



PCARA Update



Volume 17, Issue 11 Peekskill/Cortlandt Amateur Radio Association Inc. November 2016

Go radio

Members from the Peekskill/Cortlandt Amateur Radio Association (PCARA) and the Westchester Emergency Communications Association (WECA) joined



The Westchester County RACES communications vehicle was located at Croton-Harmon High School in Croton-on-Hudson.

forces to provide communications support for the 36th Annual Harry Chapin Memorial Run Against Hunger on Sunday October 16, 2016 in Croton-on-Hudson, NY. WECA generously provided the Westchester County Department of Emergency Services Radio Amateur Civil Emergency Services (RACES) vehicle to act as the command post for Net Control. With its 49 foot high pneumatic mast, the RACES vehicle provided outstanding coverage for the

day's activities. A full report can be found in this month's issue of the *PCARA Update*.

PCARA participated in the New York QSO Party on Saturday October 15, courtesy of Joe, WA2MCR. This year there were three guest operators and we achieved a substantial score for PCARA's participation in the Party! Details follow.



Remember to bring your "Go Box" to the November 6th meeting for a *show and tell* session about how it was designed and built. Share your creative talents and ideas with your fellow PCARA-members.

The 2016 PCARA Holiday Dinner is going to be held on Sunday December 4, 2016 at 5:00 p.m. at the Cortlandt Colonial Restaurant. This will be our fourth year at this location. The cost this year is \$40.00 which includes salad bar, unlimited soda/iced tea, coffee or tea, plus gratuity (Adult beverages are extra \$\$\$). Please consider joining us. **As always, all are welcome!** The menu is available on page 9.

Please give the Yahoo Group **Peekskill_Cortlandt_Amateur_Radio_Assoc** a try. (https://groups.yahoo.com/neo/groups/Peekskill_Cortlandt_Amateur_Radio_Assoc/info). The group is being administered by Lou, KD2ITZ, so drop by and start a conversation or share some information and/or ideas. Thanks Lou!

Our next scheduled meeting is Sunday November 6, 2016 at 3:00 pm at New York-Presbyterian / Hudson Valley Hospital in Cortlandt Manor, NY. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

PCARA Officers

President:

Greg Appleyard, KB2CQE; kb2cq at arrl.net

Vice President:

Joe Calabrese, WA2MCR; wa2mcr at arrl.net

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Net night

Peekskill/Cortlandt Amateur Radio Association holds a weekly net on the 146.67 MHz W2NYW repeater on Thursdays at 8:00 p.m. Join net control Karl, N2KZ for news and neighborly information.

Adventures in DXing

-N2KZ

Radio Ga Ga

Can you believe that it's 2016? How things have changed. Today's radio is only a reminder of what we remember growing up. These days, I can barely recognize it! What makes our new world? In one simple word: it's **digital**.

Everything now depends upon the Internet. This is good and bad. Internet radio brings the world to your kitchen, bedroom and car. When it is not available, it brings you a lot of silence! As I write this article, a large cyber-attack is going on — especially in the northeast portion of the United States. What would we watch or listen to if someone really did throw the big switch and crippled the Internet?

The advent of

Internet-delivered communication is quickly rendering RF transmission and distribution obsolete. Analog-anything is also just a memory! Changes in our listening habits have been profound. This new world really becomes obvious when a hurricane, tornado or earthquake visits your area. Four years ago, Hurricane Sandy made all of us humble. My neighborhood lost power for ten days. For many of us, we had to adapt to homes with no water, no power and no heat. Some families could literally not move far from home due to downed trees and floods. What to do?

My neighbors and I communicated either by cell phone or wired phone (or even in person!) as available. My name is synonymous with radio and I started getting requests. "Do you have a radio we can borrow for awhile?" The truth was revealed. Outside of radios in cars, people simply don't listen to a lot of radio anymore. When they needed to hear what was going on around them, they had no recourse.

Sandy also made another point perfectly clear. I live in a suburb of one of the largest cities in the world. There is plenty of population density in these parts! Yet, our nearby local AM medium wave stations have all adopted automated, syndicated and anonymous programming. Many are now off the air entirely. FM broadcasting is not much better. I live very close to the border between New York and Connecticut. I am just a few miles from a major city, Danbury, Connecticut, yet



Jen breaks the Internet (*The IT Crowd*, S3-E4.)

all their local stations ignore news from my area because I am in New York outside of their domain of business. Don't ignore me! I count, too! Amazing? Frustrating!

When I was in college in the 1970s, I worked at several local radio stations doing just about everything! What vital and exciting places they were! I remember being all by myself up at WFAS on Secor Road in Greenburgh when the entire northeast went black due to a serious power failure. Within an hour, the station was filled with people to help with news coverage. Everyone *was* listening to us! I also served as a correspondent during a local election at WGSM in Huntington. There must have been 50 people working that night on local live election coverage! Now, both stations are nothing more than computers and/or satellite receivers feeding transmitters. Very little human participation is necessary!

I live only 45 miles outside of the heart of New York City, yet no radio station survives that still covers my local area out in the suburbs. Most local newspapers have closed shop or downsized dramatically. You'll hear most about local events from gossipy neighbors! Facebook 'Moms' pages (like Chappaqua Moms) and maybe on a television service called *News 12 Westchester* operated by our local cable company. Journalism at its highest form!

I have to admit that having a ham radio HT (walkie-talkie) is a godsend when recovering from big local storms. Most of the local 2 meter FM repeaters remain on the air and I can trade news, notes and experiences with people all over my area. I would recommend that everyone should own a scanner to hear communications over 2 meter FM. It is the closest thing you can get to local radio these days. I should get everyone I know a simple AM/FM radio, but what would they listen to? The dominant wide-area news source is the mighty and powerful WCBS Newsradio 880 which can be heard for hundreds and even thousands of miles at night. They are not local to my hometown but they are very good at what they do. Their news coverage is beyond first-rate.

