CENTRAL OKLAHOMA RADIO AMATEURS
COLLECTOR AND EMITTER

Volume 13
JANUARY 1988
Number 155

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SECOND CLASS MAIL Postmaster, see page 2

1 AERONAUTICAL CENTER ARC

MEETS: FIRST THURSDAY, FLIGHT STANDARDS BUILDING. FAA, SOUTH MACARTHUR 7:30 PM

PR	BOB PACE, WA5CJG	376-3569
VP		
S/T	JACK IHAN, WB5SVN	677-8537
EDITOR:	BOB PACE, WA5CJG	376-3569

2 CENTRAL OKLAHOMA VHF

MEETS: 10:00AM THIRD SATURDAY, RED CROSS 10TH & HUDSON (BACK DOOR) OKLA CITY

PR	JERRY METHORE, KD5IS	524-5080
VP	RICHARD GIMMEL, KA5TTH	721-3991
SE	JOE BUSNELL, K5JB	732-0676
TR	ELLARD FOSTER, W5KE	789-6702
EDITOR:	JOE BUSNELL, K5JB	732-0676

4 OK CITY AUTOPATCH

MEETS: 7:30PM, SALVATION ARMY, NW 50 & PENN

PR	GEORGE ADKINS, AD1B	722-0074
VP	DENNIS PATTERSON, WD5CSM	495-0769
SE	DAVID CAREM, KF5EB	
TR	MIKE CREWS, N5DDB	722-2638
EDITOR:	CHUCK WILHITE, K5NK	721-4926

5 OKLA UNIVERSITY ARC

MEETS: 7:30PM SECOND TUESDAY (SEP-MAY) 119 WILSON CENTER, 1334 S JENKINS

PR	FRANK DONALDSON, N5IQJ	329-4172
VP	JOHN WUSTENBERG, KE5N	325-2382
S/T	JIM GREENSHIELDS, WD5HPU	321-9981

6 ALTUS ASSOCIATION

MEETS: 7:30PM SECOND THURSDAY NORTH MAIN FIRE STATION (CD) ALTUS

S/T	MIKE SULLIVAN, N7DNU	477-2938
EDITOR:	MIKE SULLIVAN, N7DNU	477-2938

7 BICENTENNIAL(76er) ARC

MEETS: 7:30PM SECOND TUESDAY KIPS RESTAURANT, RENO & MERIDIAN

PR	DENNIS MUSSER, KA5GTM	524-4670
VP	DICK BAKER, WB5TMW	685-2867
S/T	JERRY SPROUL, N5AUH	354-0017
EDITOR:	JERRY SPROUL, N5AUH	354-0017

9 WHEATSTRAW ARC

MEETS: 2:30PM SECOND SUNDAY. LOCATION VARIES. SEE CLUB SECTION FOR DETAILS.

PR	RALPH WILDER, WA5PFK	(WATONGA)	623-5421
VP	TOM JOHNSON, N5IKM	(EL RENO)	262-5631
S/T	JOE GARLAND, WA5FLT	(CALUMET)	893-2660
EDITOR:	JAN KUEHN, N5JUT	(OKARCHE)	263-4480

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11 EDMOND AR SOCIETY

MEETS: ODD MONTHS, 3RD SUNDAY, 2:00PM EDMOND EOC. DINNER, EVEN MONTHS, 3RD FRIDAY.

PR	PHIL WOLFENBARGER, N5HIP	789-0681
VP	DEE MIZE, WD5FHR	341-6163
SE	GLORIEA GUINN, KB5BGM	341-3886
TR	EDITH VAUGHN, KA5YPW	348-2961
EDITOR:	DEE MIZE, WD5FHR	341-6163

12 QUARTER CENTURY W A

MEETS: QUARTERLY AT VARIOUS PLACES.
NET: 3855 KHZ SUNDAY AT 8:00AM.

CHM	ROBERT RUNYON, AA0D	373-1818
VCH	GENE NAILON, K5DLE	341-8289
S/T	HOWARD BAKER, W5AS	721-5453
EDITOR:	ROBERT RUNYON, AA0D	373-1818

13 KAY COUNTY ARC

MEETS: 7:00AM THIRD THURSDAY PIONEER DRIVE-IN BANK, PONCA CITY OK

PR	DAVE LAND, KD5FX	762-8616
VP	STEVE SCOTT, KA5S6K	762-0117
S/T	HARRY BEATTIE, WD5DPR	765-3862
EDITOR:	CHARLES NORTH, N5EYD	762-8136

14 CIMMARON ARS

MEETS: 7:39 PM SECOND TUESDAY WX5Y PLAYHOUSE, 827 S 13, FAIRVIEW

PR	RAY BARNES, AB5Z	274-3334
VP	LEO PEIL, WZ5H	886-2998
SE	NADINE PAINTON, N5FMH	764-3599
TR	DENNIS PAINTON, WK5V	764-3599
EDITOR:	JACK DAY, NN5I	227-3462

15 SOUTH CANADIAN ARS

MEETS: 9:30AM SECOND SATURDAY, RED CROSS BLDG NORTH OU CAMPUS. NORMAN

PR	ANDI WOLFE, WU5W	NONE
VP	DAVID MEDDERS, K5PL	360-4292
SE	DORINDA SKAGGS, A5IVA	799-6727
TR	MONTE BATEMAN, WB5RIX	329-7485
EDITOR:	DAVIS EGLE, KD5IT	321-7570

16 EDMOND AR CLUB

MEETS: 7:00PM SECOND MONDAY. SEE CLUB SECTION FOR LOCATION AND TYPE

PR	MARK NORTHCUTT, WD5DYI	755-4672
VP	BOB MOORE, KA5ETA	799-1765
S/T	KAY NORTHCUTT, WA5DYJ	755-4672
EDITOR:	MARK NORTHCUTT, WD5DYI	755-4672

17 OK CPM USER GROUP

MEETS: 7:30PM SECOND THURSDAY OSU, ROOM 307

PR	WILLIAM COOTER	360-2141
VP	JIM WHITE	364-5289
S/T	JOY MELTON	789-0280
EDITOR:	WILLIAM COOTER	360-2141

18 GREAT PLAINS ARC

MEETS: 7:30PM FIRST TUESDAY WOODWARD PUBLIC WORKS BLDG.

PR	WINDLE HATCHETT, WA5PLN(FT SUPPLY)	766-3561
VP	RON TICE, WB0PGD(MOORELAND)	994-2138
SE	ROD FORD, WB5OVT(GAGE)	923-7683
TR	FREIDA PATTERSON, N5EOX(WOWD)	256-2111
EDITOR:	LOIS FORD, N5JGQ(GAGE)	923-7683

19 OKLA INDEPENDENT ARC

MEETS: 7:00PM SECOND TUESDAY SOUTHWESTERN BELL OFFICES, PONCA CITY

PR	LIN JACKSON, KA5IJM	762-7299
VP	BRUCE LEFEBURE, KA5IKI	NONE
SEC	BIZ WICHY, WD0HCO	762-3297
TR	DAVE WHITE, WN5LUI	765-5707
EDITOR:	GLEN BISHOP, JR., KA5PUB	NONE

21 TRI-CITY ARC

MEETS: 1ST THURSDAY OF THE MONTH.
PLACE:

PR	ROBERT DOLTON, KA5RHU	379-2365
VP	RON PHILLIPS, WB5UPU	382-1856
S/T	J. B. BILLS, KE5MU	379-3992
	P.O. BOX 655, HOLDENVILLE OK 74848	
EDITOR:		

CENTRAL OKLA RADIO AMATEURS

MEETS: 7:30PM FOURTH TUESDAY. RED CROSS BLDG. 10 & HUDSON OKLA CITY (BACK DOOR)

PR	GARRY SKAGGS,	799-6727
VP	LEE WARD, N5HIR	789-0681
SE	YVONNE WARRINER, WB5TYW	379-3149
TR	MARK KLEINE, N5HIR	329-9285

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Club NEWS

VSLOW

Minutes of Club Meeting

The December meeting will be held the day after the C&E paste up so we will cover any monkey business that happens there in next month's C&E. It will be a Christmas lunch at the Bricks with a white elephant gift exchange. I suspect the January meeting will be a lunch on the third Saturday of the month (Jan. 16, 1988) also at the Bricks, 32nd and Portland. Gathering should start about 11:30 am.

