



PCARA Update



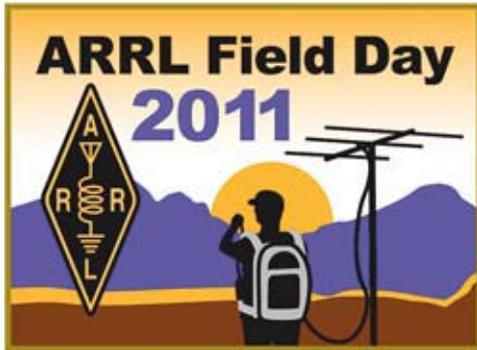
Volume 12, Issue 6

Peekskill / Cortlandt Amateur Radio Association Inc.

June 2011

Field test

Field Day is June 25-26 this year and we'll be tying up any loose ends at the June meeting. We're



planning on holding Field Day at Walter Panas High School in Cortlandt Manor. As I had mentioned in last month's article, this year's theme is "keep it

simple." If you have a few hours of free time that weekend, please consider joining us.

Annual membership renewal notices have been sent out courtesy of Joe, WA2MCR via snail mail. Please be sure to send your renewals in ASAP. As with so many organizations in these challenging economic and financial times, we are facing a shortfall this year, so your renewals are greatly needed and appreciated!

Our next regularly scheduled meeting is at 3:00 pm on Sunday June 5, 2011 at Hudson Valley Hospital Center in Cortlandt Manor, NY. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

BARA Hamfest

Bergen Amateur Radio Association's Spring Hamfest was held at Westwood Regional High School in Washington Township, NJ on Saturday May 28. Following very good attendance at the recent OCARC and MBARC Hamfests, a large contingent of PCARA members once again turned out to enjoy one of the fixtures of the Spring amateur radio calendar. This time around they were able to enjoy fine weather and lots of outdoor tables on a warm May morning.

Perhaps as a result of jet-lag or the early hour,

your editor forgot his camera, so we are grateful to Ray W2CH for the accompanying photograph.



PCARA members at the recent BARA Hamfest. L to R: Malcolm, NM9J, Mike N2EAB, Joe WA2MCR, Sarah plus father Karl N2KZ and Marylyn KC2NKU. [Photo - W2CH]

PCARA Officers

President:

Greg Appleyard, KB2CQE, kb2cqe 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 neighborly news and technical topics.

Adventures in DXing

- N2KZ

Cold and Hot

The year 2011 may be remembered as a year of extremes: extreme gas prices, extreme weather and extreme radio conditions. It was not so long ago that our mailboxes were buried in snow. Now the sun has returned and every day is just a little hotter. Who expected 85 degree heat in mid-May? Sunspots haven't been much different. For months and months, we only



An active sun is waking up Earth's ionosphere.

received a single spot or two from the Sun. To the delight of DXers, there are now more spots in the sky than in a dry cleaner storefront on a Saturday morning!

During the past winter, the low bands were very long, deep and quiet. Difficult 160 meters lost its signature 'static salad,' appearing completely devoid of the crunches and crashes familiar to low band DXers. AM broadcast reception assumed a similar tone. In the



darkness before dawn, WWL 870 New Orleans and KMOX 1120 St. Louis sounded like local stations day after day.

Dramatic changes in propagation also changed the roster of stations on 80 and 160 meters. When sunspots are abundant, 80 and 160 usually run relatively short in range. Without long-term solar agitation, these bands had plenty of time to quiet down into long range marvels. Regular correspondents from New England, the mid-Atlantic and Midwest states were no longer reliant. Not all was lost. If you like to chat with Australia and New Zealand, a chorus of stations could be found at dawn as regular visitors. Sometimes the voices from down under were disarming in strength. At the same time, WBZ 1030 Boston and even WCBS 880 from nearby High Island in The Bronx suffered from fading and phasing at this QTH.

This spectacular show went both ways. Hams in

Australasia could hear the weakest stations here in The States. 30 and 40 meters often stayed active long into the morning not fading out until 9 am or later. My meek QRP CW low band transmissions were being heard nightly in the Mountain and Pacific states time after time. Stations in the 1, 4 and 8 zones were tough or impossible to work. What happened to all my old friends?

