PCARA Update

Volume 20, Issue 1 Peekskill/Cortlandt Amateur Radio Association Inc. January 2019

New Year buzz

Welcome to a New Year! We ended 2018 with the **PCARA Annual Holiday Dinner** on December 2, 2018 at the Cortlandt Colonial Manor Restaurant in Cortlandt Manor, NY. The event was well attended with 16 folks, not an overflow crowd like the previous year, but the chocolate cake showed up with the correct PCARA inscription! A marvelous time was had by all.

PCARA Holiday Dinner on December 2, 2018.

The next event in December was the **PCARA Breakfast**, held at Turco's in Yorktown Heights, NY on the 15th. The breakfast was well attended with much Holiday Spirit in the air. At the breakfast Mike W2IG (formerly W2IGG – new vanity call) announced that the next **PCARA VE Test Session** was scheduled for Saturday January 19, 2019 at 11:00 a.m. at the John C. Hart Memorial Library in Shrub Oak, NY. Keep that date in mind, because the next **PCARA Breakfast** will take place at 9:00 a.m. that same day at Turco's in Yorktown Heights, NY. Please consider joining us for breakfast and/or test session.

On December 24, 2018 PCARA participated in another annual tradition — providing parking assistance for Christmas Eve Mass at the Church of the Holy Spirit on Crompond Rd in Cortlandt Manor, NY. Thanks to members Bob N2CBH, Malcolm NM9J, Al K2DMV and David KD2EVI who turned out to help provide service and support for our community. THANK YOU.

If you are looking for a winter project, think about attending the **PCARA UHF Workshop** on January 16, 2019 at 7:00 p.m. at the Town of Cortlandt CUE Room in the Cortlandt Town Center on Route 6 in Mohegan Lake, NY. [Further details on page 10 -*Ed.*]

Ham Radio University is being held this year on Saturday January 5, 2019 at LIU/Post, Hillwood Commons Student Center, 720 Northern Boulevard, Brookville, NY. For more information please visit: http://www.hamradiouniversity.org. Anyone interested in going should reach out on PCARA Yahoo! Groups at https://groups.yahoo.com/neo/groups/Peekskill_Cortlandt_Amateur_Radio_Assoc/info, and try and arrange a carpool.

We begin 2019 with the **PCARA Annual Bring and Buy Auction** at our next regularly scheduled monthly membership meeting on January 6, 2019 at 3:00 p.m. at New York – Presbyterian / Hudson Valley Hospital in Cortlandt Manor, NY. Please take a few minutes to look around your shack and see if you have any items that you may no longer want or need, and bring them along to the January 6th meeting. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

Contents

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.

contd. p2 ⇨

Adventures in DXing

- N2KZ

Making ARRL Great Again

One hundred years ago, The American Radio Relay League was originally organized to form an efficient system to transfer and send messages from place to place around the world. It also served as a society for amateurs to exchange ideas, develop technologies, organize activities and simply have fun.

Many things have transpired in a century of operation. The amateur community has always been an impressive collaborative think-tank. Hams always continue to advance electronic technology. Each clever miracle moves us towards tomorrow. We are living in a world inconceivable to our ARRL founders back in 1914. Amateur radio has had an enormous impact in the world we know today.

Consider the concept of the handheld transceiver. Hams have been an integral part of its development since the birth of this idea. Repeaters, phone-patch, linked systems with automatic handoff, multiple receive sites have all added value to this idea. Continual refinement, breakthroughs in miniaturization — and — manufacture in enormous quantities all combined to create one of the great technologies of our lifetimes. Nearly everyone owns one today. It's now called a *cellphone.* When hams collaborate amazing things can happen!

During the first century of its existence, the ARRL itself has dramatically grown in size and complexity. It is now known as a multi-faceted organization way beyond the dreams and imaginations of their founding fathers.

Where is The League today? My friend George, NY9A, summarized the situation succinctly: "They have become too professional to be amateur." The man makes an excellent point. No pun intended, The League has become beleaguered in internal politics and finance. Many see it as primarily a big business focused on publishing. Think of the ARRL and your first vision might be *QST* magazine and ARRL books. Is that all there is? Is that all that it can be? Hardly!

A Whole New World

This article is meant to serve as inspiration and motivation to bring new life and purpose to the League. Let's invigorate the crew at ARRL headquarters in Newington — and its affiliate clubs — and the 160,000 members that support the League every year.

Joe WA2MCR waits to tour ARRL's Headquarters building in Newington, CT during the League's 2014 Centennial.

We can be equally innovative in public involvement and relations as we have been in business management and technological advances. Maybe it is time to get back to basics. Maybe we should remember that ham radio is a hobby. Hey! Hobbies are supposed to be fun!

A good first step is to understand where the League stands today. A very good place to start an evaluation is to carefully read the ARRL Annual Report for 2017. You can find a PDF copy at: http://www.arrl.org/annual-reports . I know I was amazed at some of the activities and charity efforts that are mentioned within.

Although many of the items seen in the *Annual Report* might be described in our monthly *QST* magazines, you might not recognize their impact and importance until you read it in the context of this presentation. Read and learn! The League is quite a complicated organization.

continued from page 1:

PCARA Board

President:
Greg Appleyard, KB2CQE; kb2cqe 'at' arrl.net
Vice President/Treasurer:
Joe Calabrese, WA2MCR; wa2mcr 'at' arrl.net
Secretary:
Lou Cassetta, KD2ITZ, radiocassetta 'at' gmail.com
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Bob Tarsio, N2CBH
Mike Dvorozniak, W2IG

When you have digested this primer about the ARRL, consider what more we can do. An encouraging sign of health is when a group's membership is constantly motivated to improve today's status quo. Let me share some of the best ideas I have heard from fellow hams recently.

ARRL 2017 Annual Report.

Look Local

A very basic step would open the League to full membership participation. Many of us feel the League is a faceless monolith run by representatives we never interact with. It would be wonderful to bring a new feeling of *partnership* between the League and individual clubs and members. As it stands today, many of us feel the League is quite autonomous with respect to anything we do locally. How much can you learn about clubs in our area through the ARRL? How much does the ARRL know about us? We can do more!

Through the pages of *QST* and the ARRL web site (http://www.arrl.org/) you *can* discover when special event stations and other activities will happen. If you are a newcomer, these listings may be hard to navigate. Let us suggest developing an on-line database at arrl.org we could use to discover many things that are *local.*

ARRL web site can be difficult to navigate until you become familiar with it.

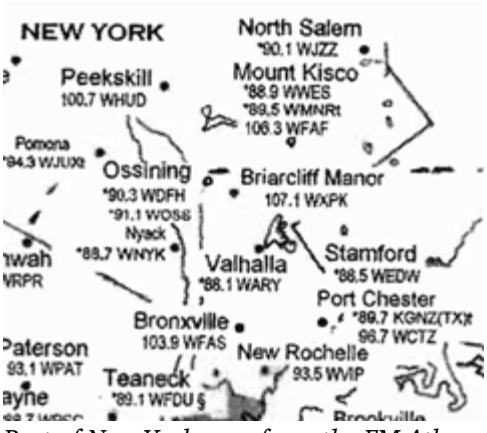
You can't enjoy a hobby if you don't know what is going on and how to participate. If the ARRL web site could become the center of all things amateur radio members would learn about *everything ham radio* happening nearby their QTH. Just enter your zip code and read about the events of not just one club but *all of them!*

Help newcomers (and all of us!) easily discover the world of ham radio! There would be no need to visit the sites of PCARA, PEARL, WECA, CARA, Mount Beacon, QSY, Rockland Repeater Association and many more to gather information! One site could show you all the events (not just special events) for your area all at once.