I confess, even I have succumbed to the reality of present day technology *and I do enjoy it*. My overall listening experience and audio quality have improved in legions. Goodbye static! Using Internet radio, I can listen to stations as far off as Radio New Zealand in full fidelity stereo in my car wherever I go. I now regularly listen to a music station from Martha's Vineyard in Massachusetts and talk radios KFI Los Angeles and WJR Detroit. I also enjoy WBZ Boston, CNN news radio from Atlanta and many podcasts are also available by voice recognition in my car. I say "Tune to 880 AM" and the radio miraculously starts playing WCBS. Magic!

After being a DXer basically since birth, this transi-

tion has been profound! I no longer have to crawl through endless amounts of noise and propagation to bring in exotic voices from far-off places. BBC World Service or BBC Radio Scotland is available at the press of a button. It's better than being there! All the places I love in the world seem so much closer now. I can listen



Craig Routzahn on WLEW-AM, 1340 kHz from Bad Axe, MI.

to Craig Routzahn reporting the news on WLEW 1340 AM from Bad Axe, Michigan anywhere I go. How cool is that?

Internet radio has also given broadcasters a huge plus: Suddenly, everyone is an international

broadcaster heard around the world! My favorite music channel, mvyRadio from Martha's Vineyard, keeps a running tally map on their web site showing where people are tuning in. See <http://www.mvyradio.com/map/>. No doubt, there are no limits! Their sounds are heard worldwide!

A passing analysis of today's mass media is also filled with irony. The one thing that encouraged everyone to first see television right after the Second World War was sports — specifically wrestling. Does history repeat itself? Fast forward seventy years and the one thing that is saving the concept of live television is sports and news. You just can't cover them effectively as an on-demand broadcast. Someone is going to spoil it for you and tell you all about that amazing play or the final score. To satisfy your audience you still have to do it *live!*

A very similar story is found in the world of radio. What an amazing invention it was when it came to fruition in the 1920s. Suddenly, everyone would be listening to the exact same thing all at once. Although the performers were standing, formally dressed in lavish studios, every listener played a part as members of the audience, wherever we might be. Next morning, a universal conversation might arise at work about last night's radio show. Open your windows on the day of the big game and you could hear the cheers as the home runs were hit. All of us shared the moment! Will this continue?

Now digital media, with immediate availability, threatens to take away the community we used to enjoy. No-one is listening to the one local radio station anymore! Teams of inventors and promoters are trying to regain the electricity we have lost. Radio and television has been rendered obsolete due to lack of convenience alone. All of my daughters, nieces and nephews

have little recognition of broadcasters and what they produce. TV and radio is now called YouTube or iTunes. Our apologies to all the emergency and civil authorities that now hunger for a tenable method of reaching their populace. *'Hey, guys! There is this century-old thing called a radio!'* A reply shouts back: *'but no one owns them anymore!'*

Another harsh reality about old-fashioned broadcasting really steers its rudder. No matter how exciting, immediate and entertaining radio and television can be... *they are a business.* You can never forget or deny that fact. In turn, it is much more economical to simply post files on-line for later retrieval by your audience. Twenty four hour a day programming is just not efficient. You want to access your favorite song or program (and be able to rewind and shuffle through it) **right now.** Who can wait?

Ongoing programming is also expensive. With on-demand streaming, you no longer need someone to arrange playlists, monitor quality control and continuity or even man and operate transmitters. Just think of all the money you can save. Use much less electricity, require much less real estate and construction (fewer offices and workspaces and no antenna towers!) Your web site can carry commercials and more ads can be interspersed into your posted digital files. More money for less effort. This makes terrific business sense. Let's do it! And we have.

Yet, in some respects, the more things change, the more they remain the same. Over 50 years ago, I received my first pocket transistor radio. It would bring in stations from seemingly everywhere, coming out of a

3 by 5 inch box, with that familiar little radio sound. Today, I still listen to a 3 by 5 inch box, with that same little radio sound, except its called an iPhone 6! It picks up more stations and has a *dual* earphone but the batteries run out just as quickly!



New and old radios. Fuji two transistor set from 1960 on the right.

So what *do* I listen to? It's a very personal blend of good talk, good music and virtual visiting back to places I should be. I rely on three Internet apps: TuneIn, iHeart Radio and Radio.com. Although there are exceptions that force you to install specific apps to receive single stations, you can hear literally hundreds of stations from all over the world with these three. From the U.K., I listen to BBC Radio Scotland, Capital FM and Smooth FM from London. France offers Fréquence3 and the dozens and dozens of offerings

from the NRJ group. NRJ has a 'station' for virtually any taste in music. Find adventure at <http://www.nrj.fr/>. RTE Radio One from Ireland offers some fascinating programming, too. In my car, I can choose from AM, FM, XM, iPod, Bluetooth, iHeart, Pandora and Slacker. Where do you even start?

On this side of the pond, the CNN TV audio simulcast and CBC Radio One keeps you in touch with current events. I can use my car's Bluetooth connection or Aux jack to hear streaming TV programming like the superior CBSN free 24/7 all news service. My local NPR



Internet news channel CBSN.

groups can be heard as well: WNYC New York, WNPR and WSHU Connecticut and WAMC Albany, New York and even WCMU in upstate Michi-

gan. Don't forget, SiriusXM radio still offers around 200 digital channels via satellite along with dozens of sports and traffic / weather audio streams. Another 50 specialty SiriusXM stations are fed online only. Use your imagination... what isn't on digital radio?

I must mention the spectre that never seems to go away called **HD Radio**. This is the supposedly compatible add-on digital AM or FM radio system used in North America. Its name connotes 'high definition' but only in the loosest sense. If anything, it maybe (?) should be called 'Hi-Fi' radio. In most cases, this piggy-back digital system provides simulcast copies of what is broadcast via analog transmission. You can listen to analog AM, digital AM and even a digital FM simulcast all of the same thing! The top-of-hour station ID gets elaborate! "WCBS, WCBS-HD and WCBS-FM HD-2 New York."