Time has changed things back to normal. The coming solstice has drained all the remarkable depth from the low bands. Now, the sun is rising much, much earlier. I am greeted with full sunlight as I travel to work at 5 am. With Australasia no longer apparent, America's low ham bands are now quiet as a mouse in the early hours. Everyone else is either sound asleep or getting ready for work! AM radio follows along. I can no longer hear WJR 760 Detroit after about 5:15 am, but now WBZ 1030 Boston is strong all through the night and continues on ground wave throughout the day.



I See Spots

If you have any doubt that the sunspot cycle has begun its revival, ask fellow PCARAn Ray, W2CH down in White Plains. Using a modest single 20 meter Hamstick, mounted on his balcony railing, Ray worked HK1X Columbia, VA3ITA Toronto, YO2BM Romania, OK1CF Czech Republic, RU5TT Russia and 5B4AIF in Cyprus all in one day!



Balcony-mounted antennas as used by Ray, W2CH. Hamstick is on the left. [Photo - W2CH]

Consider Ray's challenge. Operating from a steel and concrete building, only a small part of the horizon is available, free and clear, without severe attenuation. In compensation, Ray enjoys about 50 feet of height

above ground level. This comes in very handy when operating two meters or 70 cm. W2CH has been heard widely on FM simplex and even D-Star modes. It is only a matter of time before Ray achieves his first apartment-bound DXCC award!

Sunspots are not the only show in town. Don't overlook the amazing possibilities summer tropospheric skip can bring to the VHF and UHF bands. As I am writing this article early on a steamy morning, New York City DTV television channels are popping in and out, but a full array of stations from Philadelphia, Baltimore and the Washington D.C. area are easy to receive. FM radio is no different. You'll often hear stations up and down the Atlantic seaboard all summer long.

I have a dream of someday seeing hams rising to the occasion and taking advantage of this strong mode of propagation. I often witness tropo appearing powerful and potent for hours, yet few hams jump on to ride along with it. To someone (like myself) looking for every possible grid square working towards a VUCC, passing up summer tropo skip is a crime!

Take advantage of the new-found sunspots! It will only get better and better. Looking for the deepest and strongest DX? Savor every possible moment. It's easy to fit your car for six and ten meters. When these bands are open (and they have been!) all you need is a wet noodle to be heard. You'll find that a mag-mount whip will be quite sufficient to work a multitude of DX. Not a lot of power is required. I run 25 watts on ten meters and 10 watts on six meters with wonderful results.

Without a Net

Have you ever seen The International Space Station fly overhead? Do you know what President Obama has in common with ham radio in Manhattan? If you had tuned into PCARA's Old Goats Net, your



*The International Space Station with Space Shuttle docked.
[photo - NASA]*

answers would be "yes!" The Old Goats Net meets Thursday nights at 8 pm on the PCARA two meter

repeater at 146.67 MHz with a minus 600 offset and a 156.7 PL. No base rig? No HT? No scanner? No problem! You can hear us via The Internet via Radio Reference.com or by using free iPhone / iPad / Droid apps like 5-0 Radio. Look at the January 9th



Join the net on 146.67 MHz

postings on PCARA's Facebook page for full details! Even better, tune in and find out the very latest.

Mark your calendars! The ARRL VHF QSO Party, America's largest contest for 50 MHz and above is just a few days away: Saturday, June 11 at 2 pm through Sunday, June 12 at 11 pm. If you need grid squares towards your VUCC or just a great operating challenge, this is your big chance! The last weekend in June is ARRL Field Day. PCARA will begin setting up at 9 am



Field Day site at Walter Panas High School.

on Saturday, June 25 at Walter Panas High School, 300 Croton Avenue, Cortlandt Manor. The contest begins at 2 pm and continues for 24 hours until 2 pm Sunday, June 26. Everyone is invited to attend. You don't have to be a licensed ham to enjoy Field Day. It's a great chance to spend time with your fellow PCARAn, try out new equipment and share your operating skills. Please come by and enjoy the fun!

Until next month, 73s de N2KZ.



