

Don Wallace's best Christmas

(Jan David Perkins is the author of "Don C. Wallace, W6AM, Amateur Radio's Pioneer")

Don Wallace adjusted the catwhisker and slide tuner - 200 turns of 22-gauge wire wound on a Quaker Oats box. From one end a wire went out the window, up to the barn roof, to a palm tree in front of the house, and two blocks down Linden Avenue. Another wire led to a grounded water pipe.

Don recognized a throaty buzz, his friend Jim Cook, signing JC. He could recognize the characteristic sound of each of the dozen amateur stations in the Los Angeles basin. When Don answered, signing W-U, his self-assigned call, the transformer groaned, the spark popped like a firecracker, and he smelled ozone.

The transmitter, its fixed spark electrodes connected to a hand-wound transformer, operated at 250-meter wavelength. Don's brass key connected directly in series between the transformer primary and the AC power mains.

Don chatted with Jim Cook for a while, then signed off when his nose told him the transformer was too hot. Made of stovepipe laminations and copper wire, it burned out periodically, forcing Don to disassemble and rewind it.

Don and Jim, who lived just three doors away, had built receivers and learned the code together four years earlier. Jim's uncle had given Don the stove pipe. When Jim wanted to transmit, he borrowed a spark coil from his father's Model-T Ford. Though the spark coil produced little radio energy, Jim's signal was heard six miles away.

One time Jim forgot to reinstall the spark coil. His father cranked until his arm was sore. He wasn't amused when he discovered the coil missing.

Direct-keyed spark transmitters like Don's had a peculiar characteristic called "kickback." Sometimes, when he pressed

the key, he caught the AC cycle at a peak of the same polarity as at the end of the previous character. That made the transformer core saturate, producing a tremendous bang, and drawing a high-current pulse from the AC line. The power distribution system reacted by making a voltage surge that flashed light bulbs. Sometimes they even exploded. Needless to say, this made the neighbors apprehensive.

Don's signals, and those he heard, would sound like ignition noise in a modern receiver. The "note" had a sharp or a coarse characteristic, depending on the shape of the spark electrodes. Tuning and the amount of coupling to the antenna affected the sound of a spark transmitter, too. Each was unique.

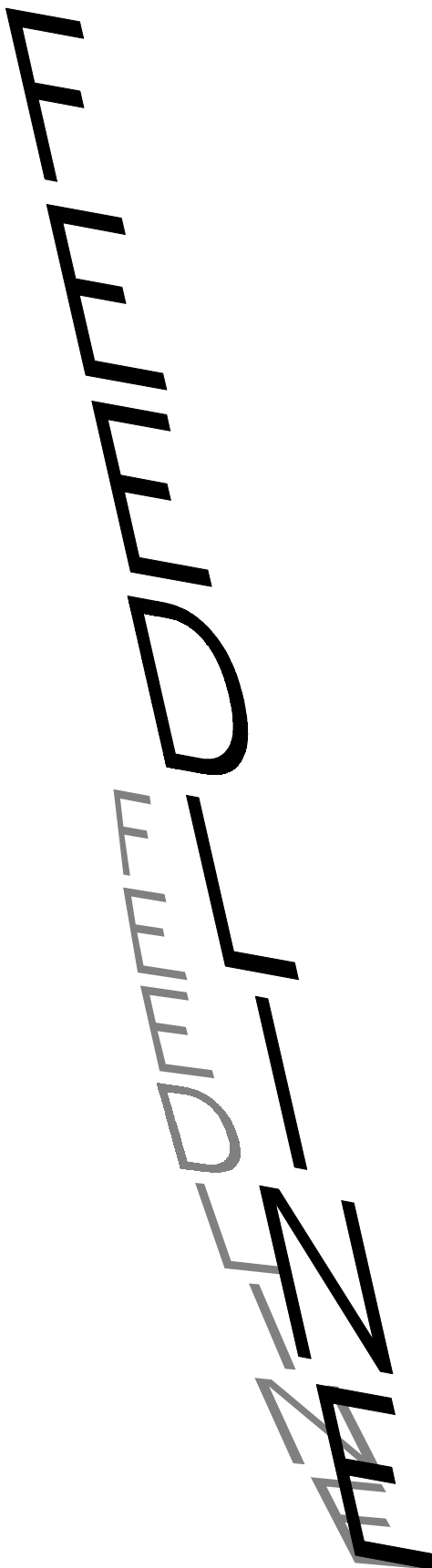
In 1913, when Don was 15, his father managed the First Exchange Bank in Long Beach. Though he could be considered well-to-do, Don's father wanted his children to appreciate the value of a dollar. They earned their own spending money. That was one reason every item in Don's station was home built, right down to the hot-wire ammeter.