HD Radio also allows digital-only transmission of more than one stream per over-the-air carrier. You might hear alternative music, talk or ethnic programs on additional virtual channels. For example, CBS Sports Radio is found on WCBS-FM HD-3. I always wonder: 'Is anyone listening?' The programming is out there. Using HD Radio requires heavy licensing fees to the purveyors of the technology. Only the biggest stations can really afford it. It works for somebody!

An editorial comment: Today's radio listeners face a stark and impersonal world filled with endless choices. So many programs are offered to us, yet a majority are created by computers without a human touch. I really miss hearing actual human beings on the air. Except for morning drive-time (0600 to 1000) shows, most stations rely on nationwide syndicated talk or music services with pre-recorded 'tracked' announcers to fill up the rest of their broadcast days. The sound

is as chilly as cold steel. Music is impossibly repetitious. To this pair of ears, 'classic rock' was old 30 years ago. There are *new* bands now that play some great *new* tunes. Can you put today's performers on the air once in awhile, please? I would love to hear local talk and conversation, local sports like play-by-play of high school sports, local musicians and local events. What an incentive it would be to gain local listeners. I can dream, can't I?

One can only wonder about the future. Lifestyles are constantly changing. I can't possibly expect the world of the mid-20th century to continue into the 21st century. Those of us who grew up in the 1950s expect television and radio to always be a part of our worlds. Even more extreme, I enjoy being fluent in Morse code, first popular in the 19th century! Imagine going to an unemployment office looking for work. The reception clerk looks up at you and asks your profession. You cheerfully reply: 'Telegrapher.' OK... what's a telegrapher? Today's youth will remember Snapchat, Instagram and Club Penguin fondly. Zoom ahead to the year 2060 and you'll find all of them in the same dilemma you and I are in now!

Still, I fear that one day the sky will be falling. The Internet might really, really be halted one day. Will good old over-the-air radio still be on and available? (Maybe — unless they use an Internet IP studio-to-transmitter link!) Sometime in the future, someone will figure out how to stop the Internet and chaos will ensue. I don't want to be there when all the eggs in the basket smash to the ground. One of those eggs will include Internet-delivered television, radio, streaming and on-demand. Will over-the-air broadcasts still be broadcast over-the-air? Will the amateur radio operators of the world save the day? I hope we never find out!

We will always have our memories. Close your eyes and recall the sounds of Radio Caroline offshore and lightning fast DJ Jackson Armstrong on WKBW Buffalo. Late at night, Jean Shepherd told us stories unscripted (!) for an hour on WOR. Bob-A-Loo Lewis rocked top 40 hits on WABC. You could also relax to American Airlines' 'Music 'Til Dawn' with Sy Mann. I can hear them all through



my two transistor radio... I swear! It doesn't matter what decade or century you might find yourself in... sending pictures and voices to places far away really is magic!

73 es dit dit de N2KZ 'The Old Goat'.



Run Against Hunger 2016

The 36th Annual Run Against Hunger took place on October 16, 2016 around Croton-on-Hudson. PCARA was once again ably assisted by members of Westchester Emergency Communications Association (WECA).

Run history

After the untimely death in 1981 of Harry Chapin in a Long Island motor accident, concerned citizens in Croton-on-Hudson decided to honor the singer's



memory with an annual race in his name, raising funds to fight hunger and to provide food for children and adults in need. The race has been taking place every year since 1981. Organizations that benefit from the Run Against Hunger include the Cortlandt Emer-

gency Food Bank, the Croton Caring Committee, Caring for the Homeless of Peekskill (C.H.O.P.), Hillside Food Outreach in Pleasantville, the Food Bank for Westchester, and WhyHunger.

Meeting the organizers

Members of PCARA and WECA met with the Run Against Hunger's Race Director Jud Ramaker and Assistant Race Director Mike Grayeb on September 25. We heard about some changes to arrangements compared to 2015. The 5K Run has been changed to a Run/Walk. The one mile Fun Run would be divided into two groups: fourth grade or below and fifth grade or above. New arrangements would be in place for water distribution and the organizers should be informed of any water stations not ready on time. They should also be informed if the chain across the Croton Dam has not been removed before the 10K runners approach. Start of the 10K event has been moved from 11:45 a.m. to 12:00 noon so it no longer overlaps with the end of the Fun Run. The organizers would like to be informed of leading positions roughly one half mile from the finish for the first three male and the first three female runners.

These arrangements were communicated to PCARA members at the October meeting and to WECA members by Public Service Director Kathleen, KC2VCT. By October 15, operators had been assigned to nine of the fourteen requested radio locations.

The big day

Sunday October 16 began cold and still — the temperature was only 45°F at 7:20 a.m. as the Westchester County RACES communication truck pulled into Croton-Harmon High School, driven by Alan N2YGK. Alan parked the truck alongside the High School, started the generator then installed a high-gain dual-band antenna on the pump-up mast. He raised the antenna to full height, where it nicely cleared the roof of the school.



The Westchester County RACES communications vehicle pulls up outside Croton-Harmon High School. Alan N2YGK can be seen on the roof installing an X50A gain antenna.

With the lack of any breeze, generator fumes were collecting in a pool behind the back of the truck. A decision was made to change from the generator to local AC power, fed from the school building.

Two important station assignments had already been arranged. Net Control would be handled by WECA's Emergency Services Director Tom, WB2NHC. Tom settled into the operator position within the RACES truck and began preparing radios and computers for the task ahead. The Organizer's Shadow was once again Greg, KB2CQE. Greg was



The hydraulic mast on the back of the RACES truck extended to its full height of 42 feet.



Tom WB2NHC at one of the operator positions inside the RACES truck

equipped with ARRL safety vest, handi-talkie and clipboard. His objective would be to keep track of Jud Ramaker and Mike Grayeb as they roamed around the school grounds, ready to pass any messages that needed their attention.

5K Run/Walk

The first event of the day was the 5K Run/Walk, scheduled to begin at 9:30 a.m. from Old Post Road South, near Veterans Corners. The course proceeds along Truesdale Drive and Nordica Drive to the Croton Gorge Trail. The first Water Stop is at the beginning of the Trail and was assigned on Sunday morning to Steve, KD2OFD. At the second Water Stop where the trail meets Cleveland Drive Al, K2DMV was in position. And at the third post, where Cleveland Drive crosses Gerstein Street, Robert N2TSE was ready.