Essential₂ driving

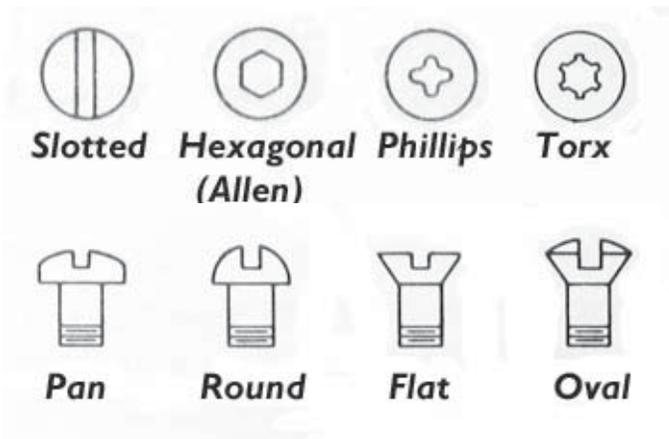
This article in the “Essential₂” series owes its inspiration to Mike, N2EAB who asked an interesting question about tool handles. We’ll try to find the answer later on.

If you open the toolbox of just about any radio amateur you will find a variety of implements, but the item most likely to be present is the humble screwdriver or nutdriver. Our amateur radio stations are held together with a variety of threaded fasteners, and the need to tighten and release them leads to many different types of screwdriver. My own radio toolbox contains a grand total of thirty different drivers!



The NM9J toolbox has lots of different screwdrivers and nutdrivers.

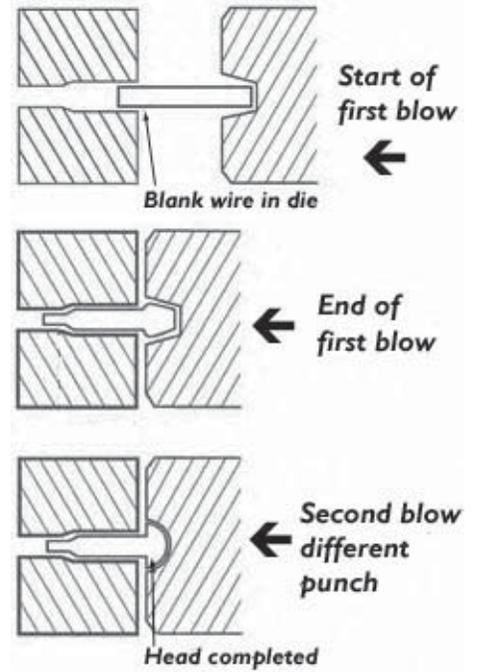
The main driver (sorry) for this wide selection of tools is the variety of screw and bolt styles that end up in our radio gear. Screw head styles used in electronics include the standard slotted head, Phillips, Allen (hexagonal) and Torx.



Turning of the screw

Bolts and screws are usually manufactured from reels of carbon steel wire, though other metals and alloys may also be encountered in radio work — including stainless steel and brass. The metallic wire,

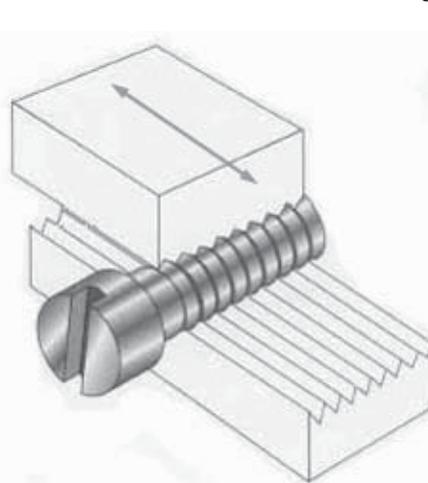
up to ½ inch diameter, is first straightened then it may be drawn down so the diameter is very accurately controlled. The wire is fed into a cold-heading machine and cut to length then held in a die where the head is formed by a punch moving forward over the protruding wire. The punch imparts the shape of the screw head, spreading the wire material out into a dome. Simple shapes can be produced with a single punch action, but complex shapes



Single-die, two-punch method of cold-heading is used to produce fasteners. The first blow partially forms the head (coning), then the second blow finishes the head shape. (Diagram adapted from Carpenter Technology Corp.)

require a double-heading action with a second punch. Finally, a knockout pin pushes the piece out of the die. Slotted-head screws may require the slot to be cut in a cutting machine.