Don's crystal set receiver wasn't state of the art. The invention of the vacuum tube, the "DeForest Audion," was a year in future, but the Bunnell "Loose Coupler" was available for \$15. Don's transmitter could have been better, too.

The rotary gap transmitter, in which an electric motor drove a wheel with insulated gap electrodes, made a higher-pitched sound because the rate of wheel rotation, not the line frequency, set the "pitch." It was much easier to copy.

Don knew all about it, and he yearned for a rotary-gap transmitter. But he couldn't afford one, and he didn't have access to the machine shop necessary to build one. So, in the weeks before Christmas, he made toys for his sister and **Christmas Story...**

(Continued on page 5)



Feedline

Feedline is a member-supported publication of the Cary Amateur Radio Club and is published monthly. Deadline for submissions is the second Thursday of the month.

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1545 Seabrook Avenue
Cary, North Carolina 27511

Cary Amateur Radio Club

The Cary Amateur Radio Club meets on the fourth Thursday of the month, **7:00 p.m.** in the lower level of the Christian Life Center of White Plains United Methodist Church. The June, November, and December meetings are held off-site. Call for location of those meetings.
Next Meeting: January 23.

1997 Officers

N9CGD	Tom Doligalski	481-1236
	President	
N4AJF	Lee Swanson	467-8128
	Vice-president	
K4IWW	Will Harper	467-0224
	Treasurer	
N4UE	Herb Lacey	467-9608
	Secretary	

HerbLacey - N4UE

Meeting Report

October, 24, 1996

Meeting called to order at 7:38 p.m., by Pres., Bob, K4HA. Introductions.

Treasurer's Report - Will, K4IWW

Savings:	\$3,143.77
Checking:	\$1,284.20
Cash:	\$26.00
Total:	\$4,453.97.

Dues are \$9/yr. CARC caps still available at \$4.

Wake Digital Communications Group (WDCG) - Lee, N4AJF, Had a tower donation from a cellular company. May get one space from them. RNCLAN and RNC both down.

OLD BUSINESS

The Christmas Traffic Project will be on again, this year. We will have a 80m CW station on the air from Cary Towne Center, Dec. 16-20, 7:30 to 9:30 p.m.

New Business

Again, we are going to do a group purchase of tickets for the Charlotte Hamfest. Pre-reg tickets are \$6; at the door \$8. Of course, to save the \$2, you have to mail (\$0.32) in a check AND supply a SASE (\$0.32), plus envelopes. The big plus is that you don't have to stand in that LONG line (in the cold) to get in. WE MAKE IT EVEN BETTER!

Bring your check to the CARC meeting on Jan. 23, made out to: CHARLOTTE HAMFEST, for \$6 for each ticket you want. The tickets will be back in time for the February CARC meeting Feb. 27. YOU SAVE \$2!

BTW, CARC has already gotten two tables and three chairs at Charlotte. These tables/chairs are for your convenience at the 'Fest for resting, visiting, storing stuff, selling stuff, etc. If you are going to the Charlotte Hamfest, plan to get in on the group purchase for tickets AND enjoy the CARC tables. You can't miss the CARC tables - just look for the CARC "street sign."

Field Day '97

Mike, AC4TG, will return, after a year off, as FD Czar. Even with the poor showing of the operators, we scored 5th place in Class 4A. The swing phone station went 11 hours without contacts due to no operators. THE BANDS WERE OPEN!!!! We could have easily caught the 4th place group. The new site at Bond Park is outstanding.