Your editor was monitoring the start of the race which began at 9:34 a.m. It took less than 20 minutes for the first runners to finish the course.



Start of the 5K Run/Walk near Veterans Corners.

Meanwhile a report came in from Water Stop 2 that one of the children taking part had become separated from her father but another adult would accompany her to the finish.

One mile Fun Run

The Fun Run is a short event intended mainly for youngsters. The course begins on Cleveland Drive, just south of Veterans Corners, then runs north to Gerstein Street and the turn-around point at Carrie E. Tompkins Elementary School, where Al K2DMV was located. The route turns back along Cleveland Drive and finishes in front of the High School. Your editor was once again at the start line to see two separate corrals of runners lined-up. The sun had disappeared behind clouds as runners from fifth grade and above with black bib numbers were first away. They were followed a few minutes later by a large group of everyone else, carrying red bib numbers. First runners were crossing the finish line less than ten minutes later.

10K Run

The main event of the day is the 10K Run which starts on Old Post Road South near the High School then proceeds northwest along Cleveland Drive and Wood Road, where it crosses Route 129. The course continues along Batten Road toward the New Croton Dam. The return route from the dam is along Quaker Ridge Road, crossing the river at Quaker Bridge Road. There is a short segment on Route 129, then a turn onto Gerstein Street, returning via Cleveland Drive to the High School.

There are four Water Stops around this course, plus three more Mile Points where radio coverage had been requested by the organizers. The last runner would be followed by the event Trail Car, marking the point where no more runners or walkers could be following behind. Combining the PCARA and WECA members who already had assignments with the additional members who arrived on Sunday morning, there were *just enough* operators to cover all points around the course.

10K Run, start time 12:00 noon

Station	Location	Operator
Net control	Croton-Harmon High School	Tom, WB2NHC
Shadow	Croton-Harmon High School	Greg KB2CQE
Trail car	Following last runner	Alan, N2YGK
Water Stop #1	140 Batten Road	Steve, KD2OFD
Water Stop #2	East end of Croton Dam	Robert, N2TSE
Mile Point 3	Croton Dam Rd & Quaker Ridge Rd	Henry, KB2VJP
Water Stop #3 / Mile 4	Danish Home	David, KD2EVI
Mile Point 5	Quaker Bridge Rd & Niles Rd	Mike, KB2IGG
Water Stop #4	Jacoby Street	Jared, KD2HXZ
Mile Point 6	Cleveland Dr & Alexander Lane	Al, K2DMV

Start time for the 10K race was drawing close, but there was still no sign of the Trail Car. A radio message to the organizers identified the vehicle (a gray VW) and the driver was located through the public address system. Alan N2YGK had been assigned to the Trail Car. He was carrying one of RACES' APRS-equipped mobile radios in its yellow go-box. This was soon connected to the

vehicle 12 volt supply and to a mag-mount antenna on the roof, just in time for the Trail Car to line up behind the runners at the 10K starting line.



Trail Car follows the runners across the start line.

Jared KD2HXZ, located at Water Stop 4, reported at 11:53 a.m. that no water had arrived yet. The information was passed along to the organizers and the situation was subsequently rectified with water arriving at 12:14 p.m. A report was received from Water Stop 2 that the dam road was open.

They're off

The 10K Run was due to begin at 12 noon. With clearing skies, temperature had risen to around 62°F. The organizers told runners waiting at the start line that they must be prepared for vehicular traffic as not all roads would be closed. The starting horn sounded at 12:00:41 and a mass of 211 runners surged past, followed by Alan N2YGK in the Trail Car.



Start of the 10K Run, close to the High School.

One aim had gone unfulfilled. The organizers had asked whether it would be possible to avoid mechanical distribution of synchronized stop-watches by using radio. A pair of electronic stop watches had been acquired to test the possibility at a couple of the radio stations, but with the late allocation of operators and

lack of additional personnel, this test will have to wait for a future event.

A report was received from Steve KD2OFD about concerned staff at Water Stop #1 because cars were coming along narrow Batten Road along with the runners, something that had not happened in previous years. The situation was confirmed from the Trail Car. Official response was that the traffic was expected as part of this year's plan.

At Net Control, Tom WB2NHC was able to keep a close eye on the speed and position of the Trail Car by monitoring APRS transmissions, viewing the actual location displayed on a computer map. This provided a fine-grained view of the event progress, rather than waiting for voice reports from the Trail Car as it passed each Mile Point.



Screen-shot of APRS display inside the RACES truck shows position of the Trail Car on Batten Road as it followed the last runner around the 10K course.

The technological leap of APRS caused a problem for Henry KB2VJP, located at Mile Point 3, which is screened from line-of-sight access to the High School by nearby high ground. Henry had been using the PCARA 146.670 repeater to reach net control after simplex communication proved unreliable. Henry had then been forced to return to simplex, after calls on the repeater went unanswered. This was because monitoring of 146.67 in the RACES truck had been transferred to a second transceiver while the main radio was being used for APRS reception on 144.390 MHz.

Al, K2DMV reported the first runners as they passed Mile Point 6, shortly before making their final turn at Veterans Corners into Old Post Road South. This information was passed to Mike Grayeb by Greg KB2CQE, ready for public address announcements as the leaders came into view at the High



Greg, KB2CQE.

School. First across the finish line was #99, Timothy George, in 38 minutes. The first female runner was #87, Kirby Mosenthal in 42 minutes.



First across the 10K finish line was #99, Timothy George after only 38 minutes. Details of the leaders had already been passed to the race organizers by radio.

Progress of the Trail Car was still being monitored by Net Control as it continued around the course. Once it had passed a Mile Point or Water Stop, the radio station there could be secured and operators thanked for their help. By 1:44 p.m. the Trail Car had reached Mile 6, and a few minutes later the last runner crossed the finish line.

