



PCARA Update



Volume 11, Issue 7

Peekskill / Cortlandt Amateur Radio Association Inc.

July 2010

Field mouse day

*"The best laid schemes o' mice an' men
Gang aft agley..."*



...just about sums up Field Day 2010 for PCARA. Due to a confluence of events involving key players in our Field Day effort, it just wasn't practical to proceed with this year's activities. So, we have set our sites on Field Day 2011! Perhaps next year we'll have a better chance for success.

There are no meetings for the months of July and August, so enjoy your

Summer! Our next scheduled meeting is September 12, 2010 at the newly enlarged and improved Hudson Valley Hospital Center. I look forward to seeing each of you there.

- 73 de Greg, KB2CQE

A better place to get better

PCARA's home for monthly meetings, the Hudson Valley Hospital Center, opened its new Patient Tower



New patient tower at Hudson Valley Hospital Center

with a grand opening ceremony on June 24.

Opening of the patient tower is a significant landmark in the hospital's 8-year, \$100 million expansion project. The new tower doubles the size of the "no wait" emergency room and includes a new lobby, gift shop, and 84 new private rooms.

Construction continues at the HVHC site, with work due to start in August on a 53,000 square foot building with doctors' offices and a Cancer Center on the ground floor.

PCARA Officers

President:

Greg Appleyard, KB2CQE, kb2cqe at arrl.net

Vice President:

Joe Calabrese, WA2MCR; wa2mcr at arrl.net

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.

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Adventures in DXing

– N2KZ

Taking Two Seriously

Anyone familiar with PCARA's Thursday night Old Goat's Net knows how tentative my signal has been lately. My trusty Icom IC-T7H HT has been suffering from geriatric problems. It's been about ten years since I first purchased it and it needed a little tender loving care. As I mentioned previously in this column, I experimented with new battery packs and more efficient antennas. This was a good first step. I continued to be plagued with intermittent output problems. The Yagi antenna I had been using for years no longer would efficiently load up. In simple terms, my signal was misery to listen to.

After careful inspection and long consideration, I found a couple of other essential things wrong. The HT antenna BNC connector had been so well loved; I had worn the locking tabs off to about half a nub. Also, the center connection suffered from years of use, no longer making a positive connection. Internally, the BNC connector and surrounds were riddled with poor and loose connections. Fitting external antennas with a variety of 75 ohm and 50 ohm BNC connectors, with different pin dimensions, didn't help. No wonder I had trouble!

I ordered a replacement BNC connector from Icom which arrived in just two days from Bellevue, Washington. It is a custom connector complete with an interesting locking screw. Removing the old BNC connector and installing the new one took about two hours of

patient labor. I needed to perform a lot of careful disassembly. Soldering was a challenge, trying to complete very delicate work in very tiny spaces. One rather large solder bridge, part of the original design, was renewed with a solid wire connection I created from repurposed Telco wire.

It all went back together very nicely. Using the original Icom rubber duck antenna, I managed to hit several repeaters on both 2 meters and 70 centimeters without effort. What a pleasure to have a solid system again!



Icom IC-T7H dual band transceiver

My mobile antenna system was improved, as well. I brought my old Newtronics Hustler CGT-144 antenna out of mothballs and mounted it on my car. This is the mother of all two meter mobile antennas. It is about seven feet long, with a large white loading coil in the center, making it a full 5/8ths wave over 1/2 wave design. The gain and penetration of this behemoth is amazing. You certainly develop a whole new sense of low bridges and vertically compact parking garages! This is some tall antenna! I'm easy to spot! The CGT-144 rises about ten feet off the ground when I cruise down the street.

Congratulate me! The effort paid off in a new confident signal during The Old Goat's Net and wherever I go. I can touch base with the PCARA two meter repeater as far away as Stamford, Connecticut using just five watts from my HT. This project has opened my eyes to a whole new dimension of two meter operation. More than ever, I have learned how active two meter FM simplex operations can be.

Hams who are acquainted with the 146.52 MHz simplex calling frequency are an enthusiastic bunch. Make a call here and you are bound to find immediate correspondence. I have worked stations from all over the New York metropolitan area on .52 with great success. You'll discover hams on .52 are often fitted with impressive antennas and lots and lots of power. This is a great place to test your DXing skills, especially if you are operating mobile. Find yourself a nice spot, with high elevation, and send out your signals awaiting a reply. I recently drove by a lofty bluff near Ridgefield, Connecticut and called 'CQ two.' I had not one but two stations reply to me. It's the first time I've ever used my HT to create a pile-up! Give .52 simplex a try! Don't miss the fun!