Joe, K5JB, Sec'y

TCP/IP on Packet

There hasn't been much happening with the TCP/IP experiments during the last month. There are now four of us on the air with TCP/IP. Dave, WD5G, lives in Midwest City; Duane, KA5WRG, lives in Del City; and Mike N5GCM lives in Moore. (Last month I got the calls and locations all screwed up...sorry about that guys.) In addition to the telnet sessions (keyboard to keyboard) and ftp sessions (reading directories, sending and receiving files, etc.) we have succeeded in exchanging mail. Unfortunately, to make TCP/IP work the computers have to be on all the time and none of us do that. I wrote some utilities to free up mail that had been locked because of a failure to deliver but not much else has happened.

There is a new set of programs that are supposed to be available "real soon now" that will permit the regular AX.25 user access to a computer running IP. If this happens it will make a lot of difference on whether I leave mine on much. There really isn't much point in putting files on both the IP rig and the K5JB BBS (except maybe the binary ones that run on MS-DOS machines, and I prefer to give someone a disk and not have the stuff sent over the air. It is horribly inefficient).

For a refresher, here are those who have IP addresses:

*Bob, KA5MIZ	44.52.0.1 (1)
Joe, K5JB	44.52.0.2
Dave, WD5G	44.52.0.3
Duane, KA5WRG	44.52.0.4
Mike, N5GCM	44.52.0.5
K5JBToshi	44.52.0.6 (2)
*Dave, WB5FWE	44.52.0.8 (1)

Notes:
(1) Not on the air yet
(2) This is my Toshiba 1100 that is used for testing when there is nobody around to play.

If you get a yen to give it a shot, any of us can provide you with the programs to run IP but you must have an MS-DOS machine and a TNC that will run the KISS protocol. You won't be able to "pop up" on IP without an address assignment because the other machines won't work with you so call one of us and let us work you into our files. Bob, KA5MIZ, is our address assignor, and as you see, the number of us is so small that address assignment is not a big deal. We have started thinking about a logical assignment with blocks for different geographic areas so traffic can be routed by using "cluster addresses". We will probably do that long before there are enough stations using IP to make any difference.

See last month's article for a description of what TCP/IP is all about. Meanwhile I'll keep you posted.
Joe, K5JB

NET/ROM Meeting

(Larry, WA7UIB, spark plugged a netrom meeting and prepared these notes for your information. He sent them to me by, ahem, Packet Radio!)

On Saturday December 12, 1987 the Netrom meeting was called to order at 2 p.m. at Max Westheimer Terminal lounge. Everyone introduced themselves and told a little bit about the netrom node they had and a little bit about their site and equipment. We had several issues to tackle, so we got right down to business with Bill, WD5HJL, starting things off by explaining his recent UHF addition to the Netrom Network. Bill has been a firm believer in UHF trunking since the beginning, and from that spark of enthusiasm OKC2 was born recently. OKC2 is a Netrom node as the others are, including the Netrom eprom chip identified as WD5HJL-2, and having the alias of OKC2. This node is unique in that it is hardwired through the RS-232 port to OKC TNC. OKC & OKC2 communicate with at 9600 bauds. OKC2 radio link to real world of other nodes takes place on the UHF frequency of 446.775 providing they also have UHF trunking available.

The other 2 nodes that have this UHF link available at present are OU2 & OU3. OU2 transmits on 145.05 and OU3 is 446.775 only. So, we have a very nice crossband link to .05 via OU2. And, you can work that backwards and put your radio on 145.05 and connect to any of the nodes on 145.01 via UHF!
Steve N5KFN (CEDAR) advised that he only lacked crystals to have his UHF link operating. CEDAR will have a direct UHF link to OKC via OKC2. Both UHF sites are around the 350' level so we anticipate a solid path for this link.

After the current UHF backbone was discussed we looked at the total network scheme and took a poll to see who all would be able to go with UHF on their installation. Smitty, AC5C ELRO Sysop, told the group he didn't have a lot of height for his node and that the extra expense could not be justified at this time. So, he would be willing to be an intermediate NODE in the chain and put plan B in effect. (To be described later.) Next, Jerry, KG5AA, OKCY Sysop was approached on the subject. His feelings were similar to those of AC5C as well. He thought that his node could possibly be used in a better more effective situation, so it was decided that his Netrom chip and TNC would be used for a proposed new site and location in the Arbuckle mountains near Ardmore. Bill, WD5HJL the Sysop of OKC has access to a site there, so we decided that OKCY would expand its horizons by moving to the Arbuckle Mountain area. Of course its alias will change, but the call & SSID will stay the same. It was discussed at that time that if we were going to go to the expense of putting up a new node in a very effective location, then can we go ahead and put a UHF link on it as well? The vote was unanimous that we do. WJ5Y, Ron of WALAW then mentioned that he had the UHF radio needed for the project. It was then proposed that Arbuckles Node use Ron's radio and be a full blown crossband node. So, OKCY will be going off in the metro and resuming in the Arbuckles soon we hope.

It was then brought up that operators of PUR, located in Purcell, would now join the network with their digipeater. They had been waiting for the UHF trunk to go in so they could communicate in the network via UHF without bothering everyone on .01. Glen NF7T and others have been working on the project, so we will have that addition to our network as soon as they get their netrom chip ordered. Thanks to the Purcell bunch!

With these plans and solutions "In the pot" now, we approached the Question & Answer of "Can we now make .01 quieter, and a better place to enjoy our hobby?" It seemed that we were off to a pretty good start by OKC2, OU2, OU3, CEDAR, POND, and Arbuckles (proposed) all going with the UHF trunk. That didn't solve the internode layer communications problem or the routing updates on .01 (Very familiar to all by @@#%&&@@ on your screens all night), but it did cut things down drastically because the user QSO and initial connection between nodes was now all on UHF! So,

we still had a problem to solve. What was to be done about the nodes in the middle of the network that spent all their time sending these horrible characters to each other? Netrom is pretty versatile, and provisions were made to override automatic updates and routing. So, Larry, WA7UIB proposed all the intermediate nodes, excluding POND and WALAW, turn off their hourly route updates as well as their transmitted and receive node information. This will effectively inhibit the nodes from transmitting their information about node updates. Also, they will ignore any information received this way. This does not present a problem for the node as long as the Sysop enters manually the routes to other nodes and permanently locks these known paths in his node. With the chain that we have set up now there was no need to have them continuously updating each other anyway we felt. The question was brought up about whether or not these intermediate nodes needed to list the nodes that, for instance, WALAW or POND may have. We decided that they didn't need to. If one wants to talk to Kansas then he can connect to POND through any one of the other nodes and he then will be able to see the nodes that POND has collected. We decided to leave POND with it update broadcasts turned on. So, you can still get new nodes added to the circuit and connect with them as normal. There is talk of Kansas Nodes going on too so POND will run as normal when they do. The same goes for WALAW down south. All of the NODES as we know them and see them will still look as normal and have the usual node list available. But, you will not see all the exotic Texas nodes that WALAW sees, as they will not be propagated through the circuit. Only WALAW will have that list available for you to see and use. All of this was hashed around a bit and was passed as being the way to go.

That was the final hurdle and everyone was happy. We sincerely hope that this will clean up .01 a bunch. We also would encourage all specialized groups in packet to meet together and organize their operations for the good of all on 145.01. That's what it will take to make a congested situation workable.

I would like to make special mention and thanks to the SYSOPS: N5KFN (Steve), AC5C (Smitty), KG5AA (Jerry), K5LGW (Jim), WB5FWE (Dave), WD5HJL (Bill) for all there help in this project. And also to NF7T (Glen) and the Purcell gang for the proposed PUR node with UHF trunk installed.

Please address any questions or comments to Larry, WA7UIB.