Conclusions

Once again, radio communication at the requested Mile Points and Water Stops headed off difficulties and could have been used to summon emergency assistance if needed. There were only just enough volunteers to assign an operator to each station, allowing no spare capacity for location backup or other tests.

As a reminder of the problems that *can* arise when a large number of runners are at full stretch, the Croton EMS ambulance, located near the finish line, had to evacuate one casualty.

Simplex communication worked well for stations close to Net Control, but there were problems with communication to the handi-talkie at Water Stop 1 on Batten Road and with the repeater link to Mile Post 3, east of the Croton Dam.

Tom WB2NHC suggested using a remote-base setup in future to cover the more difficult locations and to move all station activity to a 2 meter repeater — so everyone taking part could hear what was going on. It may be worthwhile testing this in spring 2017, ahead of the next Run Against Hunger.

Thanks to everyone from both PCARA and WECA who took part in the 2016 event. We could not have done it without you.

- NM9J

NY State QSO Party 2016

Peekskill/Cortlandt Amateur Radio Association's entry into the New York State QSO party was once again hosted by Joe, WA2MCR. Joe had set up an HF radio station in his sun-room, with an Icom IC-7410 transceiver and computer-assisted logging. The PCARA club call W2NYW would be in use, from Westchester County (WES).



An invitation to join the activity had been included in the October newsletter and mentioned at the October meeting. A reminder was also sent to PCARA's revived Yahoo Groups distribution list by Lou, KD2ITZ. As a result, Joe was joined by three members during the QSO Party operating period of 10:00 a.m – 10:00 p.m. EDT on Saturday October 15.

First to join in the fun at Joe's location was Charles, N2SO. Charles had brought along his Begali paddle and Ultra Pico Keyer — which is a tiny memory keyer. Charles had two sessions in the operating chair, before and after lunch. NM9J filled in around these gaps.



Charles N2SO hunts for counties in the New York State QSO Party, while Joe, WA2MCR watches over the software.

Later in the evening, Lou KD2ITZ joined the party. As a recent convert to CW, Lou was keeping a close eye on contest operation with Joe's automated CW set up, and was also taking part in SSB contacts as conditions changed to night-time mode.

Joe was using his ZS6BKW multiband dipole antenna, suspended high in the trees. This performed well on 20 meters and 40 meters. It would also tune up over most of 80 meters using the IC-7410's built-in antenna tuner. Activity was high, especially in the



Lou KD2ITZ (left) and Joe WA2MCR look for night-time contacts during the NY State QSO Party.

phone sections of the band, where we were sharing frequencies with Scouts enjoying their Jamboree on the Air plus DXers taking part in the Worked All Germany contest.

Joe was using N3FJP's contest software for the QSO party. This should be familiar to anyone who has used similar software at PCARA Field Days. At the end of the event, Joe totaled the band scores with the following results:

New York QSO Party 2016, W2NYW, WES

Band	CW	Phone	Total
80m	27	57	84
40m	62	185	247
20m	0	21	21

Total contacts = 352
 Total points = 37,926

Total points are calculated by multiplying the QSO points (with 2 points per CW contact) by the number of multipliers — consisting of NY Counties worked (62 max) plus U.S. States (50 max), and Canadian Provinces (9 max). For the New York counties, 53 out of a possible 62 counties were contacted.

PCARA sponsored two awards for the 2016 New York QSO Party. The first plaque will be for the top entrant in the NY Multi-One Low Power category. Multi-one means multiple operators with only a single operator at a time. Low power means 5-100 watts. The second plaque will be for the top Non-NY SSB Low Power entrant.

Here is a summary of results from past New York QSO Parties for comparison with 2016:

Year	QSOs	Points	Multiplier	Claimed total
2013	300	345	83	28980
2014	463	548	100	54800
2015	292	359	81	29079
2016	352	441	86	37926

Logs have already been submitted. Keep an eye on the NYQP web site, <http://nyqp.org>, hosted by Rochester DX Association for the final results which should appear in early 2017.

- NM9J

Holiday Dinner

The 2016 PCARA Holiday Dinner has been arranged at the same location as in recent years, the **Cortlandt Colonial Restaurant** in Cortlandt Manor.



The event begins at 5:00 p.m. on Sunday December 4.

The restaurant is located at 714 Old Albany Post Road. Take the Bear Mountain Parkway to the Highland Avenue exit, then head north. Proceed down Highland Avenue and cross the bridge. The restaurant and car park are immediately on the left, just before the 'rock cut' (or what's left of it).

The dinner menu is the same Package Number Three as in previous years. This includes:

Open Soup and Salad Bar
Soda, iced tea and soft drinks (unlimited)
 ☞
choice of:
Prime Ribs of Beef
Grilled New York Strip Steak
Grilled Pork Tenderloin Medallions
Jumbo Shrimp with crabmeat stuffing
Chicken Marsala
Penne ala Vodka

Cost will be \$40.00 per head including service, but not including any alcoholic drinks.

Fall backward 🕒

Here is a reminder that Daylight Saving Time ends at 2:00 a.m. on Sunday November 6, 2016. Remember to change any of your clocks that still require manual adjustment.

Also bear in mind that the change from Eastern Daylight Time to Eastern Standard Time takes place on the same Sunday as PCARA's November meeting, which starts at 3:00 p.m. EST. Be sure to change your clocks, or you might turn up one hour too soon for the meeting.

Essential₂ enameled

This is another of the occasional *PCARA Update* articles explaining how chemistry is “essential₂” amateur radio, electronics and life in general. This time we are taking another look at wire insulation — but not the PVC insulation that surrounds the flexible cables in our homes and radio shacks. (That topic was briefly covered in “Essential₂ radio” in the July 2006 issue.)

Instead we’ll look at the semi-flexible wire used to wind inductors in electric motors, generators, transformers, coils and loudspeakers. This is generally known as **magnet wire** or **enameled wire*** and consists of a single-strand metal conductor, covered with a very thin layer of flexible, polymeric insulation.



Spool of magnet wire.