Election of Officers

In CARCs inimitable fashion, the nomination and election of new Officers took place in sudden order. There hardly was time to object or complain!! The new Officers for 1997 are: Pres., Tom, N9CGD; VPres., Lee, N4AJF; Treas., Will, K4IWW; and Sec'y., Herb, N4UE. The Volunteer Examiner schedule is being posted on the NC/ARRL website. CARC member, Jack Davis, WA4OOD, gave an insightful program on "Electromagnetic Compatibility." He showed how product producers have to test and verify their products meet national and international standards on radiation. It is not a pretty picture seeing the hoops they have to dance through to meet those requirements. (How did I do, Jack?) Thanks for the fine program.

n4ue

TomDOLIGALSKI - N9CGD

About our Club

With the Christmas and New Year holidays behind us, its once again time to think about Cary Amateur Radio Club activities for the coming year.

The first order of business is the scheduling of meeting programs. I'm pleased to announce that the January program will be presented by Frank Lynch, KE4ZEQ, who will give an interesting multimedia presentation detailing how severe icing conditions caused the fall of several large television towers several years ago. The 146.88 Piedmont Coastal Repeater Network (PCRN) repeater was on one of the towers that fell, and it took quite a bit of time and effort to replace!

There are quite a few "holes" in the 1997 meeting schedule, and I urge all of you to jot down a few meeting ideas and get them to our Vice-President, Lee Swanson, N4AJF. I've decided to try to hold an occasional executive committee meeting about once a quarter, and we will attempt to come up with meeting programs that will make you want to attend CARC meetings!

I'm also looking for a few volunteers. First, the club needs someone to volunteer to be our "Swapfest Czar." The swapfest is our big money-making activity of the year, and thus we really need a volunteer to ensure the financial health of the club.

I'll be passing around a sign-up sheet at the next club meeting asking for volunteers for Swapfest Czar as well as several other positions which badly need filling. Why not get involved with your club?!

Tom - N9CGD

*I bought a new computer,
It came completely loaded.
Guaranteed for ninety days,
In thirty it was outmoded.*

Emerging Issues:

**AUTOMATIC PACKET / POSITION REPORTING SYSTEM
(APRS)**

(Scott, KE4RHO is an Electronic Technician / Radio Engineer with the North Carolina Division of Emergency Management. Through Emergency Management he became interested in Amateur Radio and obtained his license in September 1994.)

I have been working a good deal with digital communications since I started with Emergency Management and have brought this interest into the Amateur Radio arena. I purchased a Kantronics KAM Plus TNC early on and started experimenting with Packet Radio and found it very enjoyable. I was living in Morganton, NC at that time and was using the KD4OM Packet BBS. I also experimented with the SEDAN network. For a while that was interesting, but with the Internet rush conventional packet traffic started to die down and eventually the KD4OM BBS was taken off the air.

With a seldom used TNC sitting in my station I looked for something more interesting and useful to do with it. A close friend of mine, Jamie Dean, KE4HTM, suggested we experiment with a new packet network on 145.790 MHz, Automatic Packet / Position Reporting System (or APRS as it is commonly called). We downloaded the software from the Internet and went about setting it up. We were delighted to see a few stations positions and call signs show up on the North Carolina map on the APRS screen. We were hooked! Not only for the novelty of visual representation of packet stations actually on a map, but because we realized what that could mean for packet radio as a whole! We both soon had operational APRS wide area digipeaters on 145.790 MHz. The APRS system was initially developed for the United States Navy by Naval Officer and Naval Academy Instructor Bob Bruninga, WB4APR. I have included excerpts from an article Mr. Bruninga has written describing more fully the operation and functionality of the APRS software and network.