Packet Statistics

I acquired a really interesting set of computer programs over the last month and they have really succeeded in keeping me off the streets. They permit an operator with a well equipped station to capture a ton of information about packet activity and examine the performance in terms of data capacity, channel loading, etc. I captured a few evenings of packet brapps and have only scratched the surface as far as analyzing the results. I will share a few interesting graphs with you and discuss some preliminary conclusions I am drawing. But first, a little background.

At the Six ARRL Computer Networking Conference, held last August at Redondo Beach, CA, Skip Hansen, WB6YMH, and Harold Price, NK6K, presented a paper entitled "Performance Monitoring -or- I wanna fix it, is it broke?"

The basis of their paper was a discussion of packet radio performance. To quote partially from the paper, packet radio performance has heretofore been "...a subjective and non-detailed account usually limited to a gross statement of "goodness" or "badness", which is neither well documented nor long remembered. While there are several papers which describe the expected performance of CSMA-type systems, there is little actual data about the live amateur packet system."

They went on to discuss the need for accumulating performance data and describe work in progress to supply performance measurement software using computer and a TNC with KISS software.

Last month, the suite of programs was made available for others to take a crack at. In a nutshell, there is a program that is used to monitor packet activity and a set of programs used to analyze the results.

The programs include: STATS, which monitors output from a KISS TNC, displays activity on the screen and puts stats in LOG; REPORT, which reformats data from LOG file; TOTALS, which reformats data from LOG file; PTOTALS, which prints output from TOTALS program; and AVERAGE, which averages data from the REPORT program.

Incidentally, these programs come with full source code in Microsoft C. I have already taken advantage of this and made some modifications to look at things I was particularly curious about.

The STATS program reads packet radio frames as received and interpreted by the KISS TNC. Each frame is evaluated and information about the frame is summed in various counters. The results are saved in a log file, once every five minutes.

The log file contains, for every five minute interval, a summary record for each station pair (a circuit), each digipeater, and some other things in what is called a "frequency record". The information contains things like the time, station calls, total packets sent, details on types of packets sent, amount of data in the information packets and whether they are unique or duplicates caused by retrys. In all there are 32 different things that are accumulated about each pair of stations heard. It was necessary to modify the TNC hardware slightly to feed the modem DCD to the RS-232 DCD interface. This modification was not mandatory but enabled me to measure the percentage of time the TNC was detecting packets. I caught a couple of periods when the DCD was active 90% of the time (See figure 4.)

After a log is captured, the REPORT program is used to further summarize and combine the information in the log file. It is in a flat file format which is suitable for importing into Lotus 123 for further manipulation. The charts for this article were made that way.

The program TOTALS reads a log file and generates a file containing one record per station on the air, one record per digipeater, and one record giving totals of all packets and bytes heard on the frequency. The program, PTOTALS, is used to display the information output by TOTALS in a more readable form.

As an example of what information is extracted from the log, the information delivered by TOTALS includes:

```
D - Totals for each digipeater.
     call
     total bytes
     total packets

F - Totals for the frequency
     total packets
     total bytes
     unique packets
     unique bytes
     packets  32 bytes or less
     packets  64       "
     packets  128      "
     packets  256      "
     packets  greater than 256
     dcd on ticks
     dcd off ticks

S - totals for a station
     station call
      total rx bytes
     total rx unique data bytes
     total rx non-digi data bytes
```

Although there is a corresponding peak shortly after midnight, you can see that there is really no correlation between the gross numbers of retrys and frequency loading. The high numbers of retries logged at periods starting at 12:10, 1:16, 3:18 and between 4:08 and 4:50 were caused by bulletin boards using 3 or 4 digipeaters. One bulletin board pair generated 181 retried packets and the other generated 201! In these time periods there were only about half dozen retried packets from non-bbs stations though there were between 10 and 20 transmitters on during each of these four periods that were examined in detail.

Other time periods similarly showed a lack of correspondence between frequency loading and retrys. Figures 4, 5, and 6 show similar charts for the time period of December 8-9 from 8:00 p.m. to 5:45 am. Notice that there is almost no similarity in the shapes of Figures 5 and 6, indicating that even with 90% DCD on time the numbers of retries are not unusually high. The one peak, which occurred shortly after midnight, was caused by one station. A relatively inexperienced operator was trying a hopeless circuit and with persistence was able to generate 71 retried packets over a 10 minute period! Note that the DCD time on was a modest 35% during that time.

The reason Figures 4 through 6 are titled "Netrom Crash" is the spectacular lockup that occurred. I awakened about 2:30 with the sounds of the Toshi bleeping and squealing. It looked like it was being over-run by spurious stuff and the radio was a solid wall of packets. I stopped the stats program, renamed the log file, and restarted it with the screen output redirected to a second log-log file. After letting it run for 20 minutes I interrupted it, restarted the regular log and went back to bed.

The next day, I looked at the logs. At first I thought the problem with all the beeping was because data was just arriving too fast for the program to handle it but in cleaning the control characters out of the log I discovered that one of the netrom stations was sending weird stuff. Even it's call sign was corrupted. It was stirring three of the others up like a nest of hornets. They were sending control frames to each other like crazy, each one telling the other to disconnect from the skitzo netrom. The control frames were all properly numbered and occasionally my stats program interpreted the control frames to be saying "Choke"! What a gas. Beats getting out of bed to see Hally's comet!

I have not had the monitoring system on while activity was particularly heavy. I judge the activity by the amount of data captured in the computer buffer. Since the Net/roms have arrived, I have had to use up my lcall list (suplist to the Kantronics owners, I think) to hide the cussing from those things. That leaves me vulnerable to the BBS stuff. Therefore it is not unusual to capture 225K to 300K between 10 p.m. and 5 a.m. Fortunately it is easy to page through it with the word processor. I usually do it between fixing the coffee and starting the bacon. (retry, retry, retry, and its stuff I read three months ago...)

I have many more interesting charts but already this has gotten too big.