Similarly, it could also be a great central place to exchange ideas: Everything you wanted to know about staging a fox hunt, a 70cm class, a simplex challenge, an emergency preparedness demonstration or providing support for a church or charity event. Learn how to attract potential hams that are in school or motivate a retirement community to enjoy the ham radio hobby! Learn about activities you have never tried before: EME moonbounce, contacting the International Space Station or building an easy, useful project. I know a lot of groups have sponsored events like this. Wouldn't it be great to share our experiences? Just reading about what others have done may motivate you to try too!

The ARRL site could also promote not only their own publications but also the work of affiliated clubs like PCARA. It would be a breakthrough if we could see reviews and a sample page or two of the vast variety of books published by the ARRL — or — club newsletters from around the country or around the world. The things we could learn! The ARRL could also mention when annual guides are due for updates. You don't want to buy an edition that will be updated next month!

Many other ARRL resources could be revised and improved. Take a look at the legacy of work produced by Bruce Elving of *FM Atlas* fame. For years and years, Bruce produced a unique map-based book filled with every FM radio station in North America by callsign, frequency and transmitter location for the FM DXer community. Just a quick look at his maps and you would know what is around you and what could be heard.



Part of New York map from the FM Atlas.

Imagine how useful a book utilizing the same style would be when looking for local amateur radio repeat-

ers. I challenge you to search for your area's repeaters using the current ARRL Repeater Directory based on city or region of record alone! Also imagine if each ARRL book had an on-line comments page where readers could add their experiences and personal developments. Buying an ARRL book would have double value!

Similarly, if every club would produce a newcomer's guide describing how to get started maybe we could see many more new Technicians get on the air. It's not easy to learn all about HT transceivers, operating practices, how to find and configure your HTs for local repeaters and local club activities without a guiding light or two. Make configuration and orientation easy to do yourself!

With earned respect, we certainly acknowledge the ARRL's current website offerings like their searchable *QST* library, Logbook of the World and the important work they achieve in protecting our spectrum use rights. It never hurts to aspire to further improve today's League. This is the theme of this month's article.

Value Added

All of these new ideas and concepts might take a lot of planning, investment and hard work... but it would be worth the effort. New on-line resources could become enticing incentives for people to join the League. Ask not only what the League could do for you but what you could do for the League! En masse access and participation is the key!

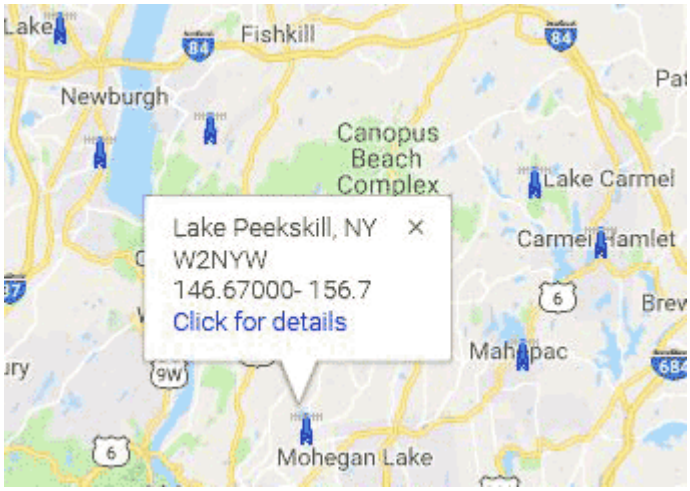
A good overall strategy for the League would be to build a comprehensive bouquet of informational and inspirational resources to make ARRL membership enticing and worthwhile. Imagine people saying "Look what I found on the ARRL website!" For $49.00 a year, the ARRL needs to demonstrate the value their resources hold within. The ARRL is a membership club. Become an active member!

Lower introductory rates for students and seniors should be promoted with more vigor. Did you know that the ARRL offers a $25 annual membership fee to everyone under the age of 21 provided they are the eldest licensee in a family? Another progressive leap would be to offer a reduced membership rate delivering *QST* magazine in only a digital form. Many clubs have moved to on-line delivery of publications with great results. In the future, a reduced rate and/or free distribution of *QST* should be offered to public libraries to attract new members, too.

As you read this article, I hope that you might have useful ideas and comments, too. Send your ideas and comments to: pcaraevents 'at' gmail.com. I look forward to what you can add or suggest!

Some Postscripts

Looking for an easy-to-use search site to discover nearby repeaters? The best one I have discovered is repeaterbook.com. Here repeater searches are free. Start at their proximity site: https://www.repeaterbook.com/repeaters/prox.php . Enter your band (like "2 m"), location by Zip Code and then change the radius to 15 miles. Scroll down a little to 'search' and this should result in a fast quick list of surrounding repeaters to try with your HT.



Sample map for 2 meters produced by repeaterbook.com

PCARA will be presenting a brief class all about the 70 cm / 440 MHz band on Wednesday night, January 16th at 7:00 p.m. Look for us at the Cortlandt Town Center CUE Room, 3131 East Main Street in Mohegan Lake, NY (in the Cortlandt Town Center behind the movie theater.) Bring your HTs, transceivers and antennas with you to experiment with. For more information, see the PCARA Facebook page.

Join us for the ARRL's annual Straight Key Night. The event starts at 7:00 p.m. New Year's Eve and ends 24 hours later at 7:00 p.m. New Year's Day. This is a fun contest where hams meet sending code by manual straight keys and 'bugs.' Even if you don't know Morse code, tune in to hear what a ham band sounded like 50 or more years ago. Many hams use vintage tube equipment and lots of very interesting contacts are made. Very slow speed code is welcomed and encouraged. Look for this activity on 3525 to 3600 kHz and 7025 to 7125 kHz.

Technicians can operate within these frequency ranges provided they use CW at below 200 watts output.

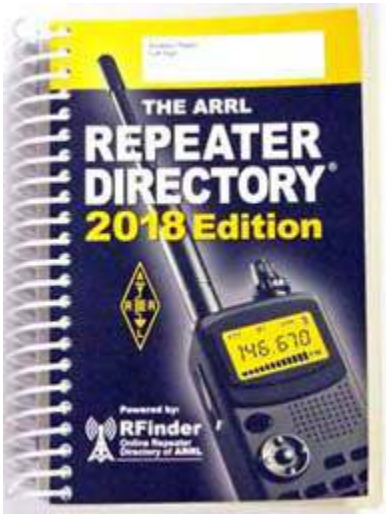
Don't forget the weekly PCARA Old Goat's Net on Thursday nights at 8:00 p.m. on our 2 meter repeater: 146.670 MHz, minus 600 kHz offset and please use a 156.7 Hz PL. All welcomed! Tune in!