APRS turns packet radio into a real-time tactical communications and display

system. In the past, packet radio has only shown usefulness in passing bulk message traffic from point to point. It has been difficult to apply packet to real time events where information has a very short lifetime. APRS, however, provides universal connectivity to all stations but avoids the complexity and limitations of a connected network. It permits any number of stations to exchange data just like voice users would on a voice net. Any station that has information to contribute simply sends it, and all stations receive it and log it. Secondly, APRS recognizes that one of the greatest real-time needs at any special event or emergency is the tracking of key assets. Where is the Event Leader? Where are the emergency vehicles? What's the Weather at various points in the County? Where are the power lines down? Where is the head of the parade? Where are the VIP's? Where is the mobile ATV camera? Where is the hurricane? WHERE IS THE DX??? To answer these questions, APRS is a full featured automatic vehicle location and status reporting system too. It can be used over any 2-way radio system including HAM, CB, Marine Band, and Cellular Phone.

In order to more fully explain the power and flexibility of the APRS system, I have also provided a brief description of some of the advanced features in the following paragraphs paraphrased from Mr. Bruninga's text:

LATEST BEACONS - This display maintains a list of the latest UI frame received from each station. In effect, this is a multi-station one-line broadcast message system. In DX cluster mode, it accumulates a list of all users and what was their latest command to the cluster.

POSITIONS - This display maintains a separate list of the positions of each station often including a brief comment. They can also contain DF and or WX info. In DX mode, this list contains the posits of all DX spots and user-locations heard.

MAPS - Maps from .5 miles up to 2000 miles can be displayed. All other APRS stations will be plotted. Stations

reporting a course and speed are dead-reckoned to their present position. A database of most National Weather Service stations is built in. You can zoom in to any point on the globe!

MESSAGES - In addition to the BEACON text one-line broadcasts, there is an operator-to-operator message capability. Any station can send one line messages to any other station. On receipt, the messages are acked and displayed on the bottom of the receiving stations screen until the operator hits the K key to kill them.

BULLETINS - This screen maintains a list of active all-net BULLETINS. BULLETINS allow one station to send multiple lines to the BULLETIN page at ALL stations.

TRAFFIC - This screen shows the last 23 lines of messages exchanged by any stations on the net. Is useful for "READING THE MAIL". DX mode TALK traffic also shows up here.

ALL PACKET LOG - This display is a time sequenced log of every new beacon or one line message sent. This is in contrast to the LATEST display which shows the most recent time of receipt of a beacon text. In DX mode, this screen shows a chronological list of all DX/WX/WWV and ANNOUNCEMENTS heard.

HEARD LOG - This display maintains a count of the total number of transmissions from each station per hour. These statistics are ideal for displaying the connectivity of the network over varying paths, such as HF, or to see when stations enter and leave the net.

DIGIPEATER LIST - This display displays the raw packet header so that APRS users can see what digipeater paths are being used by other stations. The proper use of digipeaters is important in an APRS network. An asterisk in the first column means that you hear the other station direct without a digipeater! Change your UNPROTO path to NONE to chat with those stations. In DX mode, this list accumulates a list of all DX cluster messages monitored.

STATION TRACKING - Although APRS automatically tracks mobile GPS/LORAN equipped stations, it also tracks perfectly well with manual reports or Grid-Squares. APRS will use a GridSquare in brackets at the beginning of a BText. Ad-

(Continued on page 4)

(Continued from page 3)

ditionally, any station can place an object on his map including himself and within seconds that object appears on all other station displays. In the example of a parade, as each checkpoint with packet comes on line, its position is instantly displayed to all in the net. Whenever a station moves, he just updates his position on his map and that movement is transmitted to all other stations. To track other event assets, only one packet operator needs to monitor voice traffic to hear where things are. As he maintains the positions and movements of all assets on his screen, all other displays running APRS software display the same displays. There is also a Tracking command on the P display that will cause APRS to keep the map display always centered on a selected object.

ACARS: If your TNC has an ACARS modem for receiving Airline digital packets on 131.55 MHZ, then the optional APRSair.EXE will plot the positions of all aircraft in range (usually up to about 200 miles out).

USING APRS ON ALL DIGITAL CHANNELS: If all packet stations on all frequencies would include LAT/LONG or Grid Square in their BTexts, APRS can be used as a general purpose network topology display on ANY packet frequency!