Efficiency and good maintenance are essential when attempting QRP operation. This is especially true on VHF and UHF frequencies. My verification of results came during the very first Old Goat's Net following the repairs and new antenna. Participants wondered what new rig I had purchased. You just can't receive a better review than that!

See You On Six!

Have sunspots returned to liven up our lives? One listen to six meters and you'll instantly have an answer. The recent ARRL VHF/UHF contest brought me a large handful of new grid squares in just a few



Hustler CGT-144 2 meter antenna.

hours of operating. I have also heard my first stations arriving from across the pond. Signals fluttered in from places like Portugal, Spain, Algeria and Bermuda. Unfortunately, my ten watt signal, propelled by my three-element Yagi, didn't cut through the heavy pile-ups to snare these rare catches. Maybe someday!

FM reception has also been glorious during periods of strong E-skip, but nothing beats what is now being seen on analog TV via old channels 2 through 6. Serious TV DXers are pulling in signals from all over the Caribbean and Central and South America. For decades American stations loaded up these frequencies. DX receptions like these were simply impossible. Now that American analog TV has left the air, these low VHF channels are simply loaded with new finds just waiting to be caught. DXing TV and FM make great indicators for what's up on six meters, too.

The Michigan Experience

Every summer my family vacations in mid-Michigan. The most memorable amateur radio experience in these parts is the original Old Goat's Net that meets every morning at 8:30 am. It is quite a fest with as many as a dozen or more participants from all over this part of Michigan and a few hams checking in from Ontario across the lake. The one and only local two meter repeater broadcasts from a high tower at the county seat called Bad Axe. No doubt about it: This repeater is heard!

One ham, Norris, VE3FBQ, sends a big, big signal across the lake from Canada into this machine. I can hear him with full quieting on the input frequency! Norris uses a reasonable amount of power (about 75 watts) with a long Yagi up on a tower. What a signal it produces! Even my little HT with its rubber duck antenna puts in a good signal at twenty miles away.

Listening to the voices on this net you'll understand where it got its name! Nearly everyone is a seasoned ham with call signs dating back several decades. The stories that are told are fascinating and sometimes historic. The net has been in session daily (except Sundays) since the 1970s!

Although it is possible to hit other repeaters from this part of the world, it isn't easy, especially with a

little HT at 5 watts! Since there are so few repeaters in Michigan, PL tones are generally not used. Summer-time conditions carry signals hundreds of miles. It can become hard to discern which signals are intended for your repeater. When a strong tropospheric skip lift occurs, powerful transmissions can simultaneously activate repeaters all over the state!

This morning, (July 2,) a huge tropo lift was bringing in signals from near and far. Early in the net, one of the Old Goats had to call over to another repeater in Western Michigan to ask them to cease operating until our net was over. Two meter signals can travel a long way with the help of lots of moisture and heat in the air creating strong DX-creating ducts! You



Karl, N2KZ in a Michigan T-shirt with K9 friend.

know immediately if a tropo lift is in session. When you stop transmitting and drop your carrier, you'll hear not one but several different courtesy tones twerp sequentially behind you!

Besides a handful of organized nets, there is sparse operation on VHF and UHF FM. I have heard some local hams chatting about 2 meter work with

weak signal CW and SSB, but I think this kind of activity is rare. What you will find on VHF and UHF is good old analog TV from across Lake Huron from Canada. In my particular location, you are liable to see CBC Television alternating between channels 16, 20 and 45. Canada's commer-



Goat's Annual Picnic in 2006. Norris, VE3FBQ, is near center in white shirt.

cially owned CTV has cut back almost all its over-the-air transmitters in rural Ontario but still can be seen on channel 2 from time to time. You'll also see another network called the A channel on channel 8. With very

few local stations to contend with, FM broadcast DXing can be a lot of fun, too! It literally depends on which way the winds and clouds are blowing!

HF operation from the Great Lake State is a great experience! I operate QRP CW and have had wonderful results on 20 and 30 meters with simple wire antennas. Here it is easy to get into Europe and all of the United States. County hunters and grid square hunters love the fact that I am operating from a sparsely populated county (Huron County) and a rare grid square (EN84.) I have found six meters to be difficult and challenging from this location with no tall hills to aid my signals. My past operation on ten meters, from my car, has actually proved pretty fruitful with nice catches from the Pacific Rim, South America and Europe. In the height of the summer, 40 and 80 meters can be pretty uncooperative from the lakeshore at zero height above sea level!

Rest assured it won't be long before I am back on the air from my home QTH. Create your own summer-time fun and get on the air today! See you in September and have fun!