Until next month, 73s and dit dit de N2KZ 'The Old Goat.'

ARRL Repeater Directory review - N2KZ

[Karl has dipped his pen in vitriol for the next two items -Ed.]

I can't tell you how disappointed I am. The 2018 ARRL Repeater Directory makes me sad. To this one ham, it is simply unusable. It pains me to write a negative review about something that the League spent enormous effort producing. I purchased a copy and I can find no use for it. I want to return it for credit. The League would not let me return the book since the package was already opened and the cover was creased in transit. Arrgh! Buyer beware!



The ARRL Repeater Directory is only available in this large, spiral-bound paperback format.

This book is a lengthy printout of a single sort of a database. It cannot be searched electronically. It is not organized by logical areas or regions. It is infuriating and pointless. Why was this published and offered for sale?

Compared to older editions of this guide, the 2018 Directory is enormous. My 2012 / 2013 edition was 5 ¼ x 3 7/8 inches. My new 2018 edition (with large comb binding) is twice the size at 9 ¼ x 7 inches. It is not exactly pocket-sized any more. The paper used is quite thin and gray in color — much like newspaper but less robust. These pages would tear out even after gentle use.

The huge list of repeaters it contains is no longer organized in regions. Instead of groups like 'Lower Hudson - Westchester' or 'Mid-Hudson,' all the towns for complete states are listed alphabetically. In our case, the PCARA repeaters are listed as 'Lake Peekskill' right along with unknown locales like Lake Luzerne, Lake Nancy, Lake Placid and Lancaster. This method of organization is impossible to navigate.

Similarly, on this same page, there is a listing for Long Island, New York. You won't find LIMARC's W2VL repeater listed here. You will find those repeaters that listed themselves not as their actual town of transmission but by the area they cover. W2VL is listed under its actual location of Glen Oaks, (Queens), New York a few pages back in the book. (I had to spend a minute looking for it. Luckily, I knew where the repeater was located.) This really, really doesn't make any sense at all.

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Location	Mode	Call sign	Output	Input	Access	C
Knox	FM	KB2IXT	444.50000	+	127.3 Hz	
Krumville	FM	KC2BYY	146.74500	-	123.0 Hz	
Lackawanna	FM	WB2JPQ	224.56000	-	88.5 Hz	
	FM	WB2JPQ	444.15000	+	88.5 Hz	
	FM	AB2OR	446.18000			
Lake George	FM	W2WCR	146.73000	-	100.0 Hz	
	FM	W2WCR	224.78000	-		
	FM	W2WCR	443.45000	+		
Lake Grove	DSTAR	KD2DIP B	438.90000			
	FM	N2TLD	145.55000		118.8 Hz	
Lake Luzerne	DMR/MARC	N2YQT	445.00000	-	CC1	
Lake Nancy	FM	WA2UMX	147.24000	+	91.5 Hz	
Lake Peekskill	FM	W2NYW	146.67000	-	156.7 Hz	
	FM	KB2CQE	449.92500	-	179.9 Hz	
	FM	N2CBH	449.92500	-	179.9 Hz	
Lake Placid	DMR/MARC	N2NGK	449.67500	-	CC1	
	FM	N2NGK	147.30000	+	100.0 Hz	
Lancaster	FM	W2SO	53.17000		107.2 Hz	
	FM	W2SO	224.64000	-	107.2 Hz	
	FUSION	W2SO	147.25500	+	107.2 Hz	
	FUSION	W2SO	443.85000	+	107.2 Hz	

Sample page lists all three PCARA repeaters under 'Lake Peekskill' — and the third entry has the wrong frequency.

How did anyone at the League allow this document to be marketed? The cost will break your heart, too. Over 600 pages long, it lists for $19.95 but is currently being discounted to $17.95. Add $7.50 in shipping costs and you are paying $25.45. I used a $10 off birthday discount and paid $15.45. The best thing about the purchase? They threw in a 2019 ARRL calendar free. It is much more useful than the book.

The introductory page of the Directory hawks $12.99 annual subscriptions to the ARRL's partner **RFinder** database attainable by downloading an app onto your phone. I haven't tried this app but the price would keep me away. I can search repeaters for free on the Internet without frustrating results.

Adding insult to injury, I received the January 2019 *QST* only a day or two later. In that edition there was a full-page advertisement for the *2019 Repeater Directory* available for pre-order. Why wasn't this mentioned to me when I called to purchase the 2018 edition?

Please browse a copy of the Directory before you consider purchase. This offer is really not fair to the amateur radio community. I thought I would treat myself to a newly updated and comprehensive guide to the world of repeaters. I received an unusable and fragile printout.

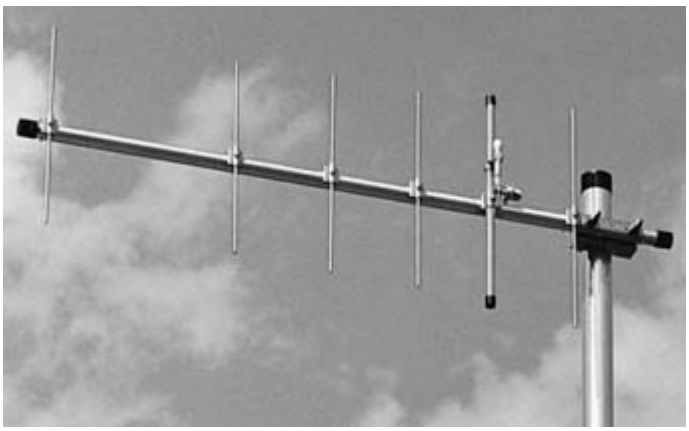
According to the ARRL Store: "The 2018 Repeater Directory® is the second edition to include "crowd-sourced" listings contributed by users, repeater owners, and volunteer frequency coordinators. This means more listings, and updated more often. Public service volunteers: include this printed directory with your emergency 'go kit.' " According to **this** reviewer, the Directory should be placed in the 'no-go' bin. Again, I am sorry for this bad news.

- Karl N2KZ

Cushcraft's A449-6S Yagi review - N2KZ

[Karl's pen nib is still corroding from being dipped in acid -Ed.]

I needed a short Yagi for demonstration purposes for my ham club's upcoming 440 MHz - 70 cm class. I purchased a Cushcraft A449-6S. I was very disappointed in every aspect of this antenna kit.



Cushcraft A449-6S six-element Yagi for 440-450 MHz.

The included manual assumed you would assemble the antenna from pictorials. I attempted an inventory of all parts. Nearly everything was present — sometimes in greater quantities than you would expect. The manual described lengths of the antenna elements and the positioning of some drilling points. The machine work was sloppy. Two elements were slightly long. I figured out the order of the elements but they were not cut very accurately.