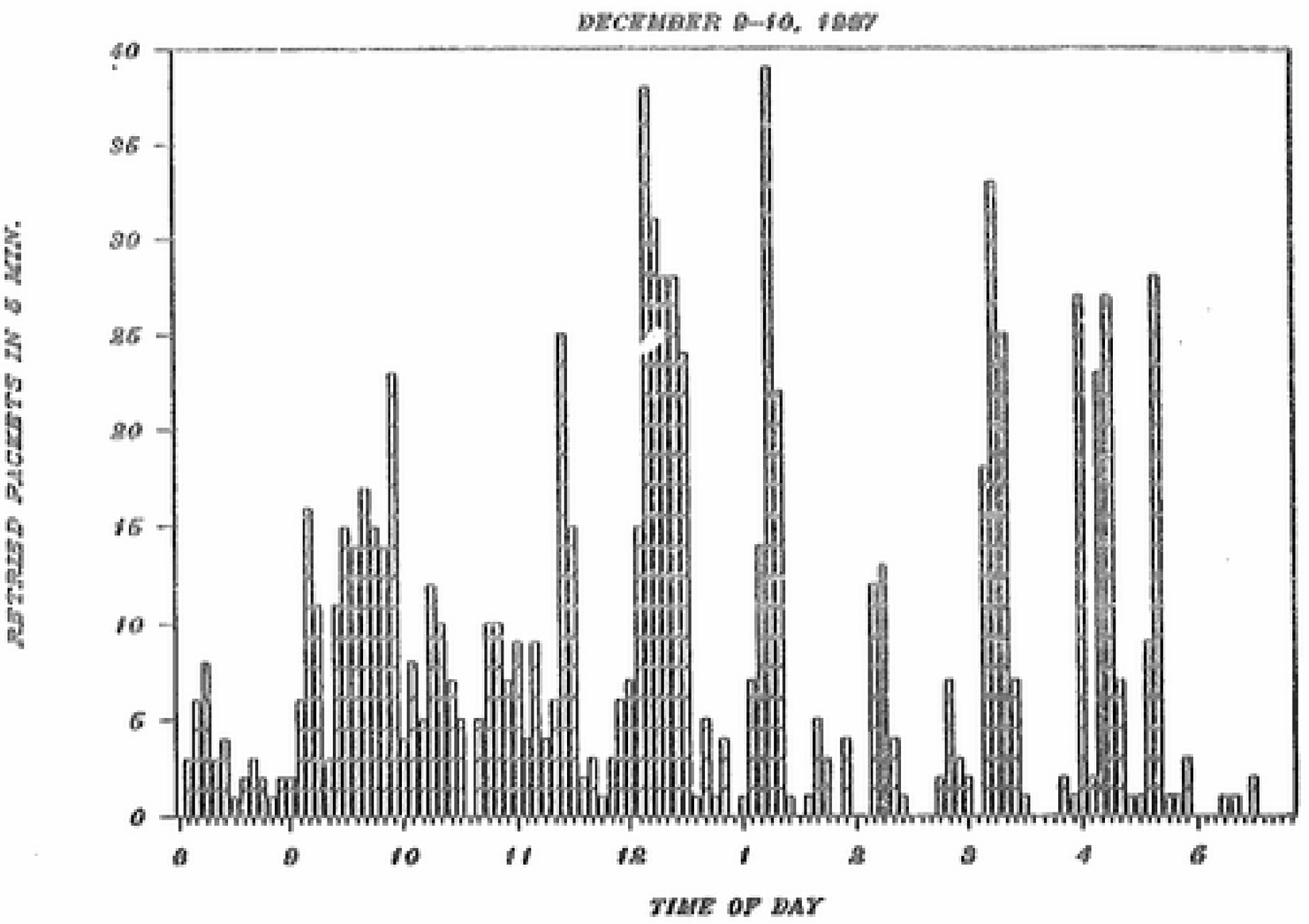

Figure 3. Retried Packets vs. Time of Day

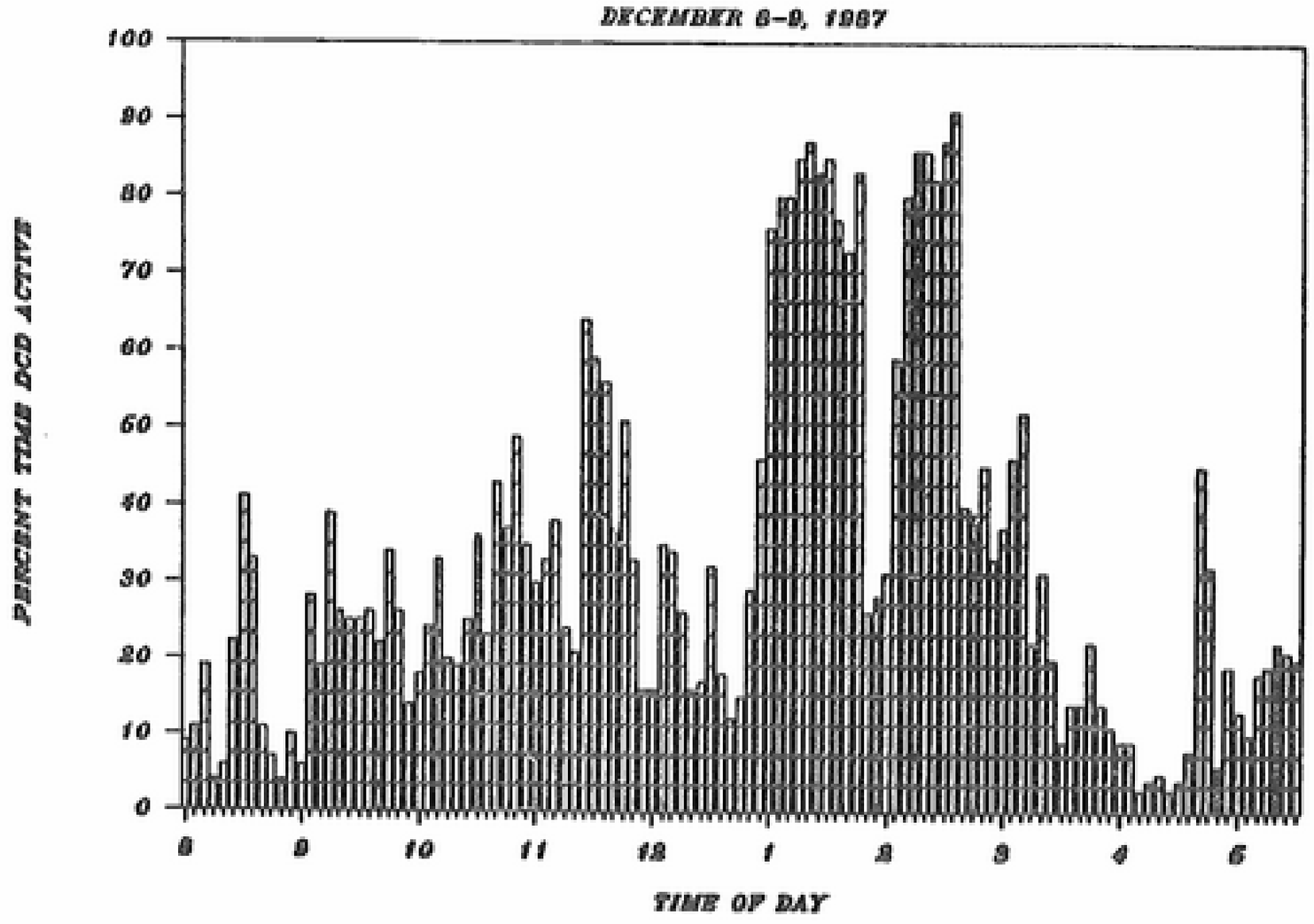

Figure 4. Percent Time DCD on vs. Time of day

total rx data bytes
total tx bytes
total tx unique data bytes
total tx non-digi data bytes
total tx data bytes

Harold and Skip designed this performance monitoring system to evaluate how efficiently the packet systems were moving information. I am a little more interested in how well it works from an individual's perspective. In other words, how fast is information transmitted and received once you hit the return key. I made some initial modifications to the methods used to determine retrys (thanks to the source code being available). This performance monitoring system is in its earliest infancy; there are a few bugs; and, there are bound to be improvements as it is fine tuned. I had a couple of periods when the computer was over-run by peculiar conditions and one station succeeded in generating packets that not only tilted the program but caused a spectular Net/Rom crash. More on that later.

However, it does a super job, for a first cut. I have spent hours looking at correlations: retrys v.s. percent Data Carrier Detect (DCD) active, polls v.s. DCD active, total bytes v.s. DCD active, etc. After spotting a difficult period, or an unusual set of circumstances from the graphs, I used the other programs to extract details so I could examine who was doing what to whom. What a gas!

I am not going to embarass anyone with the performance of specific stations but if you are interested in why your station seems to be taking forever to send or receive anything call me and we will examine possible causes of the problem. One conclusion I have already drawn is that high numbers of retrys do not correlate with high frequency loading. Sure, there are more collisions when there are more stations on the air, but the big numbers of retrys occur when certain stations are on frequency.

Seriously, there are a number of stations that typically have 35% or higher retry rate. I know they would be a lot happier if they were getting better performance than that. One high performance station that typically showed a high retry rate was trying to make long haul contacts through multiple digipeaters. He was experiencing the pitiful digipeater performance we have thoroughly examined in the past. More on this in a bit.

Well, let's look at the graphs. I selected two time periods to show you. One is a typical week night with non spectacular propagation conditions. I would judge it to be a fairly normal night from the amount of traffic captured in the buffer of the regular rig. In the first time period, logging started at 7:45 pm on December 9 (a Tuesday evening) and ended at 6:00 am the next morning. The maximum number of transmitters heard in any one five minute period was 35 around 10:20 pm. The peak activity periods, in terms of percent time a carrier was on the air (DCD active) were at about 10 pm and around 12:30 am. At these times the DCD was detecting carrier about 60% of the time. Figure 1 shows the percentage DCD active time and Figure 2 shows the number of different transmitters involved in circuits.

(During the three days that data was gathered for the Computer Conference paper, the peak number of active transmitters heard in a single five minute interval was 42. I didn't look through all my data to see if we beat that number, but I bet we did!

Figure 3 is the number of retried packets over the same interval.