SPACE APPLICATIONS: APRS is an excellent application for using orbiting packet digipeaters such as on the Shuttle, AO-16, WO-18, LU-19, MIR, and AO-27. APRS only requires one successful packet for everyone to see each successful station. The typical *CONNECTED* ROBOT mode of SAREX requires, a total of 5 successful packets. Not only does APRS reduce channel loading, but it also capitalizes on the most fascinating aspect of the amateur radio hobby, and that is the display on a map of the location of those stations. If everyone simply inserted their LAT/LONG or Grid Square as the first characters of their beacon text, everyone within the satellite footprint would see the location of every successful uplink.

FOX HUNTING OR DF'ing: APRS is an excellent tool for plotting the location of a hidden transmitter, balloon, or interfering signal. APRS has several powerful DF tools:

1) Plots the positions and Bearing lines of all participating stations whether mobile or fixed.

2) Plots the overlapping signal strength contours for OMNI-DF reports. This technique even plots big BLACK circles for NULL reports so that you see all the areas where the FOX is NOT! This OMNI technique is very powerful and locate a jammer to a neighborhood with NO BEAMS or special equipment.

3) Fade-Circle Search and Rescue technique for single station signal strength location using only a OMNI antenna.

4) Optional automatic DF interface to Doppler DF units for automatic plotting of DF bearings.

WEATHER STATION REPORTING: APRS position reports can also include the wind speed and direction, as well as other important weather conditions. APRS supports a serial interface option to the ULTIMETER and DAVIS home weather stations to do this automatically. All weather stations show up as a blue circle, with a line indicating wind speed and direction. The APRS NEXT command will successively highlight each WX station in turn, for WX at a glance. APRS also has a database of the locations of most NWS sites and can crunch a file of NWS hourly WX conditions for display. Finally, APRS users can set WX alarms and be alerted when WX conditions exceed those values.

DX CLUSTERS: APRS an ideal tool for the DX cluster user. Not only does he get to see all DX spots on the map, but by operating in the monitor only mode, he has reduced the overall packet load on the DX cluster. This is a benefit to everyone on the channel. Also the APRS monitoring station will see the SPOT as soon as the first station gets it, rather than later on down the list.

FREQUENCY COORDINATION: As more and more BBS's, DIGIS, and NODES begin to include APRS position information in their routine BEACONS, APRS makes an excellent tool for frequency coordination. The frequency coordinating body can make available APRS backup files (or .HST files) showing the positions of all coordinated services, both packet AND VOICE. These files can be distributed on BBS's to all HAMS in the area. Loading these files into APRS displays the established frequency users in a geographical setting. Also the APRS

MAPS-PLOTS-POWER command can plot range contours based on antenna height and gain, for displaying the topology of any network and also the interference ranges of voice repeaters.

CHESSBOARD: To demonstrate the flexibility of APRS in reporting the movement of objects in a net, there is a 2 mile chessboard in the center of the Gulf of Mexico. Two APRS stations can place pieces on the board with the INPUT-ADD command or can move existing pieces using the Cursor, HOOK and INSert commands! An easy way to begin a game, is to load the CHESS.BK file which already has all 32 pieces saved. By selecting the alt-SETUP-OTHER-GAME command APRS not only keeps track of the move numbers but also changes the packet address from APRS to GAME, so that others on frequency will not see their PLists cluttered with the pieces as they are moved. Also, GAME mode only UPLINKS the LATEST move, to minimize QRM. You may consider going to an unused frequency so as not to clutter an active APRS net, however. If you want to Kibitz a game in progress, also load the CHESS.BK file and use the CONTROLS-FILTERS-OTHER command so that your APRS will monitor OTHER packets on the channel so you will see the GAME packets. If you missed the beginning of the game, ask one of the players to use his Plist to HOOK and UPLINK any piece locations you missed.

As you can see, APRS is a powerful and fresh new way to utilize packet radio. There are many more features of this software, too plentiful to mention.

If you have further questions concerning APRS, please call Scott Andrews, KE4RHO, at (919) 785-0100 or e-mail me at ke4rho@ix.netcom.com.

Further information about APRS and the latest versions of APRS shareware is available on the Internet at <http://www.bluenet.net/ke4htm>.