73 and dit dit de N2KZ 'The Old Goat'



Essential₂ flexible

In the last Essential₂ column, we celebrated the 75th birthday of nylon and the applications of this versatile polymer that have found their way into both the radio shack and workshop. This time, we'll celebrate another polymer's birthday by wishing many happy returns to **silicones**, whose main manufacturing process became 70 years old in May 2010.

Chemical confusion

First a note about "silicon" and "silicone", a pair of words that confuse non-technical journalists and proofreaders alike. **Silicon**, without an "e", is a chemical element, one of the most abundant on earth, occurring in sand as well as in minerals such as quartz and mica that are important to radio. Silicon has the chemical symbol "Si". Both sand and quartz contain a chemical compound of silicon with oxygen, known as silica, SiO₂. The pure element, silicon, is a semiconductor employed in integrated circuits, better known to some people as "silicon chips".



Silicon, the chemical element

Silicones, with an "e", are polymers containing a repeating unit of silicon and oxygen: Si-O-Si-O-Si. Other groups are attached to those silicon atoms, as we'll shortly see.

Wireless wiz from NJ

Our story begins with Eugene Rochow, who grew up in Maplewood, near Newark, NJ. He had an early interest in electricity and wireless, and constructed his own crystal set with a ferrosilicon detector to receive the nearby broadcast stations. Rochow was persuaded by his older brother to study chemistry at Cornell University, though he would really have preferred to study electricity at MIT.

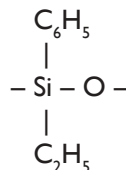
In 1935, with a PhD in Chemistry from Cornell, Eugene Rochow was lucky enough to find a job with the Hotpoint Company, a subsidiary of General Electric. Hotpoint had been using periclase (magnesium oxide) as an insulator for heaters in electric ranges until that mineral's supply was cut off by Nazi Germany. Rochow was employed by Hotpoint as an inorganic chemist to investigate alternatives to periclase. Working at the GE Labs in Schenectady, Rochow had access to an arc furnace and developed a substitute for periclase based on a mixture of lime and silica.

Hunt for hot insulators

In the 1930s, scientists from General Electric and Corning Glass Works were collaborating to find a high-temperature insulator for use in electric motors and generators. The best material available at the time consisted of glass fibers impregnated with phenolic resin, but the resin component would not stand up to the 180 deg C heat inside a small motor. In the search for a better resin, J. Franklin Hyde of Corning had synthesized ethyl phenyl silicone via a complex route that involved Grignard reagents – organic magnesium halides.



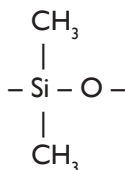
Dr. J. Franklin Hyde of Corning Glass



ethyl phenyl silicone repeating unit

The new silicone could be coated onto glass fibers, producing an excellent insulator. Unfortunately, Hyde's complicated synthesis employing Grignard reagents was far too expensive for everyday use.

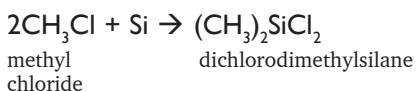
In 1938, Eugene Rochow heard about the new silicone developed by Hyde at Corning. He was thinking about the best material that could be used as a flexible electrical insulator in place of Hyde's ethyl phenyl silicone and decided that a new product – dimethyl silicone – would be superior:



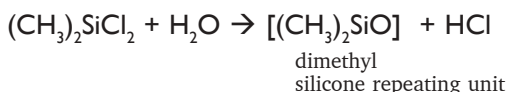
dimethyl silicone repeating unit

Initially, Rochow attempted to prepare his new product using Hyde's reaction scheme with Grignard reagents. Using this approach, he was able to synthesize dimethyl silicone as a sticky fluid. When heated, the product formed a clear, resinous material. The result was promising, but the problem remained — the synthesis was far too complicated and used expensive starting materials, including magnesium metal. Eugene Rochow worked on the problem for two more years until he discovered an alternative scheme, based on the observation that trichlorosilane could be made by reacting silicon directly with hydrogen chloride.

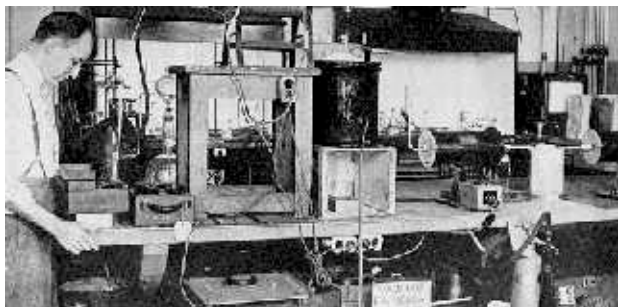
Dr. Rochow passed a stream of methyl chloride with some hydrogen chloride over a bed of silicon heated to 370 deg C. Copper was also present that acted as a catalyst. The reaction produced dichlorodimethylsilane, $(\text{CH}_3)_2\text{SiCl}_2$.