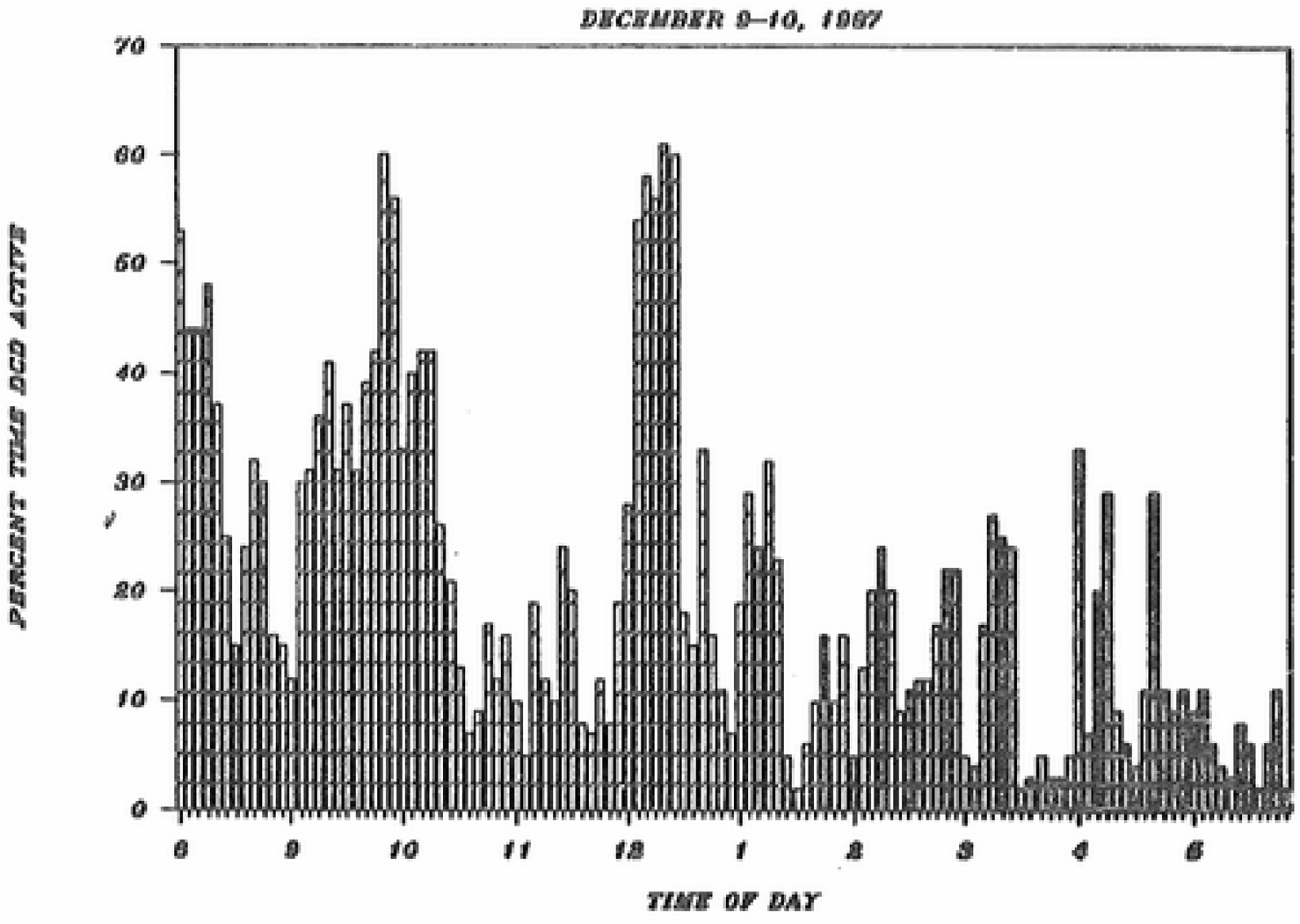

Figure 1. Percent time Data Carrier was Detected vs. Time

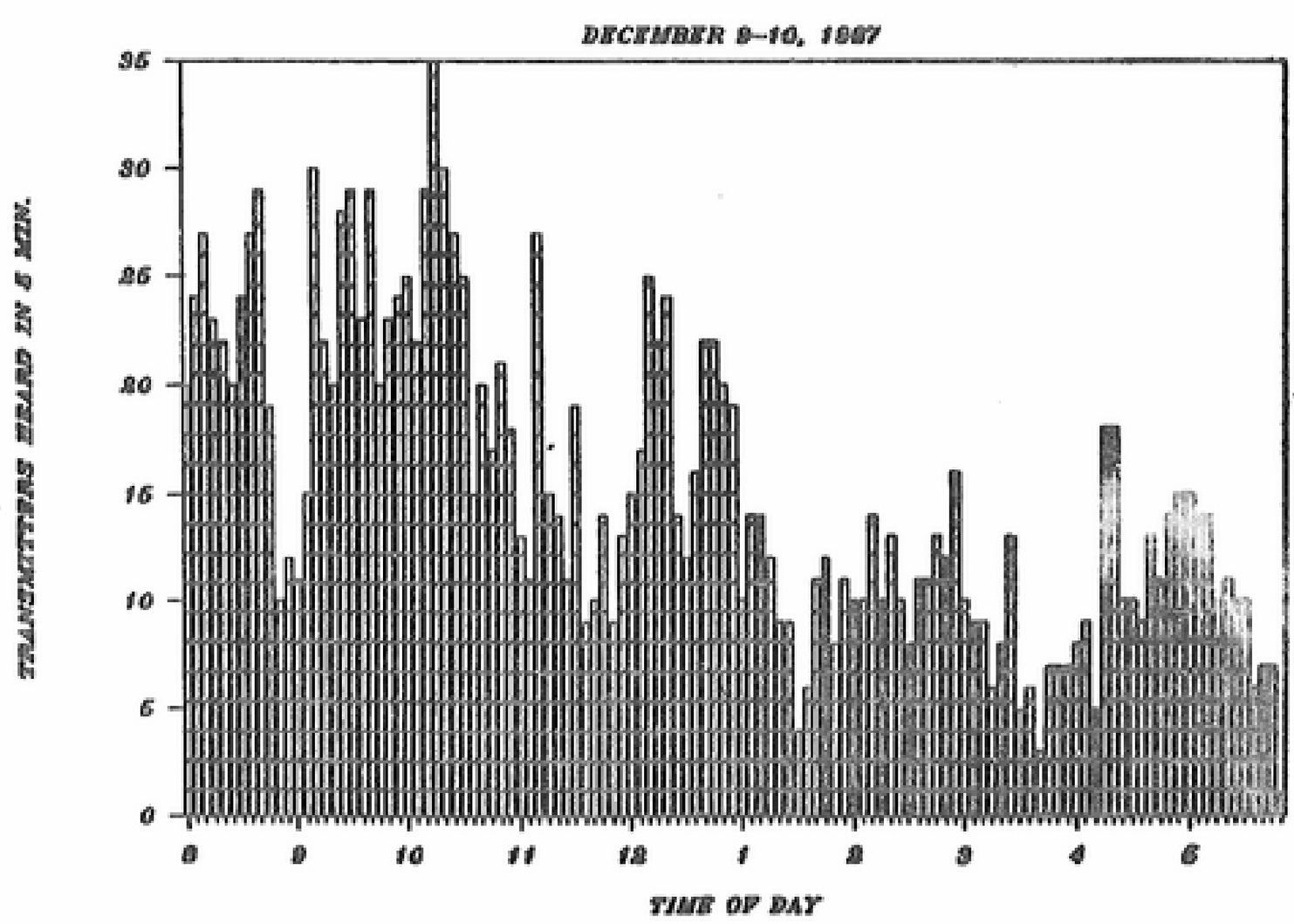

Figure 2. Transmitters on the Air

(Joe will skin me when he sees what I did during these austere times for the poor ole' C&E. I guess I'll find out what kind of nice guy he is after all!)

