



PCARA Update



Volume 19, Issue 12 Peekskill/Cortlandt Amateur Radio Association Inc. December 2018

Tests and festivities

Nomination and election of PCARA Officers and Board of Directors took place at the November 2018 PCARA Membership Meeting. Two officers remain unchanged with Joe WA2MCR as Vice President/Treasurer, and yours truly as President. Please join me in welcoming new Directors Bob N2CBH, Lou KD2ITZ, and Mike W2IGG, with Lou now taking the role of Secretary. Congratulations! These changes reflect the new PCARA by-laws adopted a few months ago.

PCARA sponsored another successful **VE Test Session** at 11:00 a.m. on November 17, 2018 at the John C. Hart Memorial Library in Shrub Oak, NY. We had ten VEs proctoring the session with three candidates. At the conclusion of the session there was one new Technician and two upgrades to General. We would once again like to thank the Staff of the John C. Hart Memorial Library for their hospitality and help in making the session a reality. Also thanks are due to Mike W2IGG who officiated the session. We're looking forward to more sessions soon.



Candidates under careful scrutiny at the November 17 PCARA V.E. Test Session.

Earlier in the day (9:00 a.m.) on November 17, 2018, the monthly **PCARA Breakfast** was held at Turco's in Yorktown Heights, NY. Ten members were in attendance with Jay NE2Q giving an impromptu demonstration of an adjustable stub made of 450 ohm window/ladder line with a sliding "trombone" section. Jay demonstrated the adjustable tuning of the stub by measuring impedance at the opposite end using a RigExpert AA-54 antenna analyzer. Also, informal dis-



Jay NE2Q (left foreground) measures impedance of an adjustable-length section of 450 ohm ladder line at the PCARA breakfast.

cussions were held on items PCARA might want to accomplish in 2019. As always, a good time was had by all! The next **PCARA Breakfast** has been scheduled for 9:00 a.m. December 15, 2019 at Turco's in Yorktown Heights, NY. Please come join us to celebrate the Holiday Season!

The 2018 **PCARA Holiday Dinner** will be held on Sunday December 2, 2018 at 5:00 p.m. at the Cortlandt Colonial Restaurant in Cortlandt Manor, NY. If you are planning to attend, please email the number in your party to *mail 'at' pcara.org* ASAP. If you remember last year's dinner, we literally had an overflow crowd, so we need a headcount to make appropriate arrangements. Thanks! A copy of the menu for the dinner can be found inside this edition of the *PCARA Update*.

The 2018 **ARRL Field Day Results** are out. PCARA had a slightly better score than in 2017 and we earned second place in 2A-ENY. Excellent! Full Field Day results are available in the December 2018 edition of *QST* (hardcopy and online). *Continued on page 2* ⇒



A report on PCARA's score can be found in this month's edition of the *PCARA Update*.

We will begin 2019 with another annual tradition, the PCARA **Bring and Buy Auction** on Sunday January 6, 2019 at 3:00 p.m. at NewYork-Presbyterian / Hudson Valley Hospital. Start digging through your shack now to try and find anything you might no longer need and bring it along to the meeting. Please invite any of your fellow Ham friends to join us! I look forward to seeing each of you there.

And please mark your calendars for January 16, 2019 at 7:00 p.m. for a PCARA **UHF Workshop** to be held at the Cortlandt Town Center Community Room on Route 6 in Mohegan Lake, NY. The Community Room is around back of the Town Center to the right of the main entrance (leading to the cinema). Thanks to Lou KD2ITZ for making the necessary arrangements with the town, and to the Town of Cortlandt Recreation Department for their continued support.

To each of you and your families, I wish a Most Joyous Holiday Season and Very Happy and Blessed New Year!

- 73 de Greg, KB2CQE

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PCARA Board

President:

Greg Appleyard, KB2CQE; kb2cq@arrl.net

Vice President/Treasurer:

Joe Calabrese, WA2MCR; wa2mcr@arrl.net

Secretary:

Lou Cassetta, KD2ITZ, radiocassetta@gmail.com

Directors:

Bob Tarsio, N2CBH

Mike Dvorozniak, W2IGG

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.

HRU 2019 Save the Date!

New ARRL CEO to Keynote 20th Annual 'Ham Radio University'

The new Chief Executive Officer of ARRL, Howard Michel, WB2ITX, will be the keynote speaker at the annual Ham Radio University (HRU) educational conference, which will mark its 20th anniversary on Saturday January 5, 2019.



Howard Michel, WB2ITX.

The event, which serves as the ARRL New York City/Long Island Section Convention, will be held in the Hillwood Commons Student Center on the campus of LIU/Post College in Brookville, Long Island from 7:30 a.m. to 3:30 p.m., with Mr. Michel delivering his remarks at 12:00 noon.

HRU will include nearly thirty informational forums covering a broad range of Amateur Radio activities, including: Assembling an Amateur Radio Station; Communicating through Amateur Radio Earth Satellites; Remote Station Operating Over the Internet; Emergency Communications, and three hands-on workshops on: Cable Theory and RF Connectors, Ethernet Connectors and Test Equipment.

In addition to the forums and workshops, there will be a V.E. session in the afternoon.