* (*Enamelled* has a double-*l* in British English).

What is it?

When you think of **enameled metal**, you may be picturing those vitreous enamel street signs, station names and advertising hoardings, that are manufactured by fusing powdered glass onto a heated steel sheet. Another application is enamel ovenware, where a vitreous coating is applied to pots and pans by fusing glass particles to a metal surface. These types of covering would be most unsuitable for wire insulation as the glass is brittle and would crack off whenever the wire was flexed or wound onto a reel.

Instead, we need a thin, durable coating that adheres strongly to the metal wire, but which is flexible enough to withstand coiling and uncoiling. Magnet wire is almost always wound with closely-spaced turns, so the insulation must prevent short circuits between adjacent turns and layers. Depending on the application, the insulation may also need to withstand high



Enameled metal station sign from the London Underground.

temperature and voltage.

The term “enameled wire” probably comes from “enamel paint”. When wire coatings were first developed, enamel paint was a natural oil-based paint which could be air-dried to a high-gloss finish.

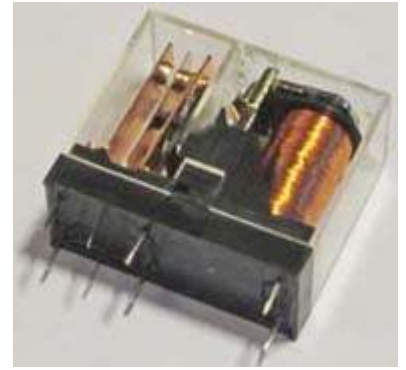
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A little history

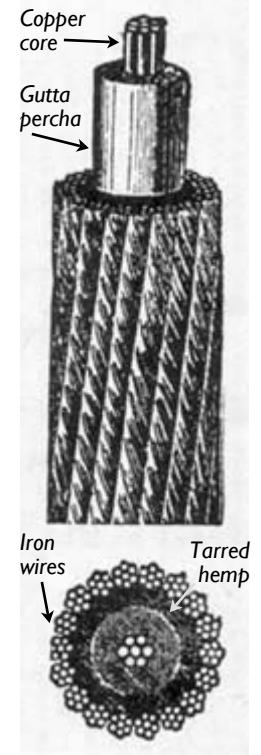
We need to travel back to the early days of electrical cables for the first uses of enameled wire. Conducting wires were initially insulated with a bulky braiding of silk, cotton or other natural fibers. This additional bulk was undesirable when coils were being wound with closely-spaced turns. The natural materials employed did not resist penetration by water, so insulation could be compromised and the metal conductor might become corroded.

To improve water resistance, telegraph cables were insulated with natural materials such as gutta percha or vulcanized India rubber, surrounding the copper and steel wire employed as conductors. Around 1858-1860, before applying the gutta percha, copper wire was first coated with **shellac** (a natural resin from the lac insect) to prevent any moisture reaching the wire through imperfections in the gutta percha insulation. This thin coating could be improved by addition of linseed oil (obtained from flax seeds and a component of varnish and oil paint.)

For generators and electric motors, a heat resistant and water resistant wire insulation was needed. One of the early materials tested was **collodion**, a solution of cellulose nitrate in ether and alcohol, but this material was dangerously flammable and slowly decomposes to form corrosive products that not only degrade the insulating properties but also attack the copper wire.



The coil of this electromagnetic relay is wound with closely spaced turns of magnet wire. Wire enamel prevents short circuits between adjacent turns.



Atlantic telegraph cable of 1857 had a core of stranded copper wire surrounded by gutta percha, followed by tarred hemp and stranded iron wires.

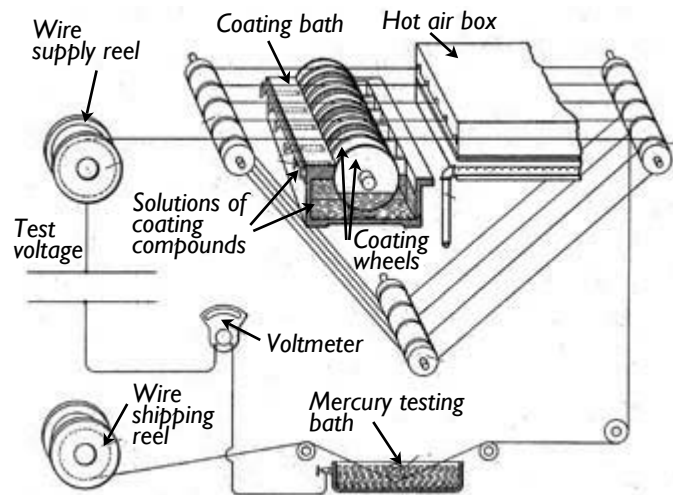
Thomson-Houston and GEC

In 1879-1880, British-born chemist and electrical engineer Elihu Thomson co-founded a Connecticut company that subsequently became the Thomson-Houston Electric Company — and was then merged in 1892 with Edison’s company to form the General Electric Company. Thomson was a giant of the early electrical era, receiving more than 700 patents for his inventions. In 1902 Thomson and John Callan were granted U.S. Patent 695,127 for an “Insulated Conductor”. In order to overcome the problems of flammable cellulose nitrate, they recommended substitution of **cellulose acetate**. A film of Canada Balsam (fir tree resin) was first applied to the bare copper wire to improve adhesion. This was followed by coatings of cellulose acetate



Elihu Thomson.

with plasticizers such as phenol and castor oil, all dissolved in chloroform. The volatile solvent was then evaporated by passing the wire multiple times through a heated box. Thomson and Callan claimed their coated wire was suitable for magnet coils where the temperature could reach 100°-105°C.



Apparatus for wire coating as described by Elihu Thomson and John Callan in US Patent 695,127.