Ham Radio Internet

Web Site Selections

Welcome to the Ham Radio Internet Column, written by your humble columnist, N9CGD. In the coming months I hope to describe a few ways that the internet can enhance your enjoyment of ham radio. I'll be telling you about some fascinating web sites, mailing groups, and ftp locations.

Of course, I appreciate your nominations for column topics: feel free to drop me an email with a URL, or whatever, to tom@aro.ncrn.net and we'll see what we can do!

This months column deals with a project I'd like to see the club tackle, the creation of a club home page. I'm writing this column aboard an American Airlines jet enroute to the Reno, Nevada area to attend a professional meeting. Reno has been hit recently by some terrible weather (massive flooding), and I was unable to get a lot of "quality" information about what things were really like. As I searched the net for information, I found a web site for the "Wide Area Data Group Northern Nevada Amateur Radio Home Page Directory" in the Reno area:

http://wadg.greatbasin.net

What a fantastic site: among other things I found a comprehensive list of area repeaters (including information as to which were more popular, which had open autopatches, where RACES nets were held, which repeaters could be linked together, geographically where repeaters were located in the area, PL tones, etc.), a list of club officers and meeting locations, Volunteer Examination (VE) schedules, local net schedules, etc. I was surprised to see that one repeater is located on the roof of the hotel I am staying at!

In addition to this textual information,

New Gear (continued)

The tutor allows you to select letter groups, number groups, prosigns, words, all of the previous, random words, or a randomly generated cw contact.

The tutor can send straight code or Farnsworth, where all the characters are sent at 18wpm regardless of the speed selected. It also has the ability to repeat the cq or

the site offered access to the club,s packet activities. After logging in, the site allowed me to list messages on the local store-and-forward BBS, check out the latest DX posts on the clubs DX cluster, etc. Wow, it was really neat!

Now, I would like to stand on my soapbox and propose that CARC get a similar site. I suggest we offer a similar repeater information list, perhaps also listing packet access frequencies. A nice map could help guide visitors and newcomers to our meetings and the swapfest. An email address or two could help new hams moving into the community learn more about protective antenna covenants, etc. We could post the Feedline electronically (I'm currently a member of a radio club in Northern California, and the newsletter is ONLY distributed over email). Maybe we could have a link to the NC section web site.

I travel a good deal, and it is just so nice to have some idea about local activities in areas I am traveling to. I've gone to a number of club meetings at locations around the US, made a lot of new friends on voice and packet repeaters, and even made a hamfest or two on these trips: however, I know I've missed lots of opportunities because I just was not aware of them. With more and more people having access to the Web, it would be a ideal to use this medium to provide folks with information about ham activities in the Cary area. What do you think? Do we have any volunteers to help "put us on the web?"

Tom - N9CGD

test patterns it has sent, so you can check your work.

What the 411 lacks in robustness, it easily makes up in portability and availability. It can teach a new ham or refresh the old. At \$70 I am sure I will get my money's worth out of the tutor, since this won't be the last time my cw slip! KM4LB

(Continued from page 1)

brother, four and six. He made a train that moved on a wooden track-certain to delight his brother. The detail work on the doll house took longer, but with football season over he had the time.

He awoke Christmas morning to the sound of the little ones racing down the stairs. He enjoyed watching them open their presents. Then he opened his-school clothes, shoes, and a football. When he had finished, his father asked him to help wash the car.

Don noticed a faint smile on his father's face as he led Don out to the barn. Then he saw the crate - big and orange, with a red ribbon. Hams heard a new high-pitched wireless signal on the air that evening.

from the Autumn '92 QNC! Scott Laughlin, N7NET, Editor and Publisher, as published in the December 92 Northern California DX Club DXer-AF6S Editor (at that time)

yournameHere urCall

New Gear: User Report

In reviewing my short (8 year) career in amateur radio, I realized that I most enjoyed the time spent on late-night CW contacts. My answer to the wave of guilt that washed over me was to regain my cw prowess through regular practice.