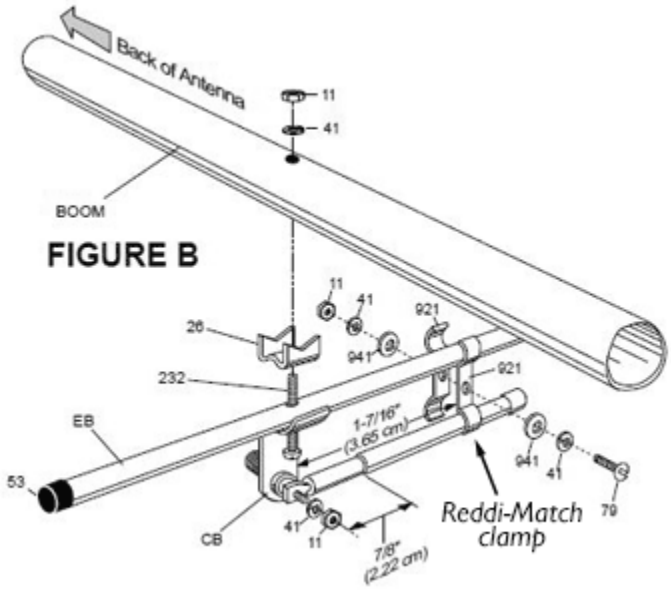
Items included in Karl's Cushcraft A449-6S package.

The dimensions of the spacing of the elements were not included in the drawings. I discovered right away that the boom was one inch short, but it apparently (hopefully) did not hurt the performance. The end caps for the main boom were one-inch size instead of 7/8 inch.

The deal-breaker: The two brackets that held the matching gimmick in place (pictured below.) These brackets did not join correctly to accept a round piece of aluminum stock. Also, the screw to hold the brackets together was not long enough (although it matched the size mentioned in the manual.) I did not want to spend any more time to find out what else was wrong.

This was not a cheap antenna: A little Yagi costing over $80 including shipping. It is a shame that Cushcraft's quality control is so poor. I wasted two hours of my life trying to make a square screw fit into a round hole. If you need a 440 antenna... this isn't it.

- Karl, N2KZ



Picture from A449-6S Assembly Manual includes location of the "Reddi-Match" clamp (arrowed), shorting the adjustable gamma-match tube to the driven element.

"Reddi-Match" clamp from Karl's A449-6S Yagi antenna. [N2KZ pics.]

440 Simplex test

At 9:00 a.m. on Saturday December 22, David KD2EVI began a simplex test on 446.000 MHz FM. Stations were invited to call David and exchange reports.

A variety of equipment was in use from 4-watt handi-talkies on high ground to 50 watt fixed stations operating with high-gain vertical antennas. Operators taking part included K2DMV, KD2HLE, N2HTT, N2KZ, WB2HNA, KD2HXZ, WB2NHC, N2EAB, N2SO, W2IG and NM9J. Subsequent reports were exchanged using Yahoo! Groups.

Battery cycle

Amateur Radio depends on all sorts of batteries — from the small AA cells in our test equipment, through the NiMH or Li-Ion rechargeable batteries for a handi-talkie, to the larger lead-acid batteries in our vehicles that also power a mobile radio.

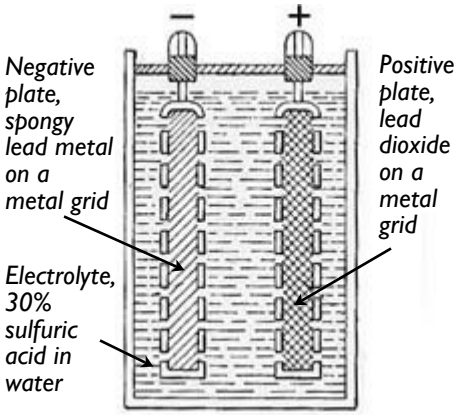
Lead acid

The lead-acid battery is still found under almost every vehicle hood and relies on technology from the mid-19th century. This same rechargeable technology is also found in portable power supplies that can start a car engine, run a compressor to inflate tires or power amateur radio equipment for an hour or two. Many uninterruptible power supplies (UPS) for computers and data centers also make use of lead-acid batteries.

This portable power supply contains a lead-acid battery to start an engine, inflate a tire or power 12 volt equipment.

The original design of the lead-acid battery came from French physicist Gaston Planté, who in 1859 took two sheets of lead, separated them with a cloth strip, rolled them into a spiral, and then immersed the assembly into a solution of sulfuric acid. Planté's invention became the first rechargeable (secondary) battery. 160 years later this basic design is still the basis of our lead-acid batteries.

In a lead-acid battery, each individual cell contains a positive plate and a negative plate. When the cell is fully charged, the positive plate (marked as +, painted red) consists of a metallic grid coated with lead dioxide, PbO_2. The negative plate (marked –, painted black) is a similar metal grid, but coated with a paste of spongy, metallic lead. The positive plate is chocolate brown in appearance while the negative plate is gray-colored. These electrodes are immersed in a strong solution of sulfuric acid (H_2SO_4) in water.



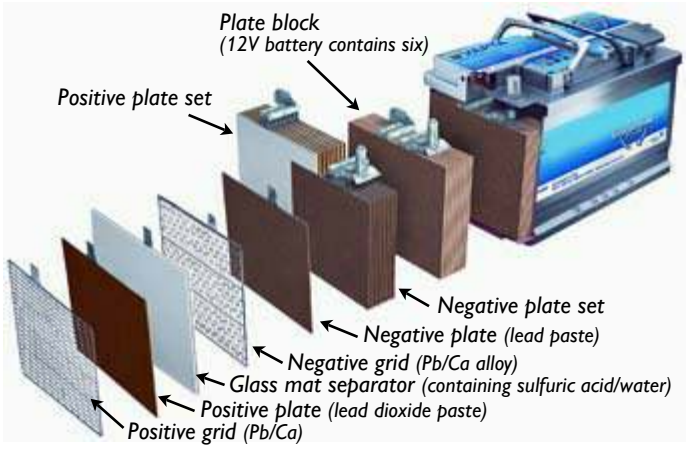
Construction of one cell of a flooded lead-acid battery.

When the lead-acid cell discharges, bisulfate ions (HSO_4^-) from the sulfuric acid solution react with lead metal at the negative plate, donating electrons and forming lead sulfate ($PbSO_4$). At the positive plate, the lead dioxide reacts with bisulfate ions from the acid solution, forming lead sulfate and water. The overall effect is for the sulfuric acid solution to become weaker, as sulfate builds up on both electrodes. (Older readers may remember checking electrolyte density in a flooded lead-acid battery using a hydrometer.) As the cell discharges, electrons from the negative plate flow around an external circuit to the positive plate.

When the cell is recharged by forcing electrons back into the negative plate, the chemical reactions are reversed: lead sulfate is reduced to metallic lead at the negative plate, while lead sulfate is oxidized to lead dioxide at the positive plate.

For a single lead-acid cell, the voltage between electrodes is approximately 2.0 - 2.2 volts, falling slowly under discharge to about 1.85 volts per cell. 12 volt automobile batteries contain six cells wired in series.

As mentioned in *PCARA Update* for November 2017 ("Power supply refurb"), modern batteries no longer have caps to check the electrolyte level, but instead are sealed and maintenance free. They contain a bare minimum of sulfuric acid electrolyte absorbed onto a fiberglass mesh between the positive and negative plates. Metallic grids supporting the electrode materials are made of lead/calcium alloy. The six cells required for a 12 volt battery are held in a rugged container made of polypropylene. With this type of construction, there is less danger of an acid spill or losing water during overcharge.



