
2. I've read over the Jain Fast Klt paper and don't understand it but its conditions look too restrictive.
3. However, I have my own fast KLT transform! FFTs computational complexity grows as  $N \log N$  instead of  $N^2$ . If a few assumptions can be assumed, I think I have fast KLT that also grows as  $N \log N$ . Basically, it uses FFT in several key parts. Actually, it is not a full KLT but only the signal detection part, i.e., determining if there is a sufficiently large eigenvalue to indicate the presence of a signal. To make the KLT fast, all  $N^2$  processes must be reformulated. The first  $N^2$  process is doing the autocorrelation calculation. In the fast algorithm it is replaced by taking the FFT of the signal, replacing each element by its magnitude, and doing the inverse FFT. (Correlation in transform domain, is element by element product). The next part of the algorithm is taking a test vector and multiplying it by the Toeplitz autocorellation matrix successively. This is basically taking the max eigenvector component and allowing it to dominate in the multiplication process. One of the assumptions is that the number of multiplications can be fixed to something like 4 or 8 independent of matrix size. Normally matrix-vector multiplication is an  $N^2$  process but it can be seen that the Toeplitz matrix multiplication is really a correlation between two vectors. The first vector is the first column of the Toeplitz matrix appended with this column listed in the reverse order, and the second is the original vector appended with zeros. Because it is another correlation, it can be done with FFTs at an  $N \log N$  rate. Another assumption that must be checked is that the assumptions about band limited signals are met and the FFTs are valid. (I'm a little rusty on FFTs).
4. Last Saturday I talked to Phil Schumacher at the RO meeting and I've plotted some of his data (part of KLT4). Graphically I'm seeing something similar to what I saw in some of my own data, namely, that for signals less than noise, reliably catching the signal is still somewhat iffy. The small sample sizes we've both done so

far may incorrectly limit the KLT's ability to detect very small signals.

5. Next I plan to do some numerical work in MATLAB to test KLT vs. FFT's ability to detect small signals among noise. I'll also test fairly large samples and hopefully find more stable results with different noise samples.

**Chuck Klein**

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From: **Steve Janis** <sjanis@magnus.acs.ohio-state.edu>  
Subject: Signal Squirter.

I got the following message from **Russ Childers**:

From: rchilder@magnus.acs.ohio-state.edu  
Wed Jun 12 19:12:52  
To: sjanis@magnus.acs.ohio-state.edu  
Subject: Signal squirter sent.

I received a mail message from **William Lonc**, who took the signal squirter to do modifications on it. He says that he sent it back yesterday. Apparently, it has to go through customs, or something, but it should be at Port Columbus sometime soon. I'm not sure, but 805 Dreesse will probably get a call to pick it up. Could you arrange to retrieve it, since I'll be out of town 'till the 24th? Thanks.

**Russ**

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I have heard nothing from any shipping company, and the Customs Service says they don't get packages until the recipient has retrieved them from the shipping company. As you can see, Russ's message doesn't mention a shipper or to whom the package was addressed. Does anyone know anything about this?

**SJ**

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From: **Stephen B Brown** <sbbrown@magnus.acs.ohio-state.edu>  
Subject: Focus room A/C

The air-conditioning in the focus room wasn't running because of a blown fuse. I have replaced the fuse, and reset a couple of breakers, and it's working fine now. I will be up at the RO later today, and I'll post a follow-up tomorrow on the latest.

**Steve Brown N8HFI**

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From: **Bob\_Dixon@osu.edu**

Subject: My Progress

The operation went fine last Friday. Recovery has been slower than I expected, but to day I feel fine and last night I slept thru the night for the first time. There is a cast from toe to knee, and I cannot put any weight on that leg. The stitches come out next Thursday (week from today). Am on crutches now, and I have a new-found appreciation for the problems of handicapped people. I cannot negotiate more than 2 stairs, so crawled down the steps to my basement to send this. Hope I can make it back up again. I now plan to come to Baker starting next Monday, for at least partial days. I cannot drive, so my schedule will be controlled by when my wife goes and comes from her job. She will let me off and pick me up at the front door of Baker. I'll have to keep my foot elevated in my office, and won't be able to get to any meetings that take more than about 50 feet of walking. Am quite bored and stir crazy tired of this darn club on the end of my leg.

**Bob**

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From: **Earl W Phillips** <ephillip@magnus.acs.ohio-state.edu>

Subject: a wedding @ Perkins.