Presented in cooperation with LIU/Post public radio station WCWP 88.1FM (<http://www.wcwp.org>), HRU 2019 is a day of activities at which more than 300 hams will share ideas, experiences, knowledge and fellowship,

Ham Radio University is supported by numerous radio clubs and related organizations in the New York City – Long Island area. They will have displays in a Club Room and provide information about their licensing classes, public service events and other amateur radio activities.

Further information and the forum schedule is on line at: <http://www.hamradiouniversity.org>.

There will be free parking and a cafeteria will be open for breakfast and lunch. A suggested donation for attendees is \$5.00.

- HRU Publicity Coordinator Mel Granick, KS2G



Adventures in DXing

- N2KZ

Almost Perfect

Where can you find three television channels, talk to the International Space Station and even bounce signals off the moon? Can you imagine having a QSO through a satellite as a repeater using just your handheld HT? Maybe you would like to track a transmitter flying high above the Earth attached to a balloon? Even better... wouldn't it be nice to easily hold a six element Yagi in your hand without much effort? FM and digital modes predomi-



nate, but all modes are welcomed! Could all of this be possible?

Yes! Welcome to the miraculous band known as **440** or formally as **70 centimeters**. You probably already have a HT for this band, so you are all set! Want a quick introduction to all the wonders you can achieve here? Read on! As an added bonus, PCARA will be presenting a free seminar, including building your own antenna for 70 cm, on Wednesday night, January 16th at the Cortlandt Town Center at 7:00 p.m. Full details will be announced shortly. Fun will be waiting for you! You'll soon understand why 70 centimeters is the most popular UHF band.

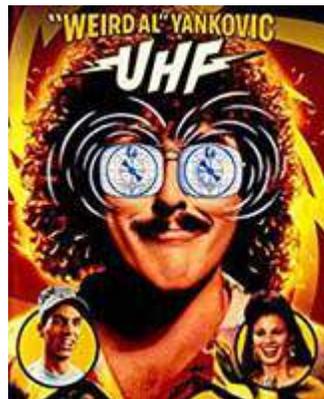
Valuable and Big

Talk about wide-open spaces! 70 centimeters holds a lot of real estate. The band is 30 megahertz wide — bigger than the entire HF spectrum and then some. 420 to 450 MHz is prime territory that we should use wisely and often... and protect. How valuable is it? How sought after is it? Plenty! Let me explain...

Recently, TV broadcasters consolidated their need for RF spectrum. The goal was to make room for more 'land mobile' users like cell phones and other wireless solutions. All TV broadcasting above channel 37 would end — handing back a huge chunk of RF spectrum (TV channels 38 through 51) from 614 to 698 MHz.

In addition, a similar arrangement was made to discontinue shared use of the UHF T-band found at the bottom of the UHF TV spectrum (TV channels 14 through 20) 470 to 512 MHz. Previously, public service users had shared these channels with TV broadcasters in densely populated areas like New York City. When all is said and done for, only channel 18 (of 14-20) will still be used for television in the New York metro area.

The message is simple: "Move over! Someone else needs this space!" The entire world wants more room for cell phones, tablets and everything that needs a wireless connection. To make the connection, UHF is the place to be!



UHF spectrum could not be more valuable. Many companies vied for their share of this newly available rare and finite spectrum. Amateur radio holds 30 MHz of this precious space and all the frequencies around it were being fought over like a mega-bargain on Black Friday!

Use of the now-available single 6 MHz wide TV channels was auctioned off to a variety of cellular speculators like T-Mobile. For example: Co-owned WNBC-TV and its sister station in Spanish WNJU-TV, decided to combine operations onto one channel and turn in their license to operate on channel 28. The rights to this *one single channel*, with about a 50 mile radius, were purchased for \$214 million dollars. Please consider: The amateur radio 70 cm band could hold 5 television channels *nationwide*. What must that be worth?

UHF is the place to be and for good reason! Think of all the things amateurs could experiment with and accomplish here. Sit back and enjoy this great swatch of RF real estate that is waiting for you. Here's a summary sample of what you might find when you tune into '440.'

ATV = Amateur Television

The three 70 cm amateur radio TV channels can be found at 420 to 426 MHz (for repeater inputs,) 426 to 432 MHz (for simplex,) and 438 to 444 MHz (for repeater outputs.) Conveniently, these channels exactly mirror three channels that are used on cable TV systems (channels 57, 58 and 60.) You can actually receive amateur TV on most conventional consumer TV sets! For a nice introduction to ATV, visit <http://www.hamtv.com>.

Far Out!

Your 70 cm signals can travel to faraway places — and back! Discover the amazing world of EME DXing: Earth – Moon – Earth. EME hams literally bounce signals off the surface of the moon to achieve QSOs dramatic distances away. Using the appropriate modes and skills, ham radio signals can even be heard riding on the backs of 'falling stars' (called meteor scatter!) As meteors enter the Earth's atmosphere, the energy they

create excites the surrounding atmosphere, allowing signals to ping off and be heard hundreds or thousands of miles away.