Construction of an AGM (absorbent glass mat) sealed lead-acid battery [after SAE International].

Toxic metal

One of my early jobs in the chemical industry was at a company that manufactured pigments and PVC stabilizers containing lead. Lead compounds are toxic and all employees had to wear personal protective equipment to prevent any lead being either ingested or breathed in as dust. Air quality was monitored and employees were subject to regular testing to make sure blood lead levels were not rising.

We are even more aware of the extreme dangers of lead today, whether from leaded petrol, lead pipe used in plumbing, lead-based paints, dust from lead-stabilized PVC window blinds or even tin/lead solder. Many of these applications are banned or heavily restricted nowadays, but you may still come across an old surface that has been coated with lead paint. Test kits are available at hardware stores to check for the presence of lead before you start sanding the old paint.

3M Test Kit can detect the presence of lead in old painted surfaces.

Tin/lead solder has mostly been replaced by tin/silver/copper in electronic manufacturing but tin/lead solder is still used in our own hobby. There are various hazards associated with soldering including hot irons, the hot metal alloy and fumes from the flux — but if you are **handling** tin/lead solder then you are strongly advised to thoroughly wash your hands with soap and water immediately afterward — otherwise you may transfer lead from fingers to food and absorb the toxic metal.

Always wash your hands after handling tin/lead solder.

Recycling

In New York State, it is illegal to dispose of an old lead-acid battery in the trash. Instead, at the time you purchase a new battery you can give your used battery to the retailer for recycling— or take the old battery to any retailer of lead-acid batteries. If you do not hand in a used battery when purchasing a new one, the retailer will charge you an additional $5.00 as a "return incentive payment".

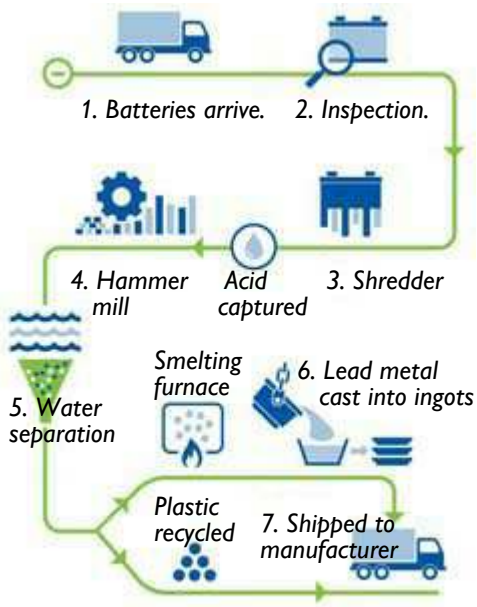
Recycling of lead acid batteries has been going on for a very long time. In the bad old days, lead recycling plants released a good deal of toxic metal into the air from their smelters. But nowadays emissions are far more tightly controlled.

You may be surprised to hear that the recycling rate for lead in batteries is as high as 99%. This beats the recycling rate for other materials such as metal cans and plastic containers by two to three times. The standardized construction of modern lead-acid batteries contributes to this high percentage figure.

Recycling process

When containers and trailers of old batteries arrive at a recycler, the first step is careful inspection of the incoming product. Inspectors must remove any non-battery material and keep a careful eye open for other battery types — especially lithium-ion — that could prove dangerous or contaminate the processing stream. The polypropylene battery cases are shredded then broken into smaller pieces in a hammer mill, with the sulfuric acid drained away. The acid is either neutralized with alkali or converted to sodium sulfate, as used in powdered laundry detergent formulations.

The remaining solids are crushed then placed into a water flotation tank where the plastic parts float to the surface and the heavy metal components sink to the bottom. Fragments of polypropylene that float are washed, dried then sent to a plastic recycler where they are melted and extruded into small pellets of uniform size, ready for remanufacturing into another battery case.



Lead-acid battery recycling process. [After DoeRun Company].

The remaining solids that sink to the bottom of the flotation tank consist of a mixture of lead, lead sulfate and lead dioxide. These items are heated in a smelting furnace, operating at around 1000°C, along with flux and coke (carbon) as reducing agent to reduce the lead compounds to metallic lead. The molten metal is then poured into ingot molds where impurities rise to the surface and are scraped off. The lead ingots are cooled, removed from the molds then shipped to battery manu-

facturers for use in the production of new lead-acid batteries.

Unwanted emissions

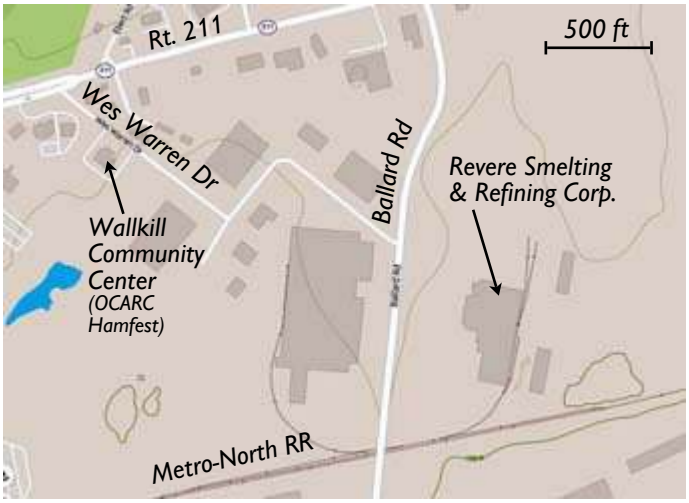
During lead-acid battery recycling there are two main danger points where toxic lead could be released — from the hammer mill when the battery case is broken open — and from the smelting furnace which maintains molten lead at high temperatures.

In 2008, the Environmental Protection Agency (EPA) revised air-quality standards for lead, tightening the allowable lead level downward from 1.5μg to 0.15 micrograms of lead per cubic meter of air. The previous standard set in 1978 had allowed 74,000 tons of lead to be emitted into the air annually.

In 2012 the EPA published a "National Emissions Standards for Hazardous Air Pollutants" (NESHAP) for secondary lead smelting, further limiting emissions from old and new smoke stacks. These new limits required lead smelters to install additional ventilation and enclosures at considerable expense.

Local smelter

The **Revere Smelting & Refining Corporation** (RSR) is a secondary lead smelting company that operates lead-acid battery recycling facilities in California, in Indiana and in the Town of Wallkill in Orange County, New York. The Wallkill plant is located on Ballard Road, roughly one half mile east of the Orange County ARC Hamfest location at the Town of Wallkill Community Center in Wes Warren Drive, Middletown. The plant processes some 200,000 metric tons of lead per year.



RSR Corp. lead recycling plant in the Town of Wallkill lies ½ mile east of the Orange County ARC Hamfest location.