Dudlo Manufacturing

Meanwhile, in 1901 electrical engineer George Jacobs had transferred from the General Electric Factory in Fort Wayne, Indiana to the Sherwin-Williams paint factory in Cleveland, Ohio. In 1906 he began work on the manufacture of fine-gauge “enameled wire” suitable for the ignition coils of early automobiles. Working at home, he formulated a

number of volatile, odorous compounds then baked them onto wire in his wife’s oven. Early products cracked and peeled, and produced flammable fumes. By a process of trial and error he found a formulation that could be easily applied and did not flake off the wire when flexed. By 1910 he was able to produce fine enameled wire in small quantities in a rented building in Cleveland.



George Jacobs.

George Jacobs’ father-in-law W.E. Mossman offered to back the invention with more capital if the family would re-join him in Fort Wayne, IN. In 1912, Jacobs founded a new firm, the Dudlo Manufacturing Company — the name “Dudlo” is derived from Dudley, MA where Jacobs was born, plus Ohio. The company moved into a barn-like building in Fort Wayne in 1914. More buildings were added as production expanded. Dudlo Manufacturing would become the originator of the modern process for enameling of magnet wire.




Dudlo Manufacturing’s first building in Fort Wayne, Indiana.

Jacobs kept the composition of his wire enamel secret. The formula was known only to himself and one other member of staff. The pungent material was mixed in an underground room, then pumped to the wire coating facility. Only two of the ingredients used in the mixing room are known today — high-flash naphtha, a product of crude oil distillation, and tung oil, an oil used in paint and varnishes, manufactured from tung tree nuts. A 1923 fire in the vents of the enameling room testified to the mixture’s flammability.

Dudlo Manufacturing had great success with the Model T Ford, introduced in 1908. The Model T ignition system had a magneto to provide electrical power, with **four** “vibrator” coils to generate high voltage for each of the four spark plugs, and a “timer” to ground the appropriate coil as the crankshaft rotated. The Dudlo site in Fort Wayne began producing ignition coils for Ford in 1913. By 1916, volume had grown significantly.

In its early years, Dudlo Manufacturing had purchased wire from commercial suppliers, then coated the wire with enamel and wound it onto spools for different applications. From 1917, the company began producing its own wire from bought-in quarter-inch


MAGNET WIRE
for
RADIO PURPOSES



DUDLO MAGNET WIRE

When winding those coils for your set, why not avail yourself of the advantages to be gained by using the magnet wire that for the past twelve years has been approved and used by the government and largest manufacturers of radio and other electrical apparatus. This wire, developed to meet the exacting requirements of radio apparatus construction, can now be purchased from your dealer in standard packages containing 1 pound of wire in any one of seven different insulations including enameled, single cotton enameled, single silk enameled, single and double cotton covered, single and double silk covered. Look for the distinctive yellow carton bearing the Dudlo trade-mark, and on one side of which is listed a table of wire diameters.

Your
Guarantee
Of



Quality
And
Satisfaction

Dealers: If your jobber cannot supply you, write

Dudlo Manufacturing Co.
Fort Wayne, Indiana
Western Representative
A. S. Lindstrom, 111 New Montgomery St.
SAN FRANCISCO, CALIFORNIA

MENTION QST WHEN WRITING TO ADVERTISERS

Dudlo magnet wire ad from QST, July 1922.

Pre-war chemistry

In 1933, production at Fort Wayne was moved to Rome, NY. Subsequently, **Essex Wire Corporation** began production at Fort Wayne in 1936 and took over most of the old Dudlo site.

Pre-war chemistry

At this stage in the story, a typical 1930s formulation for enamel coating of magnet wire might be a mixture of varnish derived from drying oils such as linseed or soybean, combined with natural gums such as copal resin plus a solvent which would evaporate when the coated wire was heated to 300° – 500°C to bake the varnish.

In order to improve properties, natural materials were being replaced with synthetic polymers, such as modified phenol-formaldehyde resins as used in Bakelite and drying-oil modified alkyd resins that were being developed for the paint industry.

rods of electrolytic copper. The copper rod was annealed and coated with tallow, then fed into a mill with steadily reducing die sizes to produce finer and finer gauge wire.

Radio and telephone manufacturers became customers for Dudlo Manufacturing's wire. The site was visited by Powell Crosley Jr., and Lee De Forest. Other customers included Magnavox, Atwater-Kent, Emerson, Steinite and Stromberg-Carlson.

By 1922, Dudlo was the largest magnet wire manufacturer in the U.S.A. By 1927 the company had produced 35 million pounds of enameled wire. But in 1927 with the depression looming, Dudlo was merged with several other wire manufacturers, including Westinghouse's Standard Underground Cable Company of Rome, NY to form the **General Cable Corporation**.

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Modern materials

Today's manufacturer of enameled magnet wire has several synthetic polymers available for coating the wire. Choice is mainly driven by the temperature at which the coiled wire can operate safely, which can range from 105° to 240°C. The thermal classes of magnet wire are defined by **NEMA**, the National Electrical Manufacturers Association. Magnet wire operating within each NEMA class should have a lifetime of at least 20,000 hours at the rated temperature.



Thermal Class A

Beginning with the 105°C grades, **plain enamel** wire as originally used in automobile ignition coils is still available for the pickup coils of electric guitars and other stringed instruments. Guitar experts are exacting about their pickup coils, claiming that synthetic oleoresin "plain enamel" insulation provides superior sound to the alternative insulator Formvar.



Magnetic pickup for an electric guitar is wound with 'plain enamel' copper wire. Six permanent magnets create a magnetic field around each steel string. A vibrating string modifies the magnetic flux, which is picked up by the coil.

Formvar, originally developed by Monsanto and also known as polyvinyl formal varnish is a copolymer of polyvinyl alcohol, formaldehyde and polyvinyl acetate. Formvar has been in use for over 60 years. 105°C Formvar-insulated wire resists abrasion and is highly resistant to mineral oils. As well as guitar pickups, it can be used in oil-filled transformers, motors and solenoids.

Class F

Moving up to 155°C wire grades, the usual type of insulation is **polyurethane**, or polyurethane with a top coating of **nylon** to improve windability. Polyurethane enamels are also used in paint. They were originated by German manufacturer I.G. Farben in 1937. Polyurethanes are manufactured by cross-linking (for example) toluene diisocyanate with a diol or polyester such as poly(glycerol adipate).