These modes of operation are not easy — but they are amazing! Take a look at the satellite dish used by PI9CAM at Dwingeloo in The Netherlands for moon bounce. Your wife



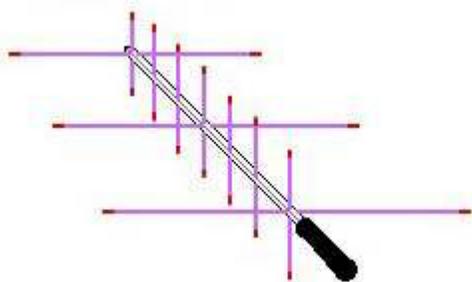
25 meter radio telescope dish at Dwingeloo, northeast Netherlands as used by PI9CAM for moon-bounce.

would love a dish like that in your backyard! Read all about EME at:

http://www.g4ztr.co.uk/app/download/13284489/RaCcom_Feb14+EME+part+1.pdf (RadCom article pdf).

Amateur radio operators can also discover and reach several earth orbiting satellites including the renowned International Space Station. Often both the two meter and 70 centimeter bands are put to use to achieve these miraculous feats. Sometimes you can reach the satellite on 2 meters and hear the reply of an orbiting repeater on 70 cm.

A good place to start learning about amateur radio satellites is the world-class group known as AMSAT (<http://www.amsat.org>.) Casual satellite enthusiasts can



Arrow II Satellite antenna 146/437-10 has 3 elements for VHF and 7 elements for UHF. Aluminum arrow shafts are used for the elements.

<http://www.arrowantennas.com/arrowii/146-437.html>. Look for satellite reception all through the range from 435 to 438 MHz.

QSL?

70 cm operation doesn't need to be hard or complex. You can start today with just a handheld HT! Local contacts to other hams can be found using the 70 cm primary simplex frequency at 446.000 MHz. PCARA operates two local repeaters on 70 cm. Both have a minus 5 MHz offset: set your radio to receive on

448.725 MHz, transmit 5 MHz below on 443.725 (use a 107.2 Hz PL tone) or set your radio to receive on 449.925 MHz, transmit 5 MHz down on 444.925 (using a 179.9 PL.) Two other repeaters are dominant in our area: WECA on 447.475 -5.0 MHz (114.8 PL) and the Rockland Repeater Association on 443.850 +5.0 MHz (114.8 PL.) The Rockland repeater is linked to a group of other bands including 6 and 10 meters with multiple receive sites. You can have some memorable DX QSOs here!

Horizontal and Vertical

FM and digital modes dominate the 70 centimeter band using mostly vertically-polarized omnidirectional antennas, especially when mobile or at repeater sites.

Enthusiasts of very weak signal operation like to use SSB and CW for deep DX with highly directional long beams using horizontal polarization. Horizontal polarization carries better over the horizon, is less susceptible to noise and does not interact as much with mounting poles and pipes associated with antenna rotors.

Internet Advantage

Worldwide contacts, often with perfect reception, can be found on 70 cm. By connecting local repeaters over the Internet, you can speak to stations far and wide with just your HT. Read all about two popular systems known as Echolink:

<http://www.echolink.org> and a similar system called IRLP (Internet Radio Linking Project) at <http://www.irlp.net>.

On Echolink, I have often joined a worldwide collection of hams via the Ireland Conference. With the easy-to-use Echolink phone app, you don't even need any amateur radio equipment at all. Upload a copy of your current license when installing Echolink and you are all set!



KB2CQE repeater site antenna on 449.925 pictured in August 2018.



Ireland Conference as seen on Echolink smartphone app.



Echolink app's transmit screen.

Scroll down the lists of available nodes and select one you might like to try. Labrador? Australia? There are thousands of Echolink nodes available for free. Just browse the app, connect and enjoy! Tap your phone screen to transmit. Tap it again to listen. Your phone becomes your transceiver. It is a really amazing experience!

If you want to use your amateur radio HT instead of your phone, there are local nodes you can connect to over-the-air. WECA's WB2ZII repeater (Echolink node

825225) can be reached via 70 cm on 447.475 MHz (442.475 MHz input - 114.8 PL.) Going to Paris? You can check into an Echolink node and feel like you never left home.

Always Fun

70 centimeters can be a very interesting place to visit. Arguably, this is the best band to use when trying to communicate within concrete and steel buildings. UHF is especially good within such buildings because of the waveguide cutoff frequency. Corridors and windows are large enough to let UHF wavelengths enter and exit, where lower frequencies would be cut off.

This wavelength behaves very much like visible light. It reflects and penetrates in amazing and unpredictable ways. Stand on top of a building or Bear Mountain with your 70 cm HT and you might swear your signal could go on forever! We proved it during the PCARA simplex challenge on May 23, 2016.

Beautiful Mornings

Listen to the weather forecast for the words "hazy, hot and humid!" In the summer months, this is often an indirect alert for miraculous reception on 70 centimeters. A natural phenomenon, known as "tropospheric ducting," brings in bold and strong signals from places far, far away. If you hear that a hurricane or Nor'easter is on its way, turn on your rig and listen carefully. Magical moments might emerge from your radio in short stead!