RSR Corporation has been working to reduce emissions at the Wallkill plant to well below what the revised regulations allow. In 2016 they completed a $55 million investment in a new Wet Electrostatic Precipitator (WESP) system. Emissions from the lead smelter are first run through a baghouse which collects particulates, then through scrubbers to capture any other emissions. As a final step, the exhaust gases are run through an electrostatic precipitator which charges any remaining particles then attracts them to the surface of a charged honeycomb of metal rods. The particles trapped on the surface are then washed down with liquid which is pumped to an on-site water treatment plant for processing. Gases exit through a new stainless steel smoke-stack which replaces three previous stacks.

RSR Corp. Wallkill lead recycling plant has a new stainless steel smoke-stack.

Connections to the electrostatic precipitator rods at RSR, Wallkill.

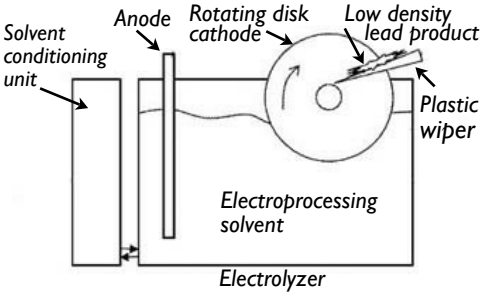
The additional electrostatic treatment has brought lead emissions at Wallkill down from 200 kilograms of lead per year to about 5 kilograms per year. The RSR Corp plants in City of Industry, California, and in Indianapolis, Indiana make use of similar 'WESP' technology.

Another way?

An alternative approach to reducing lead emissions from battery recycling is being taken by **Aqua Metals Inc.** of Alameda CA. Instead of employing high-temperature smelting to recover metallic lead from lead-acid batteries, Aqua Metals' "AquaRefining™" process recovers the metal by room temperature electrolysis using an organic acid as electrolyte.

As described in US Patent Application US 2018/0127852, a paste of lead compounds (PbO, PbO_2, $PbSO_4$) recovered from old batteries is first treated with a base such as sodium hydroxide, producing soluble sodium sulfate and insoluble lead oxide/hydroxide. The insoluble precipitate is separated out then dissolved in a solution of e.g. methanesulfonic acid in water. A high-purity lead is then obtained by electrolysis of the lead-containing electrolyte, plating metallic lead onto a rotating cathode. Porous lead paste

can then be scraped off the rotating cathode. Lead dioxide — which will not dissolve in the electrolyte — is filtered off and reduced to lead oxide with e.g. sodium sulfite, prior to dissolving in the electrolyte. The electrolysis process takes place at room temperature and produces high-purity lead in blocks or ingots.



Aqua Metals' lead electrolyzer.


Six cells employing Aqua Metals' electrolytic process are shown recovering low-density lead from lead-acid batteries.

Aqua Metals has constructed its first recycling plant at McCarran, Nevada where work is going on to improve recapture of the electrolyte.


Aqua Metals' first plant for recovering lead from lead-acid batteries in McCarran, Nevada.

In 2017, Johnson Controls acquired just under 5% of Aqua Metals shares and became the first licensee for its AquaRefining™ technology. Johnson will supply Aqua Metals with batteries to recycle then purchase metals from Aqua Metals' facilities.

Despite this progress, some doubts have been expressed about the throughput of Aqua Metals' electrolytic process, compared with established smelting techniques. The new recycling method might provide a niche process for adding capacity alongside a conventional smelting operation.

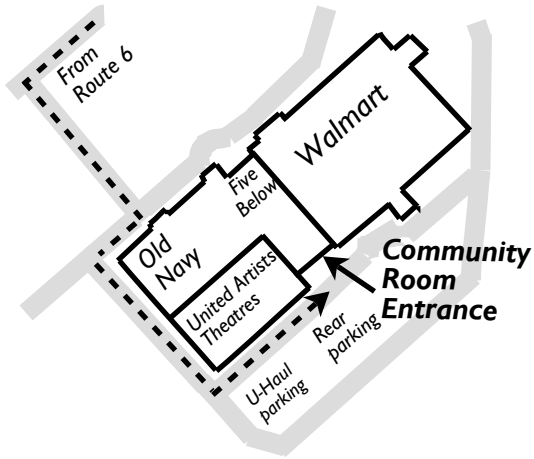
[Article inspired by *C&E News* report, 2/5/18.] - NM9J

UHF Workshop

Peekskill/Cortlandt Amateur Radio Association will be holding a **UHF Workshop** on Wednesday January 16, 2019. The presentation by Karl, N2KZ will include tips for operating and antenna construction.

The workshop will take place at the Town of Cortlandt Community Room, which is located off Route 6 and offers programs and activities to town residents of all ages. On Friday and Saturday nights the Community Room opens as the **CUE**, the **C**ortlandt **U**pper Teens **E**ntertainment Center.

The CUE / Community Room is located within the Cortlandt Town Center shopping complex, alongside the NY State Police Satellite Station at the rear entrance to United Artists' movie theatres. Take the access road alongside Old Navy, then drive past the U-Haul parking area in order to reach the cinema parking lot.



Map shows location of the Town of Cortlandt CUE / Community Room at the rear of the Cortlandt Town Center shopping complex.

Participants are encouraged to bring their own UHF antennas to the workshop for show-and-tell plus performance testing. For additional information, please send a message to: pcaraevents'at'gmail.com.

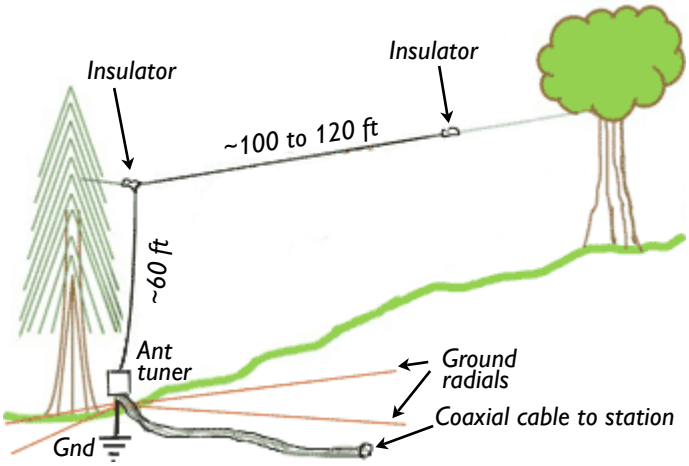
V.E. Test Session

A PCARA Volunteer Examiner (V.E.) Test Session is scheduled to take place on Saturday January 19, 2019 starting at 11:00 a.m. at the John C. Hart Memorial Library, 1130 E Main St, Shrub Oak, NY. Once again, this session follows on from the PCARA breakfast at Turco's, scheduled for 9:00 a.m. the same morning.

The cost for candidates is $15.00 per exam or retest. A photo-ID is required and your Social Security Number will be needed if unlicensed. Please bring a copy of your current amateur radio license if upgrading. All candidates are strongly advised to contact Mike W2IG before the test session, using e-mail address: w2igg 'at' yahoo.com.