This product could then be treated with water to make dimethyl silicone:



This direct synthesis by Eugene Rochow was first achieved in May of 1940, and was patented in 1941.



Dr. Eugene Rochow reenacts his successful synthesis of dichlorodimethyl silane at GE Labs.

GE's chemical engineers perfected the process, using distillation to produce high purity compounds and by careful control of the curing process were able to regulate the number of silicon atoms in the chain. By controlling the chain length and the amount of cross-linking, it is possible to generate silicone fluids, emulsions, lubricants, resins or elastomers. By 1947, GE had opened a plant for manufacturing silicones in Waterford, NY.

By the way, poly(dimethyl silicone) is also known as polydimethylsiloxane and as dimethicone. You will frequently see these names on ingredient lists on consumer products.

Greased lightning

In 1943, Corning Glass formed a joint venture with Dow Chemical to produce the new silicone compounds. One of the first products to be sold was

"Dow Corning #4 compound", a moisture-proof silicone grease intended to prevent corona discharge between the ignition



Dow Corning #4 Compound for electrical insulation

wires of high-altitude aircraft. In WWII, this product allowed direct air delivery of planes from the USA to England and North Africa. Nowadays, the product's excellent electrical insulation allows many more applications including protection of electrical connections, electrical assemblies and terminals. It can seal and lubricate cable connectors, battery terminals, door seals, and rubber O-rings.

Silicone grease is produced by mixing dimethyl silicone oil with amorphous silica.

Another application of silicone grease that shows up in the radio shack is thermal transfer compound for use between a semiconductor device and a heat sink. The product improves heat transfer between two adjacent surfaces by filling voids with a material having good thermal conductivity.



Dow Corning 340 silicone-based heat sink compound

Silicone-based heat transfer compound usually consists of silicone grease in which fine particles of zinc oxide, silver or aluminum have been dispersed.

Flexible silicones

Silicone products were further developed during WWII as elastomers that could replace and outperform natural rubber, supplies of which had been limited by the Axis powers. Natural rubber — which is produced from the sap of rubber trees — has poor high temperature performance, plus poor resistance to ozone and ultra-violet radiation.



Natural rubber degrades with time. The red material was a rubber balloon. Old rubber bands break when stretched.

Silicone rubber excels in these areas and was used during WWII for gaskets — in battleship searchlights and in superchargers for aircraft engines.

The long Si-O-Si-O molecular backbone in a silicone polymer is more 'bendy' than the C-C-C backbone of natural rubber and the newer product is therefore more flexible. Silicone rubbers are more resistant to attack by molds and other chemicals. They are used in electronics to seal and protect circuits, for gaskets, for electronic encapsulation and for reducing audio noise. Silicone rubber is also used for corona-resistant tubing, wire insulation, cable terminations, and connectors. Silicone rubber sleeving, slipped over



Silicone rubber sleeving.

component leads, can easily withstand the heat of soldering.

One giant step

Silicone rubber has many uses in automobiles including tires, cylinder head gaskets, engine covers, spark plug covers, water-pump gaskets, and hoses. When Neil Armstrong took his historic first step on the moon in 1969, it was with boots made from GE silicone rubber. New silicone materials were also used



Neil Armstrong's first historic step on the moon in 1969 was made with boots made from GE silicone rubber.



Belkin silicone rubber sleeve for iPod.

in the lunar module and command module. Today, the flexible case for your cellphone or iPod is probably made from silicone rubber, while conductive silicone rubber is used in membrane keyboards.

Another

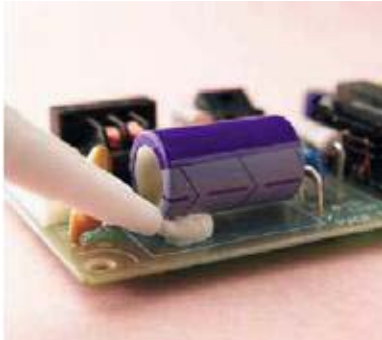
type of silicone rubber that may be encountered in workshop and shack is the "Room Temperature Vulcanizing" or RTV silicone. These products are usually sold for adhesive or sealant use in the form of a paste in a sealed tube – once the paste has been squeezed out of the tube, a chemical reaction converts the product to a tough, flexible rubber that forms a water-tight seal to surrounding surfaces.