Picture an enormous virtual heating duct or vacuum cleaner pipe that can tunnel signals in from hundreds of miles away. Tropo openings often begin before dawn and last until well after mid-morning when the humidity burns off to normal conditions. The areas you can contact are distinct but sporadic. You can

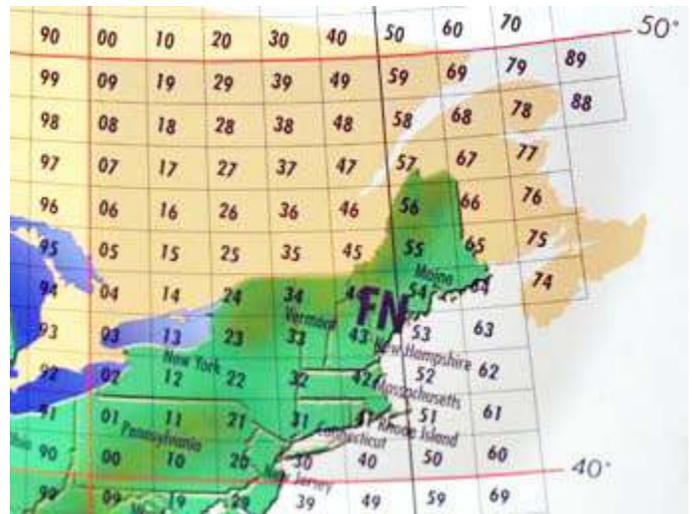
hear the 'opening' travel up the eastern seaboard with localized reception sometimes at simply enormous signal strengths.

In our area, your reception can reach to South Carolina and up to Boston along the Atlantic shoreline. Find yourself going into Central Pennsylvania and the Finger Lakes region of New York to the west. Rhode Island, Eastern Massachusetts and Southern Maine can be revealed to the east. When you see fog and inversion on a summer's morning, turn on your rig, get out your logbook and start hunting for DX!

Start Counting Grids

What in the world is a Maidenhead grid? When you are surrounded by very distinct and localized skip, you need a much more exact method of measuring DX than just countries, states or even counties. In the Maidenhead system, the map of the entire world is divided into very distinct squares. If you use the system to its finest definition, you can pinpoint where your latest DX catch is from.

For instance, my QTH is located at FN31eh. The FN 'field' area covers the Northeast, much of Atlantic Canada and Quebec, Pennsylvania and parts of New Jersey and Ontario. The 31 grid square then narrows the scope to Connecticut and the Southern Hudson Valley. The sub-square designation 'eh' just about shows you to my doorstep.

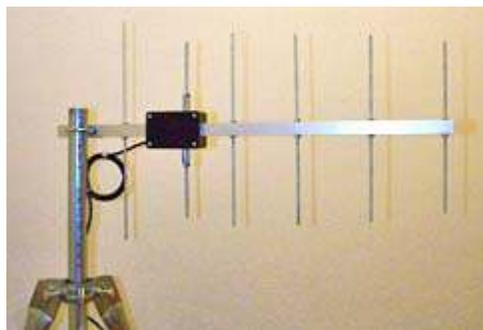


Maidenhead grid squares in Field FN. Grid square 31 covers Connecticut and the southern Hudson Valley. [From Icom U.S. Grid Square Map]

You need to familiarize yourself with this system. Maidenhead grids are the basis of most VHF/UHF reception awards and VHF/UHF contests — the universal measure for the world above 50 MHz. The ARRL's coveted 'VUCC' (VHF UHF Century Club) award is based upon achieving QSOs with hams in 100 Maidenhead grids. Check out the ARRL's introduction to the system at: <http://www.arrl.org/about-grid-squares>.

Antenna Ups and Downs

There are good things and not so good things in the world of 70-centimeter antennas and feed lines. In



Six element Yagi for 440 MHz constructed by VE3RGW for \$18.00.

<https://www.qsl.net/ve3rgw/antproj2/6euyagi.html>

the middle of the band, a full wave-length is only about 27 inches long. This is tiny! Compare that to the 33 foot long 20-meter dipole hanging in your backyard. Such a small

wavelength makes for very compact designs of even multiple element Yagi antennas.

On the downside, 70 cm signals are fragile and must be handled with care! Very small variations in feed line impedance and even where you position your antenna (or even your hands) may make profound differences in efficiency and tuning of your antenna to resonance. Snow, rain and even tree leaves can change your world. A great signal in the winter might nearly disappear if a few layers of thick tree leaves get in the way in spring.

Be aware that you should treat your signals well in your home shack, too. Thin coaxial cable can weaken your transmit and receive signals dramatically. To reduce line losses, use the best large diameter "RG-8 type" cable with foam or 'air' dielectric that you



Belden 9913 coaxial cable is a low-loss 0.405 inch dia. RG-8 type with 'air' dielectric and solid inner conductor.

can find. Serious DXers use cable known as 'semi-flex' fitted with military standard N-type connectors. Utmost care

needs to be provided towards all UHF antennas mounted inside or outside. Being too close to pieces of

metal, random wiring or duct work all can cause profound deterioration to performance. Your rule-of-thumb should always be 'free and clear.'



Semi-flex patch cable terminated with N-type male connectors.