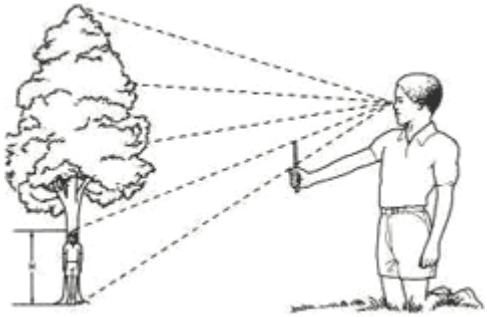
How to shoot a tree

At the December PCARA Breakfast, Charles N2SO described how he was planning to follow the example of Joe, WA2MCR and erect an **inverted-L** wire antenna for 160 meters. Charles has several tall trees in his yard, but was not sure if they would be tall enough for an inverted-L and asked about methods for determining tree height.



Sketch plan of an inverted-L antenna for 1.8 MHz. Overall wire length should be approximately 160 to 180 feet.

I remembered that **Scouts** know several ways to measure the height of a tree — they can use the length of the tree's shadow or set up an object of known height — possibly another scout — to act as a reference, then employ a similar-triangles calculation. See for example: http://www.inquiry.net/outdoor/skills/b-p/estimation.htm



Determining tree height by the Scouts' 'pencil method'.

With no scouts nearby to offer advice, David KD2EVI proposed a simpler method. He had a laser rangefinder that could be used to measure distances directly. David offered to assist Charles with a survey of his antenna tree.

How fir is that tree?

On December 19, David KD2EVI paid a visit to the location of Charles N2SO in Yorktown Heights. David had brought along his **Bushnell Yardage Pro Sport** rangefinder. This device, measuring roughly 4"×3"×1¾", is powered by a 9 volt battery and projects a pulsed infra-red laser beam toward the target. The instrument measures the overall time for an infra-red pulse to be transmitted, reflected by the target then returned to the receiver lens. Distance is calculated and displayed in meters or yards on a liquid-crystal display which is integrated into the optics of the built-in monocular for viewing the target.

Bushnell Yardage Pro Sport Laser rangefinder has transmit and receive lenses plus monocular objective on front face. [KD2EVI pic.]

The instrument was originally designed for measuring range to an animal target or to a golf flag. Maximum distance for measurement depends on target color, reflectivity and weather conditions, but is specified as 5-450 yards for a tree, and is accurate to within one yard.

David measured the height by standing under the tree and "lasing" as close to the vertical as he could. Charles' tree was estimated to be **65 feet** high. This should be quite adequate for supporting one end of an inverted-L antenna for the 160 meter band. General advice is to make the total wire length (vertical plus horizontal sections) greater than one quarter wave to 3/8-wave long. This corresponds to a total length of 160-to-180 ft. As the wire length increases, the point of maximum antenna current moves higher up the vertical section, above ground level.

David KD2EVI measures the distance to Charles' tall tree using a laser rangefinder. [N2SO pic.]

The Bushnell Yardage Pro Sport Laser Demo rangefinder is an older model (~2007). More modern types are available at reasonable cost, for example the Bushnell Trophy Xtreme, TecTecTec ProWild Hunting and TecTecTec VPRO500 Golf Rangefinder.

- NM9J

Run Against Hunger – official report

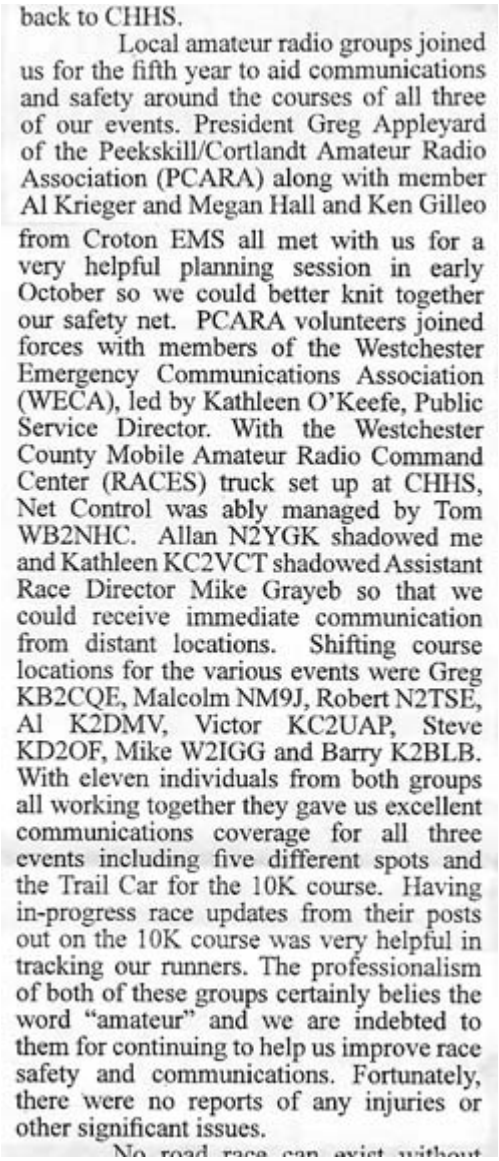
Thanks to the efforts of Henry, KB2VJP we now have the official report on the 2018 **Harry Chapin Memorial Run Against Hunger**. A three-page letter from the Run organizers has appeared in *The* (Croton) *Gazette* dated Dec 20, 2018 - Jan 2, 2019. Our own report on the event — which took place on Sunday October 21st in and around Croton-on-Hudson — was published in *PCARA Update* for November 2018, pp 5-7.

In the newspaper letter, Race Director Jud Ramaker reported there were 1,005 registrants for all three events then went on to thank all the organizations that provided support for the fund-raising races. This included Croton-Harmon High School (CHHS), Croton Emergency Medical Services, Croton Police, local Girl Scout and Boy Scout troops, plus the NYC Department of Environmental Protection, which had granted permission for runners and race vehicles to cross the Croton Dam.

Assistant Race Director Mike Grayeb interviews outside Croton-Hudson High School while Race Director Jud Ramaker stands at center. Jud's radio shadow Alan N2YGK operates nearby (right). [Pic credit: Run Against Hunger].

The newspaper report includes a special mention for the amateur radio groups that supported the event. Here is the relevant paragraph from *The Gazette.*

"Local amateur radio groups joined us for the fifth year to aid communications and safety around the courses of all three of our events. President Greg Appleyard of the Peekskill/Cortlandt Amateur Radio Association (PCARA) along with member AI Kroeger and Megan Hall and Ken Gilleo from Croton EMS all met with us for a very helpful planning session in early October so we could better knit together our safety net. PCARA volunteers joined forces with members of the Westchester Emergency Communications Association (WECA), led by Kathleen O'Keefe, Public Service Director. With the Westchester County Mobile Amateur Radio Command Center (RACES) truck set up at CHHS, Net Control was ably managed by Tom WB2NHC. Alan N2YGK shadowed me and Kathleen KC2VCT shadowed Assistant Race Director Mike Grayeb so that we could receive immediate communication from distant locations. Shifting course locations for the various events were Greg KB2CQE, Malcolm NM9J, Robert N2TSE, Al K2DMV, Victor KC2UAP, Steve KD2OFD, Mike W2IGG and Barry K2BLB. With eleven individuals from both groups all working together they gave us excellent communications coverage for all three events including five different spots and the Trail Car for the 10K course. Having in-progress race updates from their posts out on the 10K course was very helpful in tracking our runners. The professionalism of both of these groups certainly belies the word "amateur" and we are indebted to them for continuing to help us improve race safety and communications. Fortunately, there were no reports of any injuries or other significant issues.



back to CHHS.