(And if you don’t believe that a simple punch could distort cold steel, just remember what happens when you are manually driving a screw and the screwdriver slips out of the slot in the screw head — or what happens when you tap a center punch with a hammer to start a hole for drilling into a steel chassis.)



Thread-rolling forms threads in the screw blank by rolling between dies.

After cold heading, the screw blanks are fed to a thread cutting device, the most common of which is a thread roller. The unformed blank is rolled between two flat dies on which the thread pattern has already been cut. This cold-forms the metal of the blank into the desired screw thread.

The screws and bolts can be subjected to a final finishing process.

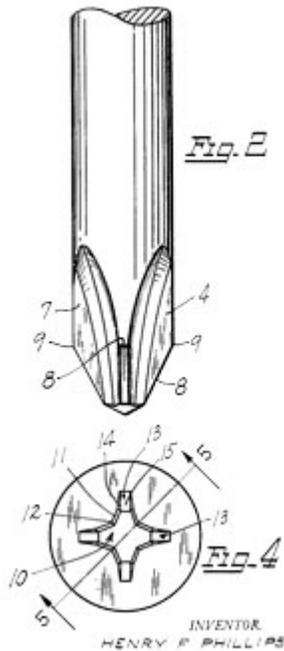
Steel screws can be hot-dip galvanized by passing through a bath of molten zinc. The thin layer of zinc metal around the steel reduces corrosion during subsequent use. Steel bolts can be blackened by passage through a bath of molten sodium hydroxide with nitrates and nitrites added to oxidize the surface of the steel to iron oxide (Fe_3O_4), followed by dipping into oil which is absorbed into the porous iron oxide layer.

Steel screws and bolts can also be electroplated with protective metals such as chromium, cadmium and zinc. The additional thickness of plated metal must be taken into account when the bolt has to be mated with a corresponding nut.

The company I work for has been involved in a novel process for coating metal fasteners with a thin coat of aluminum. Metal alkyls are used in a chemical vapor deposition process to apply metal coatings to small parts such as nuts, bolts, rivets and clamps.

Getting cross

Slot-head screws have been used since medieval times, but in the twentieth century more efficient designs emerged. The story of the Phillips screw begins with Oregon inventor J.P. Thompson who received a patent in 1933 for a crosshead-recessed screw that self-centers the screwdriver with the screw head. Thompson approached many screw manufacturers who said his screw was impossible to reproduce because the punch needed to create the recess would destroy the screw head. Thompson then showed his idea to an engineer acquaintance named Henry F. Phillips who offered to buy the patent. Henry Phillips founded the Phillips Screw Company in 1934 and patented an improved design for the crosshead screw and matching screwdriver in the mid 1930s. The wedge-shaped Phillips screwdriver head is designed to mate more accurately with the recess in the screw head, preventing the tool from slipping and allowing the screw to be carried to the work. These ideas were adopted by the USA's largest screw manufacturer, American Screw Company in Providence, RI. The Phillips screw head was adopted by GM in its Cadillac



Drawing from Henry Phillips' 1936 US Patent 2,046,837 "Means for uniting a screw with a driver".

Division in 1937, and went on to see wide-spread use in World War II.

The hexagonal screw head has its origins in a square-shaped socket popularized by Canadian inventor Peter L. Robertson. Robertson devised an efficient manufacturing technique for cold forming screw heads with a square-shaped hole at his Milton, Ontario factory in 1908. Screws with a hexagonal head were subsequently manufactured by the Standard Pressed Steel Company in Philadelphia PA, but they did not become widespread until World War II when the design was widely used for setscrews. The Allen Manufacturing Company of Hartford CT registered a trademark for the Allen Wrench in 1943, and ever since the L-shaped wrench with a hexagonal cross section has been known as an Allen Key.



Phillips head screws and bolts.

The Torx head was developed by Textron Corporation for use with automatic torque-limited screwdrivers on assembly lines. The 6-pointed star shape patented in 1971 is intended to stop screwdriver slip-page once the required amount of torque has been applied to a fastener. Torx screws have seen widespread adoption in automobiles, hard drives, computers and home electronics.



Hexagonal-head screws

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Torx-head screws as used on a disk drive assembly.