**Dr. Wing's** daughter is getting married this Saturday, 6/29, at Perkins observatory. As his guest list may be a bit larger than the parking lot in front of the observatory will hold, I told him that I would open the chains to the parking lots at the RO; the one by the office, the one at the garage, and the one in front of the focus room if he needs a few more spots. As we don't have a meeting this weekend, I didn't think it'd hurt anything. If there's some secret stuff going on, like a conversation with UFO's, someone will let me know before then, I hope.

Other than that... **Steve Brown**, how are things going at the RO? Has the A/C been repaired yet? If it's unrepairable by you, will **SJanis** call in someone to take care of it? Also, did we perform the shutdown procedures correctly? If not, would you give me/us a briefing at the next meeting, on the VERY off chance that I'll ever go in there again?

**-JR-**

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From: **Phillip Barnhart**

Subject: 11/23 from hausman now on site at ro.

**Steve Janis** and I picked up the 11/23 given to us by Hausman Steel on Goodale Blvd last Tuesday. With the kind help and key of **Russ Childers** we unloaded it beside the previous 11/23 with the two RL02 drives next to the screen room parts. We await expert advice before moving it or its compatriot to the focus room with the other two 11/23. Methinks we are overrun with PDP 11/23 things. I seem to have noise on the line. UGH!

**peb**

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From: **Phillip Barnhart**

Subject: Jones Middle School communications blockage.

Date: Thu, 11 Jul 1991 19:50:54 GMT

I got a call from **Steve Murdock** the other night. He is again stumped in trying to get in touch with PRIVATE.RADOBS by modem/computer. He tells me he gets the connection with Magnus, but his screen remains blank and he is unable to know what is going on. Can we, anyone, having the slightest inkling of what to do get him on line this summer?? He said he will be at the RO next meeting to paint the horn edge mounts as promised last February. Let us not miss this golden opportunity!!!! I have his phone number — but seem to have just misplaced it. Call me if you would like to make contact with him at the school to work out the bugs.

**peb**

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From: **Stephen B Brown**

Subject: news from the front

Date: Fri, 12 Jul 1991 19:10:44 GMT

Thursday, I ran through a dry run of a SYSGEN (called a PREPGEN) on the 11/23. This consists of running through the SYSGEN, answering all the questions, but not actually building an executable. The result is a saved answer file suitable for the next run at SYSGEN. This procedure took only a couple of hours and was pretty straight forward. For all the questions I was unsure about, I took my cue from the syssaved.cmd file on the current 11/23 system. There were a couple of discrepancies. The current system was apparently built with support for DD: (Dectape) devices — I took this out. There were discrepancies in the YL: (serial port) driver addresses. The list of addresses and interrupt vectors for the serial cards in the current syssaved.cmd file seemed incompatible with the hardware.

Before doing a real SYSGEN, I think I'll have to pull the cards out and check what addresses they are jumpered for. I only had enough RL01 disk packs to copy the first 2 (of 6) of the distribution disks. I'll need at least one more to do a SYSGEN. (Actually, it's probably not strictly necessary, but I want it for my peace of mind.) My mind would be very much more peaceful if I had about 10 more — enough to copy the whole distribution set, and extras to screw up with. There are many RL01 packs in the focus room at the RO. Most are old backups. I'm sure that some of them are redundant or so out-of-date that they are no longer valuable, but the labels are quite cryptic and I can't decipher them confidently enough to decide which ones can go. I need someone with more history than I have (I'm thinking of you, Bob) to look through them and make that decision. The same goes for the remaining RL01 packs in Dreese — I think I've already picked out all of the ones which obviously don't contain valuable data.

Moving on, does anyone know of a utility which will defragment the free space on a Files-11 disk? On our system, 512 blocks on DL1: are supposed to be reserved for a checkpoint file (i.e., swap space). The operating system requires that this space be contiguous on the disk. DL1: has plenty of free space (>2000 blocks) but the largest contiguous bunch is less than 500 blocks. (I removed as much as I could from DL1:, hoping to get enough off to get back a big chunk of free space, but no luck.) Consequently, we're now running with only 256 blocks of checkpoint space. I'm pretty sure I could accomplish the defragmentation with BRU or PIP, but doing it

that way would require (guess what!) an extra RL01 pack.

Lastly, I report the demise (by suicide) of an infant groundhog.

Doubtless unable to face up to a futile life as miserable, despicable vermin, it hurled its little body under the wheels of my car far too late for me to stop or swerve. It perished quickly, but probably painfully.

**Steve B.**

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Designed by Jerry Ehman

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