Local amateur radio groups joined us for the fifth year to aid communications and safety around the courses of all three of our events. President Greg Appleyard of the Peekskill/Cortlandt Amateur Radio Association (PCARA) along with member Al Krieger and Megan Hall and Ken Gilleo from Croton EMS all met with us for a very helpful planning session in early October so we could better knit together our safety net. PCARA volunteers joined forces with members of the Westchester Emergency Communications Association (WECA), led by Kathleen O'Keefe, Public Service Director. With the Westchester County Mobile Amateur Radio Command Center (RACES) truck set up at CHHS, Net Control was ably managed by Tom WB2NHC. Allan N2YGK shadowed me and Kathleen KC2VCT shadowed Assistant Race Director Mike Grayeb so that we could receive immediate communication from distant locations. Shifting course locations for the various events were Greg KB2CQE, Malcolm NM9J, Robert N2TSE, Al K2DMV, Victor KC2UAP, Steve KD2OF, Mike W2IGG and Barry K2BLB. With eleven individuals from both groups all working together they gave us excellent communications coverage for all three events including five different spots and the Trail Car for the 10K course. Having in-progress race updates from their posts out on the 10K course was very helpful in tracking our runners. The professionalism of both of these groups certainly belies the word "amateur" and we are indebted to them for continuing to help us improve race safety and communications. Fortunately, there were no reports of any injuries or other significant issues.

No road race can exist without

Paragraph from Croton Gazette describes support from local Amateur Radio groups.

The report concludes by stating that $38,000 had been raised by the 2018 Run Against Hunger. Local organizations that benefited include the Croton-Cortlandt Food Pantry, the Croton Caring Committee, Caring for the Hungry and Homeless of Peekskill and Fred's Pantry. In 2019, the 39th Annual Harry Chapin Run Against Hunger will take place on Sunday October 20.

- NM9J

Church support Dec 24

PCARA had once again been invited by Kathy Campolo, XYL of N2LJO, to provide support for the 4:00 p.m. Mass at the Church of the Holy Spirit on Route 202. This is the Church's most popular service of Christmas Eve, with many families wanting to take part.

At 2:30 p.m., Bob N2CBH and Malcolm, NM9J arrived at the parking lot, to be joined by Al K2DMV and David KD2EVI. Although Monday had begun with light snow, by afternoon the temperature had risen to 40°F and the snow had melted. Sunshine was occasionally breaking through the clouds, though a chill wind was blowing across the church grounds.

Bob and David investigated the grassy area above the upper parking lot and declared it dry enough for vehicles to use. After a short discussion with Fr. John, the first job was to erect barriers and warning cones to guide incoming vehicles around the traffic circle then onto the grass from the upper lot.

Al K2DMV, David KD2EVI and Bob N2CBH arrange barriers and cones outside the Church of the Holy Spirit.

At 3:00 p.m. as the first vehicles began arriving, spaces were available in all three three parking lots. By 3:25 p.m. the middle lot near the church had filled, followed by the upper lot — so that David and Bob had to begin guiding vehicles onto the grass. By 3:45 p.m., Bob declared the upper parking completely full, so Al and David walked down to Route 202 to close the entrance and inform incoming traffic that no more places were available.

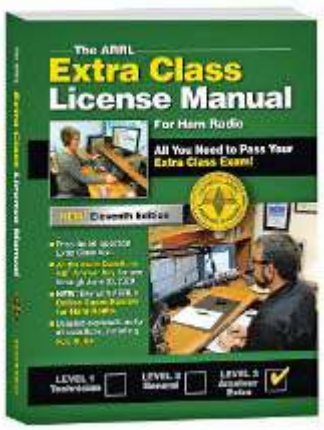
Closing off the entrance at Rt. 202.

Vehicles began parking across the street — this generated another hazard as pedestrians had to cross busy Route 202. Bob provided assistance by stopping traffic as necessary.

Just before the service began at 4:00 p.m., we noticed several people walking away from the church — not only had all the seats been taken, but standing room within the church was now completely full. As the rush of approaching traffic had subsided, we returned to the parking lot, collected the warning cones and declared the operation complete. Time to warm up with a hot drink!

WECA Extra Class

Westchester Emergency Communications Association (WECA) is offering a free training class for the Amateur Extra Class license in 2019. The class begins on Tuesday January 8th, running from 7:00 p.m. – 9:00 p.m. and continues for ten weeks. Location is the Westchester Fire Training Center, 4 Dana Road, Valhalla, NY. A V.E. Test Session will take place on Thursday of the 10th week at the same location.



Each class will have an instructor who is knowledgeable in the subject area. The overall course is organized by WECA Education Director Larry Sutliff, W2UL. If you are interested in the course, please contact: W2UL'at'weca.org.

Candidates are advised to purchase the following text books:

- "ARRL Extra Class License Manual", 11th Edition, with link to Practice Exam Software.
- "ARRL's Extra Q&A", 4th Edition

Further details are available from the WECA web site at: http://www.weca.org/education/Extra.pdf .

Peekskill / Cortlandt Amateur Radio Association

Mail: PCARA, PO Box 146, Crompond, NY 10517
E-Mail: mail 'at' pcara.org
Web site: http://www.pcara.org
***PCARA Update* Editor:** Malcolm Pritchard, NM9J
E-mail: NM9J 'at' arrl.net
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 Jan 6: PCARA meeting, Annual Bring & Buy Auction. NewYork-Presbyterian/Hudson Valley Hospital, 3:00 p.m.
Wed Jan 16: PCARA UHF Workshop, Cortlandt Town Center CUE Room, 7:00 p.m.
Sat Jan 19: PCARA Breakfast, Turco's, Yorktown Hgts. 9:00 a.m.
Sat Jan 19: PCARA VE Test Session, John C. Hart Memorial Library, Shrub Oak, 11:00 a.m.

Hamfests

Sat Jan 5: Ham Radio University and ARRL NYC/LI Section Convention, LIU-Post, Hillwood Commons Student Center, 720 Northern Blvd., Brookville, NY. Doors open 7:30 a.m.

VE Test Sessions

Jan 10: WECA, Westchester Co Fire Trg Center, 4 Dana Rd., Valhalla, NY. 7:00 p.m. S. Rothman, (914) 949-1463.
Jan 13: Yonkers ARC, Will Library, 1500 Central Park Ave, Yonkers NY. 1:00 pm. Pre-reg. John WB2AUL, (914) 969-6548.
Jan 14: Columbia Univ ARC, 531 Studebaker Bldg, 622 W 132nd St, New York. 6:30 p.m., Alan Crosswell (212) 854-3754.
Jan 19: Peekskill/Cortlandt ARA, John C. Hart Memorial Library, 1130 E Main St., Shrub Oak NY. 11:00 a.m. Contact Michael Dvorozniak W2IG, (914) 488-9196.

Peekskill / Cortlandt Amateur Radio Association Inc.
PO Box 146
Crompond, NY 10517