Tool making

Screwdrivers are manufactured by a process that bears some resemblance to the manufacture of screws. The starting material is once again a coil of steel wire for the metal blade that will be fitted into the handle. The wire is first spooled off the coil and drawn down

to the desired size by feeding through a die with a reducing aperture. The drawn-down wire is then heat-treated to obtain the desired tensile strength – this involves holding the wire at around 1350 deg F for 12 hours.

The wire is straightened then transferred to a cold-forming press which cuts the wire to length, then forms the screwdriver tip and the “wings” for embedding in the handle.

For a flat-blade screwdriver, the tip is formed in the press. For a



Flat-tip screwdriver blade with wings

Phillips screwdriver blade, the cut wire is sent to a “swage and grind” machine, where dies form blades for the tip from the heated wire. The tool is then ground and the “wings” are formed. The blade is treated in an



Phillips-tip screwdriver blade with wings

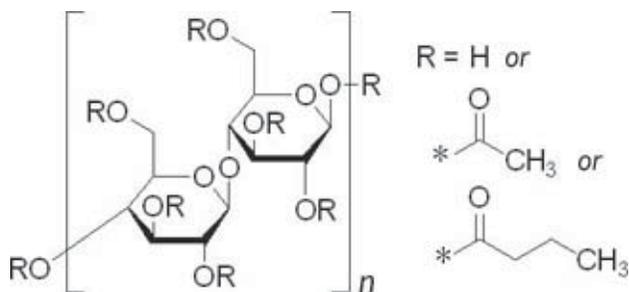
in-line furnace at approximately 1550 deg F, followed by oil

quenching. The steel pieces are then placed in an oven at 500 deg F and baked. High temperature heat treatment followed by quenching results in an extremely hard, brittle steel, with the subsequent tempering process reducing internal stress.

Inexpensive screwdrivers are nickel-plated before assembly. More expensive screwdrivers are ground to size, then the shank is chemically milled and polished. The screwdriver goes to a nickel bath and is electro-chemically chrome plated.

Getting a handle

Handles for screwdrivers were traditionally made of wood, but you will not find too many wooden handles around today. Modern handles are mostly made from cellulose acetate butyrate (CAB). Cellulose acetate butyrate was developed in the 1930s by Eastman Chemical (Tenite). It is manufactured by



Chemical structure of cellulose acetate butyrate (CAB). Repeating unit of the polymer is enclosed in square brackets.

reacting the natural polymer cellulose, produced from softwood or cotton, with acetic acid and sulfuric acid. Further esterification of the hydroxyl groups of cellulose is achieved by adding butyric acid and acetic anhydride. The resulting product is more stable and chemically resistant than cellulose acetate. This is a result of the alternating acetyl and butyryl groups on the cellulose backbone.

Cellulose acetate butyrate is delivered to the screwdriver factory in powder form, mixed with a liquid plasticizer such as 2-ethylhexyl adipate. The CAB is fed into an extruder that heats the material and pushes the molten polymer through a rotating screw into bars that are 8 to 10 feet in length. The rods are then put into an automatic turning machine, which shapes the handles and cuts them to final length. A hole is drilled in the handle where the screwdriver blade will be inserted. The handles are washed and



Stubby Phillips screwdriver with CAB handle. (This well-used item was a door prize at the Preston ARS dinner, 40 years ago!)

stamped then assembled on a hydraulic machine that forces the blade into the plastic handle.

Stinky tools

The question asked by Mike, N2EAB was — why do my old tools smell so bad? Mike is not the only person suffering from this problem, as an Internet search reveals many other people asking the same question.

The cause of the bad odor is those plastic handles — which for decades have been extruded from cellulose acetate butyrate. One clue comes from Eastman’s own data for Tenite plastics which reveal



(for example) that Tenite Cellulose Acetate Butyrate 530-16 — which is intended for tool handles — contains an **odor mask** and has a plasticizer level of 16%.

If a tool smells bad immediately after purchase, it could be because residual butyric acid was left in the polymer used to mold the handle. If the smell develops over time, it might be because of exposure to high moisture levels, heat, or acids that will cause hydrolysis of the ester linkages. The resulting free butyric acid has a powerful odor of **rancid butter** or vomit. Decomposition of cellulose ester polymers is accelerated by their acidic by-products — acetic acid and butyric acid — so sealed or closed containers should be avoided as they will hasten the deterioration.