There are some limitations with the process of performance monitoring with this suite of programs. I already mentioned that it was designed for a particular purpose and I was interested in using it for a slightly different purpose. It was recommended that a computer with a hard disk be used for the logging but I used my Toshi with its 720K floppies. Since no one logging period was greater than maybe 7 hours, I was able to break the log files up into less than 200K lengths. For analysis, they were combined with the word processor and the time intervals I was interested in were carved out of the center of the thing. The Toshi is quick enough, with an 8 MHz 80C86, but the screen might be slow enough to cause some of the problem I experienced. I did use the Gucci computer with the hard disk to do the analysis since I needed simultaneous access to the files and the analysis programs. It was also handy to flip from word processor to 123 and back to check different things.

I think Skip and Harold did a heck of a good job with this suite of programs. If I was more of a C programmer I would take greater advantage of the availability of the source code. They indicated in the documentation that came with the programs that it was only a beginning. If so, I am eager to see what is coming next.

As far as a performance monitoring tool, it must be remembered that using the STATS program is, to a large extent, an exercise in comparing what I hear to what other stations are hearing. It does make some judgements and counts the circuit between an origination and destination if it hears a packet digipeated. The 71 retries I mentioned earlier were from WFORD and destined for a local station, with no digipeater. I probably don't hear WFORD more than 80% of the time so I undoubtedly missed hearing some retrys.

When the BBS is on here, the other rigs are desensitized so packets would be missed while someone is reading files. In a nutshell, the results are not perfectly bullet proof in quantative terms but they are sure a lot better than relying on subjective impressions (tinged with emotion, I might add).

As Harold and Skip stated at the outset in their conference paper, we will never know if our packet technology tweeking is doing any good if we don't use some kind of yard sticks to measure the performance results. I am already surprised that what I perceived to be retrys caused by collisfons are more likely retrys from hopeless RF circuits and improperly set up and operated stations. On re-reading the conference paper, I found that Harold and Skip came to the same conclusion.

After the Net/rom folks get their network organized, it will be interesting to compare the logs I made the last few weeks with a later time period. One real difficulty is in selecting a period (or rather happening to be on frequency during a period) that would be considered average. Packet activity swings from busy-busy to quiet-quiet and it is easy to make hasty generalizations. (...like the deal with the Indian wise men examining an elephant.)

Anyway, like I said, "Playing packet radio in the middle of the night is more fun than getting out of bed to look at Hally's comet!" Joe, K5JB