You will also see that seasonal changes in terrain will change the personality of mobile operation. As you drive along in the spring and summer, you will hear more quick fades and 'picket fencing' on 70 cm as compared to 2 and 6 meters, especially when leaves are on the trees and everything is in bloom. As you go further up in frequency, your signals will act more and more like visual light showing unpredictable bounces and reflections often defying logic! Always 'walk' your antennas when you try to position permanent installations. A profound hot spot may be just inches away from a devastating null in signal pickup.

The harmonic relationship between 2 meters and 70 centimeters could not be better. The two meter band, from 144 to 148 MHz multiplied by three sits perfectly within the 70 cm band from 432 to 444 MHz. This allows very easy and convenient designs for multi-band antennas to cover both bands. A full half wave-length on 70 cm is just over a foot long. No need for loading coils for an efficient whip for your HT.



Comet M24-M dual-band antenna for 144/440 MHz.

Onward!

So, did you ever think so much could be going on within just one ham band? This is only the beginning! There is a fascinating world waiting for you around 440 MHz. Make a date to join us on January 16th at the Cortlandt Town Center at 7:00 p.m. and learn much more about it!

Many thanks to our PCARA Update editor-in-chief, Malcolm, NM9J, for his help and contributions to this (and every) column!

Until next month, happy holidays and see you at the PCARA dinner! 73 es dit dit de N2KZ 'The Old Goat.'



VE Test Session – Nov 2018

PCARA's second Volunteer Examiner (V.E.) Test Session of the new series took place on Saturday November 17, 2018. Venue was the same as for the September 15 session, in the Children's Reading Room at John C. Hart Memorial Library, Shrub Oak. **Mike W2IGG** continued his role of V.E. Team Liaison, informing candidates of the test requirements and encouraging a good number of Volunteer Examiners (V.E.s) to come along and take part.

The V.E. Team consisted of Mike W2IGG, Lou KD2ITZ, Karl N2KZ, Verle W2VJ, Tom KD2JUH, Larry AC2QH, Stan WA2NRV, Paul AC2T and Lester K2LTM plus NM9J. With the exception of K2LTM, the other nine VEs had all been present at the inaugural session in September.



Karl N2KZ explains the NCVET Form 605 to candidates at PCARA's November 17 V.E. test session.

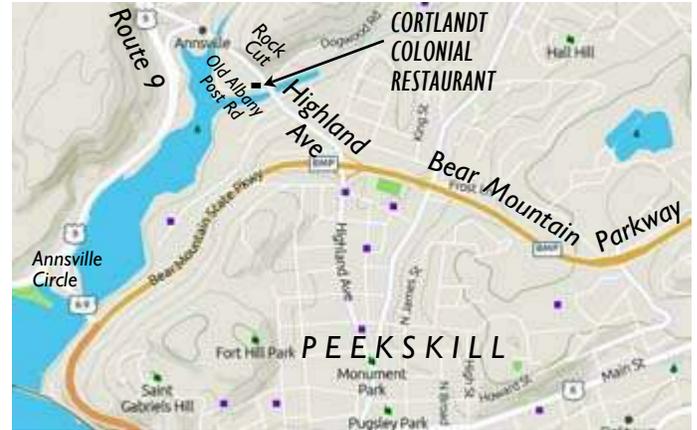
PCARA's Saturday morning breakfast at Turco's had been scheduled for earlier the same day, and all ten participants made the four mile journey to John C. Hart Library. As a result, the V.E. Team was reinforced by six "non-V.E. Helpers", as the Test Session Report Form describes this role. Thanks to Joe WA2MCR, Greg KB2CQE, Jay NE2Q, Richard N1GIL, Jared KD2HXZ and Al K2DMV who came along to support the activity, boost morale and publicize PCARA.

Three candidates took tests, one of whom was a 'return-customer'. As a result of success at the September session, Jan LA1ZN received Technician call KD2QMA and on November 17 he successfully made the upgrade from Tech to General. Martin KD2JQG, who had driven down from LaGrange, also made the upgrade from Technician to General. Our third candidate Rob successfully passed the Technician examination. Club information was handed to all three by Lou, KD2ITZ.

Congratulations to the successful candidates and a thank-you to all members of the V.E. Team.

Holiday Dinner

The 2018 PCARA Holiday Dinner will take place at the same location as last year, the **Cortlandt Colonial Manor Restaurant**. The event begins at 5:00 p.m. on Sunday December 2.



The restaurant is located at 714 Old Albany Post Road. Take the Bear Mountain Parkway to the Highland Avenue exit, then proceed north down Highland Avenue and across the bridge. Restaurant and parking are immediately on the left.

The dinner menu is as follows:

Open Soup and Salad Bar
Soda, iced tea and soft drinks (unlimited)
 ♦♦♦♦ choice of: ♦♦♦♦
Prime Ribs of Beef
Grilled New York Strip Steak
Grilled Pork Tenderloin Medallions
Jumbo Shrimp with crabmeat stuffing
Chicken — Marsala, Chardonnay, Sherry or Madeira
Penne ala Vodka, traditional or w/grilled chicken
Custom Cake – Chocolate Mousse

Cost will be ~\$42.00 per head including service, but *not including* alcoholic drinks. Please let Greg KB2CQE know if you will be attending by emailing the number of people in your party to: *mail 'at' pcara.org*.