Polyurethane enamel wire is "solderable" — the copper metal under the insulation can be soldered wire-to-wire or wire to solder tag without scraping by simply heating the insulation to the temperature of molten solder, typically above 350°C. The polyurethane

decomposes, leaving a fresh copper surface for the molten solder to alloy to. Since one of the decomposition products of polyurethane could be toxic toluene diisocyanate, the work-area needs to be well-ventilated.



Polyurethane enamel can be removed by heating the wire with a soldering iron.

Applications of polyurethane-enameled wire include high frequency coils, relay coils, transformers and motors.

Class H

The next class of wire insulation is 180°C. Some polyurethane enamels can be used in this range, where they are recommended for **RF coils**. The alternative, **polyester**, is *not* solderable. Instead, the insulation has to be removed by flame or by an insulation-piercing termination. When combined with a nylon topcoat for abrasion resistance, polyester finds application in encapsulated coils, relays, ferrite pulse transformers and small appliance motors. A typical formulation for wire enamel would be the polyester reaction product of dimethyl terephthalate with ethylene glycol and glycerol, dissolved in xylene or ethylene glycol monomethyl ether. See “Essential₂ antennas” in *PCARA Update* September 2006, page 5 for more on the chemistry and applications of polyesters.

Another product used in 180°C class wire enamel is **polyester-imide**, which *is* solderable, though at higher temperatures than polyurethane. The polyester is first applied as a base coat, followed by a top layer of **polyamide-imide** derived from a tricarboxylic acid such as trimellitic acid and a diamine. The polyamide-imide can be dissolved in a solvent such as cresol (which is toxic) or in N-methyl-2-pyrrolidone (NMP).

This type of insulation has excellent solvent resistance and is used in electronic coils, small appliance motors and tool motors. Polyester-imide wire enamels are some of the most versatile types manufactured today and they are used worldwide in significant tonnage.

Class K

The next wiring class is 200°C. The wire enamel for this temperature range is usually **polyester/amide-imide**, using a polyester based on tris(2-hydroxyethyl) isocyanurate, or THEIC.

A special polyester formed from THEIC and terephthalic or isophthalic acid, combined with a traditional polyester is first applied to the wire as a base-

coat. A topcoat of polyamide-imide is then added for improved windability and shock resistance. This type of enameled wire is highly resistant to moisture and chemicals. It is also resistant to **Freon refrigerants** as employed in hermetically-sealed compressor motors for refrigerators and air conditioners. The same wire is also used in generators, transformers and coils, and as a general-purpose enameled wire for rewinding of electric motors in motor-repair shops.



Temco 200°C 8 AWG magnet wire has a modified polyester base-coat and a polyamide-imide top-coat.

Practical points

What does this all mean for our hobby? If you purchase a small spool of magnet wire for winding an HF coil or a toroid, it's highly unlikely that the supplier will tell you anything about the chemistry of the enamel or the temperature class.

One exception is Powerwerx, which supplies magnet wire to various standards, see <https://powerwerx.com/magnet-wire>.

If you are in the market for a *large* quantity of magnet wire, you can always go direct to the manufacturer for full specifications.

One point to bear in mind is the difference between vintage power transformers and their modern equivalents. Older transformers were insulated with natural resins and potted in materials such as bitumen. As a result, operating temperatures had to be held in check. When this type of transformer overheated, you could immediately tell from the odor of burnt insulator.

Modern transformers and electric motors can be designed to run at much higher temperatures, thanks to rugged, efficient wire enamels and the thermoset molding compounds used to hold the wire coils in place. As a result, transformers and motors can be smaller and operate at much higher temperatures than you might expect. You could easily suffer a burn while touching the hot surface, so take care.

- NM9J



Peekskill / Cortlandt Amateur Radio Association

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Newsletter contributions are always very welcome!

Archive: <http://home.lanline.com/~pcara/newslett.htm>

PCARA Information

PCARA is a **Non-Profit Community Service**

Organization. PCARA meetings take place the first Sunday of each month* at 3:00 p.m. in Dining Room B of NewYork-Presbyterian/Hudson Valley Hospital, Rt. 202, Cortlandt Manor, NY 10567. Drive round behind the main hospital building and enter from the rear (look for the oxygen tanks). Talk-in is available on the 146.67 repeater. *Apart from holidays and July/August break.

PCARA Repeaters

W2NYW: 146.67 MHz -0.6, PL 156.7Hz

KB2CQE: 449.925MHz -5.0, PL 179.9Hz

N2CBH: 448.725MHz -5.0, PL 107.2Hz

PCARA Calendar

Sun Nov 6: PCARA Meeting, New York-Presbyterian Hudson Valley Hospital, 3:00 p.m. **Go-Box** show and tell.

Hamfests

Sun Oct 30: LIMARC Hamfest, Levittown Hall, 201 Levittown Parkway, Hicksville, NY. 9:00 a.m.

Fri Nov 25: Fairlawn ARC Auction, Fair Lawn Senior Center, 11-05 Gardiner Road, Fair Lawn, NJ. 6:30 p.m.

VE Test Sessions

Nov 5, 12, 19, 26, 29: Westchester ARC Radio Barn, 4 Ledgewood Pl, Armonk, NY. 12:00. Pre-reg M. Rapp, (914) 907-6482.

Nov 10: WECA, Westchester Co Fire Trg Cen, 4 Dana Rd., Valhalla, NY. 7:00 p.m. S. Rothman, (914) 949-1463.

Nov 13: Yonkers ARC, Will Library, 1500 Central Ave, Yonkers, NY. 1:00 p.m. Pre-reg John, WB2AUL, 914-969-6548.

Nov 18: Orange County ARC, Munger Cottage, 183 Main Street, Cornwall NY. 6:00 p.m. Joseph DeLorenzo (845) 534-3146.

Nov 21: Columbia Univ ARC, 531 Studebaker Bldg, 622 W 132nd St, New York. 6:30 pm, Alan Crosswell (212) 854-3754.



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