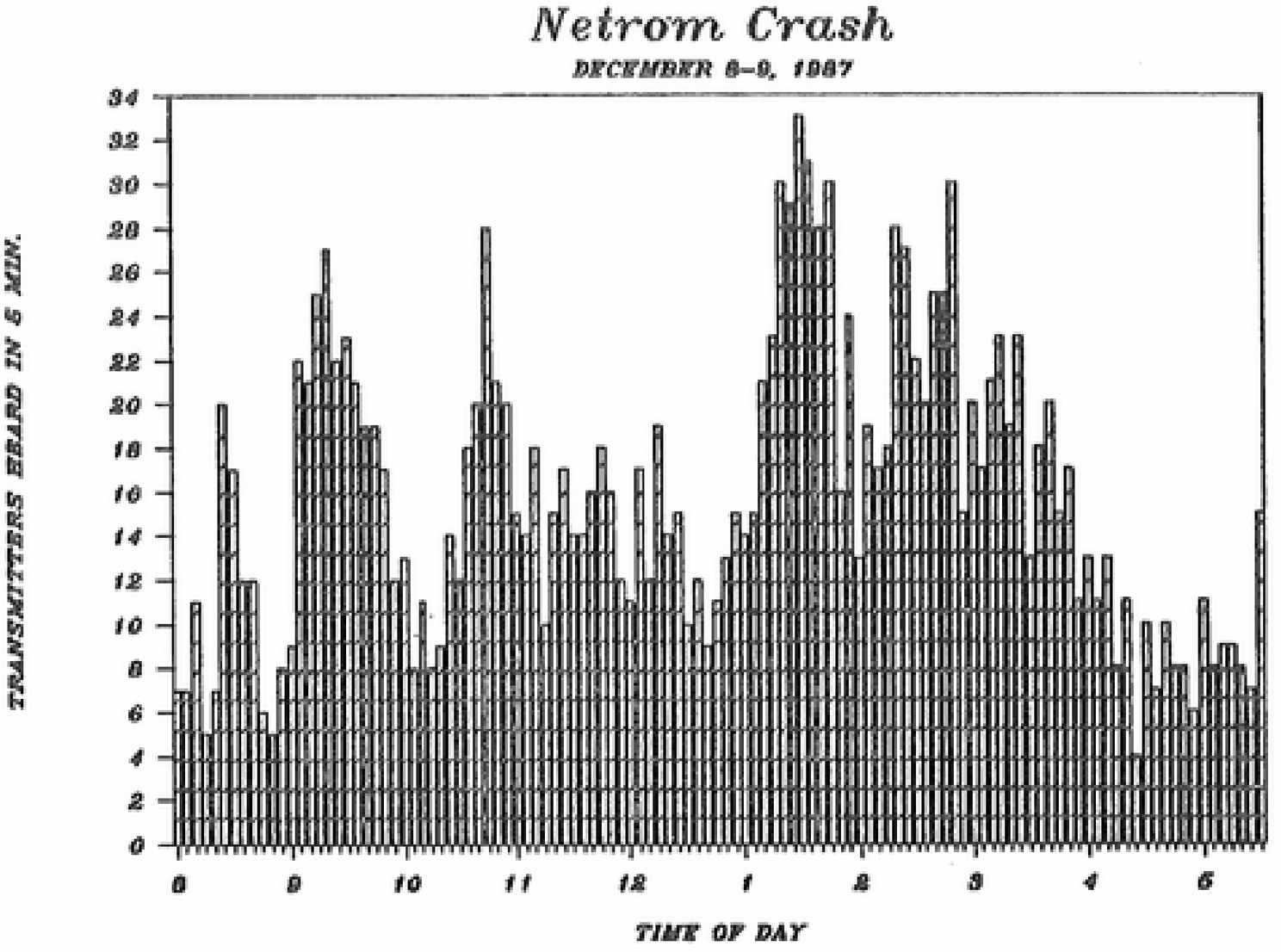

Figure 5. Transmitters Heard in 5 Minute Intervals

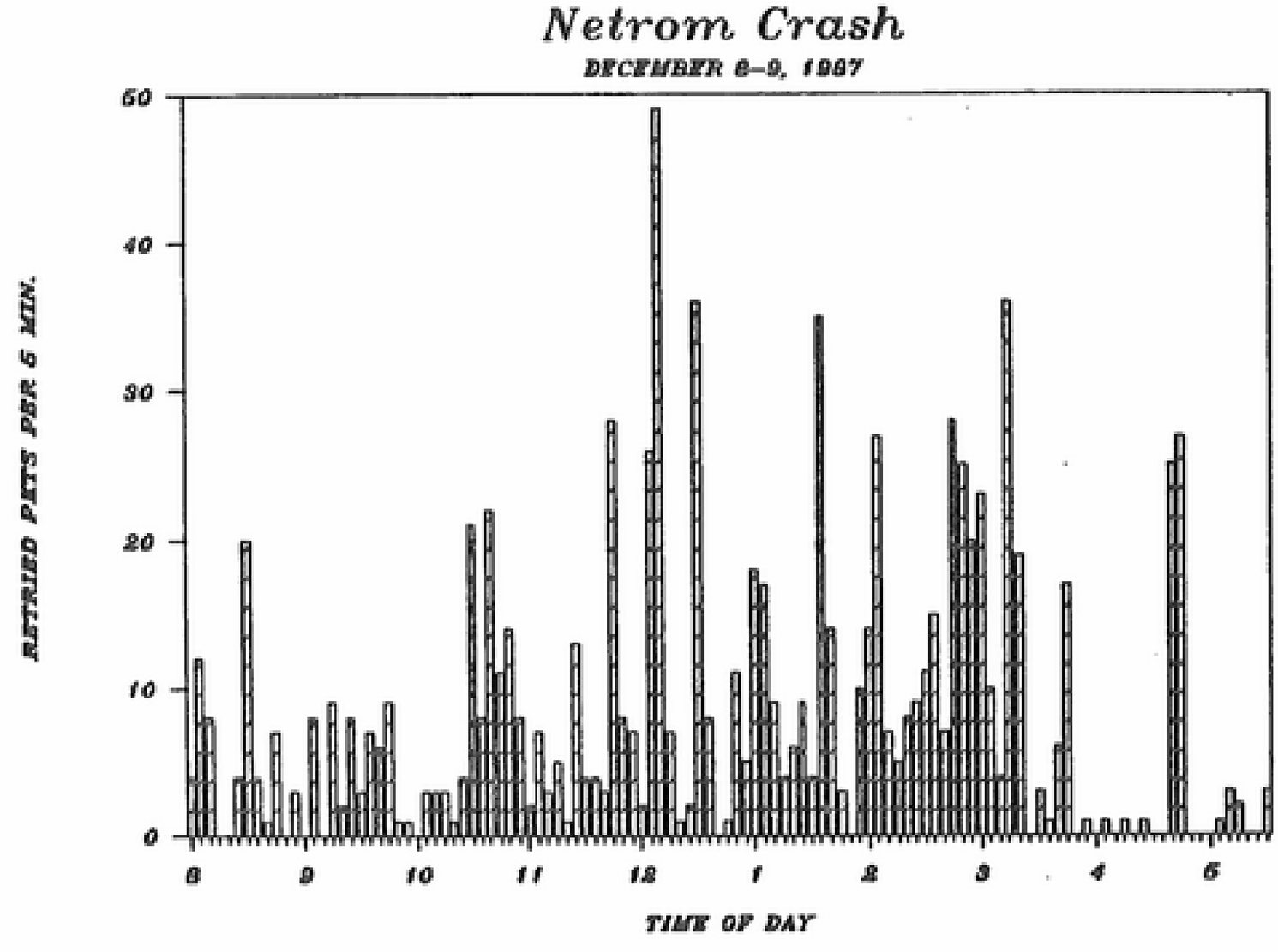

Figure 6. Distribution of Packet Retrys

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| KAY    KOUNTY                 |
|                               |
| AMATEUR    RADIO    KLUB      |
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By the time you read this the Holidays will be over, I hope you and yours had a fine one. The November meeting went well, a big tip of the hat goes to Marsh WA5UBO for taking care of it while Mike and I were out of town. The December meeting is still a week away as I write this. It should be a really fine one by all the planing that Steve KA5SJK is putting into it. I'll give a full report next month.

The January meeting will be on the 21st out at the Vo-Tech at 7 p.m. again. The subject will be preparation for the coming spring weather season. The program at the December meeting should get us all thinking along those lines. Please mark your calendar now and plan to attend no matter what the weather.

What do you think of the Kay Kounty logo? It was just an idea I had and I thought I would see what it looks like it print. Let me know what you think of it on the .97 repeater. Yes folks, we still have the Kay Kounty net at 9 p.m. on Monday nights. This is the best place for up-to-date information about our club activities. Now that Old Man winter has set in, I know you're not out working in the yard that late, so you have no more excuses.

The packet digipeater has been installed out at the old .97 receiver site. (That's the blue water tower east of town on your way to Kay lake). It seems to be doing real well out there. It's running 80 watts which gives it a 640 watt ERP. However, it looks like we'll have to climb up and turn the DB-264 antenna to the south to help get into the National Weather Service better. Right now it's pointed east and it was just too windy the day we moved it out there to adjust it. Any volunteers? Like to climb towers??? I did it last time, and I remember saying to myself, "Self, don't you ever get up HERE again!". I ran a test of the back-up batteries this week, they went over 16 hours with the digi going off every MINUTE! This is a lot longer that I thought it would, so we should be in good shape if the power goes. This digipeater will allow us to check into the NWS HQ in Norman and get up to the minute weather conditions whenever there is severe weather in the state.

Well, that's about all for this month, 73, Dave KD5FX

For Sale-
Kenwood TR-2500 handie talkie, with 2 battery packs, 12 volt adapter and speaker mic. $200. Catch me on the 146.97 repeater evenings or call 405-762-8616.

Also For Sale-
Tandy Model-100 laptop computer. 32K ram, built-in 40 X 8 lcd screen, 300 baud modem, and 5 programs. Comes with the matching cassette storage device and lots programs and books. $300. Catch me on the 146.97 repeater evenings or call 405-762-8616.

Modifying the TM-2530/2550/2570 for MARS/CAP Operation

The TM-2500 series radios may be easily modified for use on MARS/CAP frequencies from 141-150.995 mHz. Open the radio and locate the control unit on the bottom of the radio. This is the same board that the TU-7 and MU-1 are mounted on. Just to the left of IC3 you will find a row of diodes. Cut diodes D8, and D11. After the diodes have been cut you will have to 'reset' the microprocessor.

To reset the microprocessor press and hold the 'PS' key with the power off. Then, turn the power switch on and release the 'PS' key. All of your programmed data such as memory channel data, DCL data, and phone numbers will be erased and you will have to reprogram them. If the radio is not reset it will not recognize that you have cut the two diodes.

WARNING

Protect your license and ensure that you are on an authorized frequency before transmitting.

Modification for Kenwood TM-221a to add MARS/CAP frequencies-

Open the radio and locate the control unit circuit board. This is the same pcb that the mic connector is on. In the corner just above the VFO/M, M. IN, and mHz keys is R25. Remove this for xmit from 142.000 to 151.995, move it to location R24 for Xmit from 138.00 to approx. 154.00. These resistors on the the foil side of the PCB.

Be careful with these resistors, they are the surface mount type, a 15 watt or less solder iron is required to remove them.

WARNING

Protect your license and ensure that you are on an authorized frequency before transmitting.

GREAT PLAINS A.R.C.

WSHGH Repeater 146.13/73

NOT ENOUGH

The November meeting of the GPARC was held Tuesday, November 3rd with eight members and four guests present. Since our constution requires that ten members be present for a quorum, only a lot of good visiting and informal reporting took place. President Windle announced that a Board of Directors meeting would be held the following evening at the home of Gerry and Sharon Ford.

THE NEXT EVENING

Our thanks to Gerry and Sharon for the hospitality extended to the Board od Directors! Several very interesting topics were discussed at this meeting including the upcoming Christmas Meeting, election of officers and the possibility of trying another day of the week for club meetings. It seems that an artificial gerbel livened up this meeting, but I'd rather not discuss that matter any further.

N5AV RIDES AGAIN

Jon Wright, N5AV, dropped in to see us the day before the club meeting but wasn't able to attend our activities because of a prior comittment. Everything seems to be going well for him at his new QTH except that he hasn't been able to do any radioing other than when he is mobile. We hope that the next time he is in the area he will be able to attend one of our get-together

SHORTEST YET

This is undoubtedly the shortest GPARC article submitted to date. Lots of goodies should come out of the Christmas meeting, so standby for next month. For now, Happy Holidays and 73.

Lois, N5JGQ

FOR SALE: Brand new 4 amp hour, 12 v Gel-Cell batteries, $20.00 ea. I have four that were sent to me by mistake. Will be returned if nobody wants them. Chet, W5GDL, 427-1439.

O.I.D.A.R. NEWS NOTES

Well I hope everyone out there in Radio Land has had a good Christmas and you all got the YEASU 's you wanted, After all, everything else is just a cheap imitation of a radio!!! Ahhh Soooo.....Well anyway, this month's O.I.D.A.R held it's annual X-MAS dinner here in Ponca City. This year it was decided to have dinner here in Ponca because lately too many members were sending their money to Toe kee yo and other far away Japanese cities in a vain attempt to increase their scores in next years upcoming HF contests. But don't worry, I am not going to give away anyones secrets !!!

Well anyway, this years dinner was held at El Chico's December 11. About 21 members showed up and enjoyed a scrumptious meal on a nice LONG table. Geln WN5J and Doug N5DUB even drove all the way from OKC to show up for dinner! Thats a trip of about 220 Miles round trip! This year various VHF propagation experiments were conducted at the table between Steve KB5DOR and Biz WDØHCO .