Cortlandt Colonial Manor restaurant.

Field Day results

Results from Field Day 2018 were published in the December 2018 issue of *QST* with the full database appearing on the ARRL web site on November 16. See http://www.arrl.org/results/database?event_id=102134.



PCARA's 2018 entry in Field Day was once more in **Category 2A**. This means a portable club or non-club entry with **two** stations operating simultaneously on the HF bands and a minimum of three people taking part. A "free" VHF station can add to the points score. We had two types of accommodation this year, with a single rental van for the first HF station, while the second HF station was set-up alongside the VHF station in the baseball dugout under a tarpaulin.



PCARA's 2018 Field Day operations took place at Walter Panas High School inside a rental van and under canvas.

Support for PCARA's 2018 Field Day effort was once again outstanding, with 22 licensed members and friends taking part. The number of contacts was slightly down on 2017, but the total points increased, as a result of emphasizing CW and additional bonus points brought in by Mike W2IGG. See *PCARA Update*, July 2018 for the post-event report. Here is a summary of PCARA Field Day results over the years:

Peekskill/Cortlandt ARA, W2NYW, Class 2A

	2002	2003	2004	2005	2007	2008	2009	2011	2012
QSOs:	718	733	968	853	1019	1109	694	879	968
Power:	2 (<150W)								
Partcpts:	15	11	12	10	14	10	10	14	15
Tot scor:	2,096	2,328	2,996	2,798	2,906	3,460	2,746	2,602	2,920

	2013 (Class 1A)	2014	2016	2017	2018
QSOs:	775	722	816	813	731
Power:	2 (<150W)				
Participants:	14	16	19	22	22
Total score:	2040	2460	3018	2734	2886

After publication of the full results database by ARRL, we can compare PCARA's efforts with our neighbors in Eastern New York and in the ARRL Hudson Division. In 2018, PCARA was:

- **Second** out of five entries in Category 2A, ENY section.
- **Eleventh** out of 40 in all of ENY section.
- **Sixth** out of 17 in Category 2A, Hudson Division.
- **28th** out of 110 in the entire Hudson Division.
- **91st** out of 328 in Category 2A nationwide.
- **554th** out of 2,902 total entries listed.

Congratulations to WECA who once again came first in the entire **Eastern New York** section, with 12,034 total points (category 4A). Here is a list of the leading entries from neighboring ENY clubs so you can compare their performance with PCARA's.

#	Call	Points	Cat	QSOs	Club
1	N2SF	11,982	4A	3,282	Westch Em Comm Assn
2	W2IR	7,210	6A	1,973	Schenectady Museum ARA
3	K2CT	6,984	2A	1,885	Albany ARA
4	K2QS	6,512	3A	1,684	QSY Society
5	W2C	5708	6F	1,348	Warren Co RC
6	W2HO	3,684	5A	679	Orange Co (NY) ARC
7	WD2K	3,338	3A	613	Rip Van Winkle ARS
8	K2PUT	3,220	3A	597	Putnam Emer Am Rep Lg
9	W2YRC	3,036	3A	832	Yonkers ARC
10	K2DLL	2,888	3A	609	Saratoga Co ARA
11	W2NYW	2,886	2A	731	Peekskill / Cortlandt ARA
12	W2RBJ	2,312	2A	589	East Greenbush ARA
13	KK2U	2,280	1B _{2B}	225	(Rob Fissel)
14	NY2U	2,106	4A	407	Troy AR
15	WW2G	1,498	1Ac	1,102	Cedar Grove ARC

Compared with 2017, PCARA made 82 less contacts, but scored a total of 152 more points. Reduction in contacts seems to be a common trend and might be explained by the vanishingly low sunspot count. Our standing in Eastern New York slipped from tenth to eleventh position — but this is still a creditable score, as the ENY stations above us with the exception of K2CT were all in higher categories (3A to 6A, three to six stations operating). Eight out of the ten higher entries also had a GOTA station.

One suggestion from the July 2018 *PCARA Update* was to spread the organizational load over more than one person next time. Another suggestion that recently came to light might be to try a different location, perhaps with less chance of a weekend ball game clashing with our own radio games.

Field Day 2019 is scheduled for the weekend of June 22-23. Here's looking forward to the next time PCARA ventures out into the big wide world of radio.

- NM9J

ARRL Elections

Democracy in action

November 2018 was not just about mid-term national elections and PCARA elections — there was also the election of **Division Directors** and **Vice Directors** to the ARRL Board. Fifteen Directors are elected on a regional basis, one per ARRL Division, to serve three year terms. Directors are assisted by Vice Directors who are also elected. The five ARRL Divisions with elections scheduled for 2018 were the Central, Hudson, New England, Northwestern and Roanoke Divisions.

Disquiet

2018 had begun with some controversy regarding ARRL's Code of Conduct, recent censure of a Board Member, plus proposed changes to the Articles of Association and By-Laws. Also in January, ARRL's CEO Tom Gallagher NY2RF announced his retirement after two years in the position. Some of the concerns expressed by members were mitigated at the January Board meeting. The post of CEO was temporarily filled by ARRL's Chief Financial Officer Barry J. Shelley, N1VXY. Later in the year the Board chose Howard E. Michel, WB2ITX to be the new CEO, starting in mid-October.