Working a rotating shift is an inhibitor to any real "sked," so I opted to look for some way to practice code anywhere, anytime. My solution was to purchase an MFJ-411 Pocket Code Tutor.

The 411 is a microprocessor-controlled code tutor featuring a dictionary that can generate random QSO's in addition to character group practice.

The tutor measures 2 3/4" x 5 1/4" x 1" and will fit in your shirt pocket, tho a bit snugly! It is powered either by an internal 9v batter or by a 9v external supply. Audio out is sent to either an internal speaker or stereo headphones.

The options allow the user to select the speed (5-60), tone, and type of code to be sent.

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Letters from your editor

Worth Repeating

It shouldn't be a shock to anyone that editors of ham newsletters find it hard to get material to publish every month. Feed-line is no exception. In a move to improve FEEDLINE and off-load some of the monthly head-scratching, I have recruited some local talent to write recurring columns. Most of the columns will appear monthly, while ones featuring longer articles will appear quarterly.

"Good columns can make a good publication great" advises the Amateur Radio News Service. "Besides adding interest, columns give continuity and unity to a newsletter. And they get more of your members involved as writers."

You can contribute to the success of this venture by communicating new material or suggestions to the columnists. My success in recruiting help was to convince them that once the readers got a feel for the new look, they would be a willing resource in supplying new ideas for the columns.

Two of the columns need a "parent." WORTH REPEATING is designed to let the two-meter-impaired members of our club share in the daily news of CARC members and friends. Only a fraction of our member's call signs appear regularly on

the ".15" machine. It's not that they aren't interested in what's going on, they just don't have the opportunity to listen in.

"Gossip is the stuff that made Walter Winchell famous in New York a half-century ago, and today makes Herb Cain San Francisco's most-read columnist." (ARNS)

See this month's "sampler" column to see what's expected. Someone with a scanner would be a good candidate for gathering fodder for this gossip cannon. Again, I would expect that members would make this column easy to produce by contacting the eventual owner of WORTH REPEATING with tidbits to publish. Maybe someone could volunteer an answering machine or voice mailbox where members can call in contributions. Volunteer, or suggest someone for this position.

The idea behind NEW GEAR is to satiate the "tech" in all of us. Even if we can't afford new gear every month, we sure like to read about it. This column can come from member-reports of new gear they have purchased, magazines or the internet. Do you surf the net regularly? Do you receive ham magazines monthly? Yes to either of these qualifies you to take charge of NEW GEAR.

Tom - KM4LB

HF sked - CARC members are meeting on 80 meters, Monday nights, about 9:30. W4FNB, K4EN, K4HA, NX9T, KE4TTS, AB4W and AB4S were in on the latest revival of this CARC activity of several years ago. Listen on .15 starting about 9:30 to see what frequency has been appropriated. It will take a while to establish a home spot on the dial. If you get there late, just call on .15, someone will be monitoring. Ten meter and CW are possibilities.

KM4LB's first-harmonic, Amy, will be studying in Spain next year. As an English/Spanish major, she aspires to teach English as a second language.

New calls heard....AC4TG is now K4EN, KB9MS is now K4HA, AB4SL is now K4QL, KI4HN is now K4MA and (de ja vu - de ja vu) KM4OX is now K4ITL.

AEA is out of business and .looking for a CARC member with deep pockets to bail them out. So much for sending in those warrant cards.

Santa brought K4EN a new Heil microphone for Christmas. Now we know how item #1 in this month's column came about!

MarcianBOUCHARD KC4TOI

QSL of the Month

This monthly feature will showcase the QSL card of one of our members. I welcome you to send me your QSL card, or advice on QSL'ing in general. Now on to this month's selection.

Tom says he designed this card early in his ham career, before he realized that "real" DX'ers prefer all of the contact info on one side of the card.

The drawings were done on an early version of Printing Press publishing software. Once the supply of light-green QSL's are gone it will be time to design a new one, since the source file is nowhere to be found. Besides, a lot has changed; for one thing, I hear that Barb has bought a bigger chain saw!

Send your QSL and/or comments to 804 Queensferry Road Cary, NC 27511.

Marcian