Conclusion — if you would like your screwdrivers and nutdrivers to last a long time, keep them cool and dry, in an open container with good ventilation. Avoid bright light, paint and solvents that might attack the plastic handles. If well looked-after, tools will last for decades.

- NM9J

A shack apart

Ray W2CH and Marylyn KC2NKU have been making improvements in their apartment-shack in White Plains. Ray recently acquired a new Yaesu FT-857D HF/VHF/UHF transceiver. The FT-857D is the successor to the earlier FT-857 and is claimed to be the world's smallest HF/VHF/UHF multimode amateur transceiver. The new "D" version adds the 60 meter amateur band and incorporates the previously optional DSP-2 digital signal processing unit. Power output is 100 watts on HF/6 meters, 50 watts on 2 meters and 20 watts on 440 MHz.

Ray erected a 20 meter dipole on the apartment terrace, then in order to cover more bands, he obtained a number of "Ham Stick" mobile antennas, which consist of a 1/2" hollow fiberglass base with loading coil wound on, covered with PVC heat-shrink tubing and a stainless steel whip that slides into the base for frequency adjustment. The Ham Stick comes with a 3/8" threaded stud, so Ray used an NMO to 3/8" adapter along with the NMO "MP antenna mount" which was already clamped onto the terrace railing.

Ray also decided to order the LDG YT-100 Tuner, and FT-Meter from local dealer Radio-Oasis, to go with the FT-857D transceiver. The YT-100 is a 100-watt automatic tuner for the Yaesu FT-100, FT-857 and FT-897 that provides semi-automatic antenna



Ray's Yaesu FT-857D multiband transceiver is topped by an LDG YT-100 automatic antenna tuner and an LDG FT-meter. [Photos - W2CH]

tuning across the HF spectrum plus 6 meters, at power levels up to 125 watts, matching a wide range of antennas and impedances. The FT-Meter is a large, analog S-meter that plugs into the meter jack of the FT-857 or FT-897 transceiver.

As mentioned in "Adventures in DXing", Ray has been having quite some success with this equipment and the small antennas mounted on the balcony of the White Plains apartment. If you have HF equipment, don't be held back by lack of a large antenna. Great things are possible at this stage of the sunspot cycle with quite modest antennas and a positive attitude.



20 meter Ham Stick at W2CH



Ham Stick

Peekskill / Cortlandt Amateur Radio Association

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Newsletter contributions are always very welcome!

Archive: <http://home.computer.net/~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 the Hudson Valley Hospital Center, Route 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.

PCARA Repeaters

W2NYW: 146.67 MHz -0.6, PL 156.7Hz

KB2CQE: 449.925MHz -5.0, PL 179.9Hz
(IRLP node: **4214**)

N2CBH: 448.725MHz -5.0, PL 107.2Hz

PCARA Calendar

Sun June 5: PCARA monthly meeting, Hudson Valley Hospital Center, 3:00 p.m.

Sat-Sun June 25-26: Field Day, Walter Panas High School, Croton Avenue, Cortlandt Manor.

Hamfests

Sunday June 5: LIMARC Hamfair, Briarcliffe College, 1055 Stewart Ave., Bethpage, NY. 9:00 a.m.

Sunday June 12: Hall of Science ARC Hamfest, 47-01 111th Street, Flushing Meadow Corona Park, Queens, NY. 9:00 a.m.

Sunday July 10: Sussex County ARC Hamfest, Sussex County Fairgrounds, 37 Plains Road Augusta, NJ.

VE Test Sessions

June 5: Yonkers ARC, Yonkers PD, Grassy Sprain Rd, Yonkers, NY. 8:30 a.m. Contact Daniel Calabrese, 914 667-0587.

June 9: WECA, Westchester Co Fire Trg Center, 4 Dana Rd., Valhalla, NY. 7:00 p.m. Contact Stanley Rothman, 914 831-3258.

June 20: Columbia Univ VE Team, 2960 Broadway, 115 Havemeyer Hall, New York NY. 6:30 p.m. Contact Alan Crosswell, (212) 854-3754.

June 25: Orange County ARC, Cronomer Hill Park, (FD Site), North Plank Road, Newburgh. 1:00 p.m.



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