Hudson Division Director Mike Lisenco, N2YBB addressed the disquiet at February's meeting of the QSY Society. The standing-room-only event attracted several PCARA and WECA members.

Electric elections

With elections slated for November, alternative candidates for Director emerged in four out of five Divisions, while Roanoke Director Jim Pace, K7CEX did not seek a new term. In our own Hudson Division, **Mike Lisenco N2YBB** was opposed by **Ria Jairam N2RJ**.

Mike N2YBB came to the September 9, 2018 PCARA meeting, presented his case for remaining in office and answered questions from members.



Mike Lisenco N2YBB (at head of table) came to the September 9 PCARA meeting to discuss ARRL concerns and the upcoming Hudson Division election.

Two weeks later, Ria Jairam N2RJ was a guest at the September 22nd PCARA Breakfast, where she explained her reasons for standing, including modernization of ARRL, improving transparency and making changes to offset the decline in membership.



Ria Jairam N2RJ (left) attended the September 22 PCARA Breakfast at Turco's in Yorktown. Also pictured are Joe WA2MCR, Jared KD2HXZ, Lou KD2ITZ and Todd N2MUZ.

Results

Election results were published by ARRL on November 16, with Ria N2RJ defeating Mike N2YBB by the narrow margin of 53 votes.

Hudson Division Director

Ria Jairam N2RJ	1,292 votes
Mike Lisenco, N2YBB	1,239 votes

Three other Divisions also elected new Directors. The only incumbent re-elected was Kermit Carlson, W9XA in the Central Division. As a result, four new Directors will join the Board from January 1, 2019.

The post of ARRL Director is not compensated (apart from expenses), so candidates who are elected give freely of their own time to consult membership, visit clubs and bring their opinions to the Board and to the Board Committees on which they serve. We thank Mike Lisenco for his past efforts and wish Ria Jairam all the best for her upcoming term.

For alternative views of developments at ARRL, see: <http://www.kb6nu.com>, <http://www.w7vo.com/election.html> and <https://www.myarrlvoice.org/>.

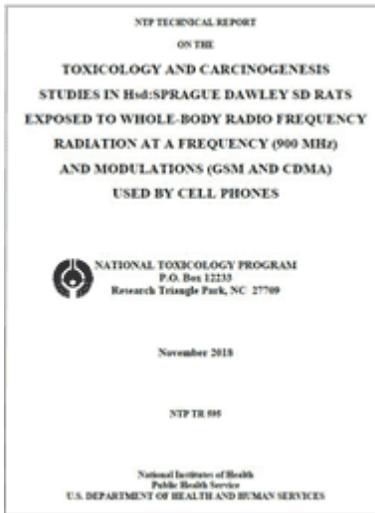
Late result

Bob N2CBH points out that one of the late results from the 2018 U.S. mid-term elections was that — following a machine and manual recount — incumbent Florida Governor Rick Scott narrowly overcame Democratic Senator Bill Nelson of Florida for his U.S. Senate seat. Mike Lisenco N2YBB had previously reported that Senator Bill Nelson was the “lead obstructionist” during past efforts to enact the Amateur Radio Parity Act, despite being passed by the U.S. House of Representatives.

RF and you

A final report recently issued by the U.S. National Toxicology Program (NTP) has been causing concern about the risks of radio frequency (RF) exposure from cell phones. The report entitled “NTP TR 595, Toxicology and Carcinogenesis Studies in Hsd:Sprague Dawley SD Rats Exposed to Whole-Body Radio Frequency Radiation at a Frequency (900 MHz) and Modulations (GSM and CDMA) Used by Cell Phones” was published on Nov 1, 2018 and is available as a PDF *via* the following web page:

<https://ntp.niehs.nih.gov/results/pubs/list/index.html?type=Technical+Report>



Popular press

Earlier reports on the study produced worrying headlines such as “Government Study Finds Link between Cell Phones and Cancer in Rats” (Consumer Reports).



Government Study Finds Link Between Cell Phones and Cancer in Rats

\$25 million study from the National Institutes of Health looked at brain tumors in animals

After the final report was released, headlines were more measured, for example: “Study of Cellphone Risks Finds ‘Some Evidence’ of Link to Cancer, at Least in Male Rats” (NY Times) and “Study Links Cell

Phones to Rat Tumors Without Judging Human Risk” (Bloomberg).

Should we worry about this? After all, most radio amateurs are quite happy to hold handi-talkies close to their heads while transmitting or they may operate a high-power HF station with the antenna nearby — at the same time wearing a phone slipped into a pocket or clipped onto a belt. Perhaps a little more information drawn from the NTP report will help you make up your own mind.

What did the study include?

The main study made use of some 1260 laboratory rats. Pregnant rats were exposed to 900 MHz GSM- or CDMA-modulated RF radiation. After birth, baby rats were exposed to the same RF radiation pattern until



Sprague Dawley lab rat.

weaning, at which point the mothers were removed and the exposure of 90 pups per sex per group was continued for up to two years. (Average life of lab rats is around two years.)