Single-part RTV systems consist of a polydialkylsiloxane with terminal hydroxyl groups, which



GE Silicone II room temperature vulcanizing silicone rubber can be used as sealant and an adhesive.

are then reacted with organosilicon cross-linking agents. This operation is carried out in a moisture-free environment. Curing takes place when the materials are squeezed out of the tube and exposed to atmospheric moisture. Note that the acetoxy-based cure system releases acetic acid, which you can smell, and which corrodes metallic brass and copper. A better choice for sealing electronic components is the alkoxy or oxime cure systems that only release ammonia, alcohol or methylethylketoxime. RTV sealants are used in the electronics industry to ensure long term performance of circuit assemblies. Applications include integrated circuits, solar cells, power modules and photo couplers. RTV adhesives are also used for fixing components to PCBs, plus sealing of LED and LCD flat panel displays.



RTV silicone rubber can be used to secure large components to circuit boards. [Momentive]

Just to bring the story up-to-date, Dow Corning is still very much in the silicone business, with headquarters at Midland, MI. General Electric's GE Advanced Materials division was sold to Apollo Management in 2006 and is now known as Momentive Performance Materials. The GE Silicones plant in Waterford, NY is still going strong under the Momentive name.

This article has only touched on the history and applications of silicones around the home and shack. There are many other applications, from "Silly Putty" to hair conditioner to bakeware. Silicones are essentially flexible.

- NM9J

Gold plate

As you drive around the highways of New York



State, you may have noticed a different style of yellow license plate popping up on newly-registered vehicles, despite much controversy over the State's initial plans.

The new plates began appearing on April 1, 2010 (!), when NYS Department of Motor Vehicles Commis-

sioner David Swarts declared: "We are proud of the retro design of the new Empire Gold plate and we are pleased to offer it to the motoring public."

The State refers to the design as "blue and gold" but it looks more like cheap cadmium orange to me.

In 2009, New York State had announced that the new license plates would be mandatory for all cars, trucks, trailers and motorcycles from April 1, 2010. The plates would cost \$25 when a vehicle registration was renewed, \$10 more than before. And anyone requesting the same plate number would be charged an additional \$20. The plan was forecast to generate \$130 million over the next two years.

County Clerks led strong opposition to the mandatory replacement of *all* plates, at a time when families were having problems making ends meet. Governor David Paterson relented on that particular provision, but the state continued with the rest of the plan and issuing of the yellow plates.

Fortunately, most drivers will be able to keep their existing blue and white "Empire" plates, with no more to pay than the normal registration renewal fees. Empire blue and white plates will continue to be valid on vehicles registered in New York State, but will no longer be issued by the DMV when the current stock is exhausted. Whether the plates are blue or "gold", the plate fee, based on the 2009-2010 Budget, is \$25 for a two plate set. Prior to April 1, the plate fee was \$15 for a two plate set. Drivers who wish to keep the same plate number will be charged an additional \$20.

Motorists who have current blue and white plates will **not** have to obtain new "Empire Gold" plates when they renew their vehicle registrations. They will be allowed to keep their current plates.

For motorists with personalized plates, there will be an option to request "Empire Gold" personalized plates when renewing the registration. The driver will then be charged the \$25 plate fee for a set of two new plates. but they will *not* be charged the additional \$20 fee to keep the same plate number, because they currently pay an annual personalized plate fee.

Empire Gold plates can also be specified when renewing on-line.



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

July - August: Summer Break

Sun Sept 12: PCARA monthly meeting, Hudson Valley Hospital Center, 3:00 p.m.

Hamfests

Sun July 11: Sussex County ARC Hamfest, Sussex County Fairgrounds, 37 Plains Road, Augusta, NJ. 8:00 a.m.

Sun Aug 8: Tri-State Amateur Radio Assn Hamfest, Matamoras Airport Park, Matamoras, PA. 8:00 a.m.

Sat Aug 21: Ramapo Mountain ARC - Hamfest *Canceled.*

Sun Sept 12: Candlewood ARA Western CT Hamfest, Edmond Town Hall, 45 Main St (Rt. 6), Newtown, CT. 8:30 a.m.

VE Test Sessions

July 4: Yonkers ARC, Yonkers PD, Grassy Sprain Rd, Yonkers, NY. 8:30 a.m. Contact Daniel Calabrese, 914 667-0587.

July 8: WECA, Westchester Co Fire Trg Center, 4 Dana Rd., Valhalla, NY. 7:00 p.m. Contact Stanley Rothman, 914 831-3258.

July 19: Columbia Univ VE Team, 2960 Broadway, 115 Havemeyer Hall, New York NY. 6:30 p.m. Contact Alan Crosswell, (212) 854-3754.



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