Various grounding configurations were tried with HT's including the sticking the ole rubber duckie into the Coke to see how far it will transmit experiment. The HT's really impressed most of the diners at the restaurant. You'd never thought they seen a walkie talkie before! Why it even impressed the waitress. She didn't have to move around the table as food orders were relayed from one end of the table to the other on 2 meters. I thought our "food net" was well organized as we had check-ins from all around the table. Unfortunately our organization fell apart after the order and we should have stationed an operator in the kitchen as one-half the members got their food within 10 minutes, followed by the other members getting theirs 30 minutes later.

Dave WN5LUI reported that the club treasure has about $514 about the money was totaled after the telephone sale the has generate over $400 to date. All the Panasonic's have already been sold and we have about 45 left of the lower featured telephone sets which we have yet to check out. We just might leave them for next year's flea market.

Not much else to report...seems like everyone is staying inside to keep warm. The repeater committee has been keeping busy. Currently the club is experimenting with a CBS Labs AUDIMAX and VOLUMAX commercial broadcast audio processor units obtained from a OKC radio station. So far results have been so so... but much more work remains to be done so it is way too early to see if it'll work out. Several repeaters in Southern California have used these units with great success in keeping audio levels constant and maximum deviation within the assigned channel bandwidth.

I would like to remind club members, and anyone else wishing to attend, that the next meeting will be on January 12th at the SouthWestern Bell offices in beautiful down town Ponca City. Until then.....

PLEASE set your copy three (3) inches wide.

THE BIG SIGNAL
OKLAHOMA CITY AUTOPATCH ASSOCIATION, INC.

NOVEMBER MEETING

A well attended meeting was held for November with approximately 35 members and guests present. An interesting program was presented by Ernest Gomez, a Manager for Southwestern Bell Telephone and Maria Malham, a Technical Consultant and Marketing Specialist for the firm. Videos were shown about the changes Bell has made in their central control centers over the past several years and new products now being used for transmission of phone signals. Fiber optic materials are now used almost exclusively and samples of the products were exhibited. It was felt by WA5BQX that K2GKK could make good use of some fibers and he would really come to life if they were properly used.

JANUARY MEETING

Be making plans now for the January meeting which should be one of the highlights of the year. Our repeater trustee, K5JL, Jay Liebmann, will present the program and be showing video of his recent trip to Greenbank, West Virginia along with several other amateurs and the Chief Engineer for N.A.S.A. at N.A.R.A, the National Astronomical Radio Observatory. Jay and the others did a considerable amount of operating on UHF. More will appear in the next issue of the C & E concerning this program. But, don't miss this one.

SPECIAL THANKS

This editor would like to personally thank George, AD1S, for helping with my rotor problem. George climbed the tower on a cold and windy Saturday morning and got the U-bolts in place and now everything works fine. I appreciate it George.

SHORT THIS TIME

Editor Joe said to keep it short this month due to the publishing of the new roster, so no New Member or Old Member column this time. Next month perhaps, but:

I HEARD: BQX can't add or subtract ..... HEL has a vvvvvery rich cousin ..... KLN listening ..... SXJ wants a Lasa Ipsu ..... KLN listening ..... GKK doesn't like freeloaders ..... FM won't comment on that ..... H #1 never says anything important ..... KLN understands that ..... SXJ discriminates against fleas ..... VHY trying to be a nice guy ..... HEL filing bankruptcy ..... KLN finds it hard to drive and read the mail at the same time ..... EN made a fatal mistake ..... WZ lives quite sumptuously, thank you ..... KLN finally figured it out ..... GKK going to the john ..... CSM wears a dress ..... SXJ actually walked on someone ..... KLN listening ..... THW swallowed a frog ..... HEL playing in the sandbox ..... KLN figured that out too ..... SXJ sticking something up M #1's nose ..... GKK picking his nose ..... DDB and CSM are full of gas ..... KLN teaching GKK the basics of electronics ..... SXJ doesn't know anything about women ..... GOH hi hi ..... VHY got a ticket ..... M #2 accusing GKK of flapping his jaws ..... BQX on a roll ..... M #1 has his hood ornament on the wrong side of the road ..... KLN listening ..... GKK and his Fruit Loops ..... GOH didn't think NK knew he was still around, hi hi ..... 1S smells smokey ..... KLN roger on that ..... GKK learning the fat man's prayer ..... KLN thinks NK did the best he could ..... BJS figured out how to get new carpet ..... M #1 had the best of opposite sex ..... SXJ had a hot car ..... HEL is all ears ..... KLN roger on that ..... EB considers FM to be an old codger ..... 1S was sorry to hear that too ..... E5M had a Smokie giving him wierd looks ..... BQX has one friend left, the other got a divorce .....

SUN	MON	TUE	WED	THU	FRI	SAT
JANUARY					HAPPY NEW YEAR 1	2
3	4	5 GREAT PLAINS	6	AERONAUTICAL TRI-CITY 7	8	9 SCARS
10 WHEATSTRAW	EDMOND CLUB 11	12 OIDAR OU 76'ers ARES	13	ALTUS AREA 14 OKC/PM	15	16
17 EARS		19 AUTOPATCH	20	CIMARRON KAY	22	23
24/31	25 VE EXAMS RED CROSS 6:00 PM	26 CORA	27	28	EDIT NIGHT for 29 C & E	30

Q. R. Zedd

HOMER TAKES A TEST

The Christmas season marked an important anniversary at Honor Roll Ranch. It has now been one year since Q.R. Zedd, world's greatest DXer, started tutoring Homer Klott for his ham ticket.

Homer, faithful readers will recall, appeared out of an icy mist a year ago on the night of the SCARS Christmas party. Zedd had just boasted that he could make anyone a licensed amateur with his skilled teaching. Then came Homer, CB antenna waggling, to say he was Zedd's man, he wanted to be a radio armature, and ten-four good buddy.

Since that fateful night, Zedd has worked hard with Homer, far more than decency and the space limitations of this column have allowed us to report. Alas, Homer has proven to be that rarest bird, a man whose brain cells do not communicate with one another.

It has been hard on Zedd. His hair is grayer now, and the Coors truck comes twice a week. But progress has been made, and only a few days ago, Zedd gave Homer a practice written examination in hopes of having him ready soon for the VEs.

We secured the text of the test, with Homer's answers, and here it is, just as we found it on the floor of the Zedd shack:

1. -- Emission type F3 refers to:

One of them beam, with three things sticking out of it. Reflector and Emitter.

2. -- Willful interference can be defined as:

That is when you have interference of the nearest kind, such as when your rubber duckies is crost.

3. -- The three elements used in Ohm's law are:

Pie, R and Square.

-- The characteristic impedance of RG58 coax is:

Ten meters below 28.3?

5. -- Antennas should be grounded during thunderstorms because:

Otherwise if they is not on the ground, they will fly away somewheres.

6. -- Calculate the length of a dipole antenna to be resonant at 7.1 MHz.

6.6 inches or 6.6 meters, one, try both.

7. -- In Single Sideband transmission, one of the sidebands is:

Not married.

8. -- An amateur radio operating license must be renewed every:

Time you move, or if the ARRL tells you to, or several years, whichever comes first.

9. -- Every well-run station should have a dummy load because:

Otherwise the owner of the radio would have to load things hisself, and then that would make him the dummy instead of the dummy he hired to load for him.

10. -- In order to initiate a contact with any station which may be listening, the amateur radio operator sends a general call signified by the letters:

10-4, you got a copy, come on back?

11. -- A novice station operating in its assigned frequency range in the 40-meter band may operate with a maximum power of:

Just enough so when you put down your key the house lights don't go too dim.

12. -- To operate most effectively, a dipole antenna should be at least how high above ground?

Well you have finally found one I do not know the answer to, sorry.

13. -- There are two kinds of simple circuits: series and _____.

Perilous.

14. -- The two parts of a diode are the cathode and the _____.

Doghode?

15. -- Most amateurs keep a careful logbook because:

Otherwise how would they know when they was going to run out of firewood?

-- KU5B