The RF radiation of each group took place at three different levels with the two different modulation schemes, while a separate group was exposed to no RF radiation to act as a control.

Causes for concern —

1. Radio frequency

The frequency chosen for exposure of the rats was **900 MHz**. When the study was commissioned by the FDA in 1999, the predominant cell-phone technology was 2G (second generation) using mainly the frequency range 824 - 894 MHz. At the time, 3G technology was just coming into use, employing 1850 - 1990 MHz as well as 850 MHz. Today’s phones use a mixture of 3G and 4G technologies, with operation on frequencies as varied as 600, 700, 800, 1695-1780, 1915-1920, 1995-2020 and 2110-2200 MHz.

Even if the study shows “some evidence” of a link between 900 MHz cell phone radiation and brain tumors in male rats, this is not *necessarily* a problem for humans using cell phones on different frequencies. As Bob N2CBH has pointed out, RF energy is absorbed by the human body more readily at some frequencies than others. For a human adult standing upright and insulated from ground, maximum absorption of RF energy takes place in the region of 70 MHz. Individual organs are ‘resonant’ at higher frequencies, for example an adult head is resonant around 400 MHz. Absorption of 900 MHz radiation by humans is likely to be different from rats, whose body size is around one eighth of our own.



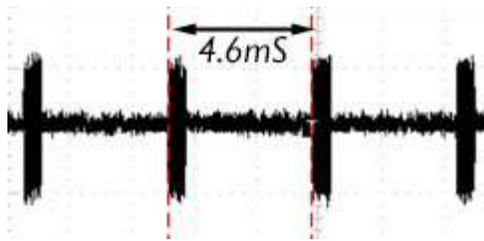
Maximum human body absorption occurs around 70 MHz.

2. Type of modulation

The radio frequency energy imposed on the rats was modulated with either a second generation (2G) **GSM** or **CDMA** type signal. GSM = “Global System for Mobile Communications”, CDMA = “Code Division Multiple Access”. 2G GSM phones use “TDMA” or time division multiple access, where each channel is shared with



other phones by splitting the available transmit time into a slot for each handset. In the USA, AT&T and T-Mobile employ GSM while Verizon, Sprint and US Cellular favor CDMA.



RF pulses from a 2G GSM phone with a period of 4.6 milliseconds. PRF=217 Hz.

2G GSM (TDMA) phones transmit short pulses of data as bursts of RF energy at a rate of 217 pulses per second. This is

equivalent to an amplitude modulated transmission and can sometimes be heard as a loud, pulsing buzz when the RF signal is rectified in a nearby landline telephone or other audio equipment. This buzz is especially noticeable when the phone is first communicating with the cell tower on the GSM control channel — the initial transmission from the phone is not power-regulated and can radiate up to 1 watt peak output.

CDMA phones use a different method of sharing the channel bandwidth, spreading information over a wider bandwidth, while still using separate frequencies for transmit and receive. CDMA phones are less likely to interfere when the signal is rectified in nearby audio equipment.

Third generation (3G) cell phones, including GSM phones, use a form of CDMA, so the pulsing buzz is less of a problem.

3. Power levels and exposure times

The power levels employed in the study were higher than the limits imposed by the FCC for cell phones. The FCC uses the “specific absorption rate” (SAR) measurement, defined as the power absorbed per mass of tissue, measured in watts per kilogram. For the general population using hand-held devices operating at maximum power, the FCC’s SAR limit is 0.08 watt/kg averaged over the whole body. For localized partial-body (spatial peak) exposure the SAR limit is 1.6 watt/kg averaged over any 1 gram of tissue in the shape of a cube.

The study exposed rats to RF energy at whole body levels of 1.5, 3 and 6 watt/kg, roughly 20-75 times the FCC human whole-body limit and 1-4 times the limit for spatial peak SAR in humans. The rats were exposed to RF at 10-minute on, 10-minute off intervals, totaling 9 hours per day — for up to two years. So the lowest whole-body exposure level used on the rats was equal to the maximum *local* tissue exposure currently allowed for human cell phone users. This power level rarely occurs with typical cell phone use. The highest whole-body exposure level for rats was ~four times higher than the maximum *localized* power permitted

for humans. And the daily exposure time for the rats was far longer than any cell phone user that I know.

4. High power lab gear

The NTP report includes a description of the equipment used for exposing the rats to RF radiation.

The Foundation for Research on Information Technologies in Society (IT’IS, Zurich, Switzerland) constructed 21 stainless steel “reverberation chambers”, fourteen of which were used in the rat study.



External view of RF exposure chambers. [Pic credit NTP.]

The chambers were installed at the Illinois Institute of Technology (IIT) Research Institute in Chicago, IL. Two of the fourteen chambers were not fed with any RF energy to act as controls. The remaining twelve chambers were fed with RF energy. (The other seven chambers were used in a separate mouse study.)

The equipment for providing the RF energy included



This Rohde & Schwarz vector signal generator covers 3.4 kHz - 6.4 GHz.

Rohde & Schwarz vector signal generators to produce the 900 MHz GSM- or CDMA-modulated signals.

Their low level output was amplified in twelve water-cooled power amplifiers manufactured by LS Elektronik AB of Sweden,

each capable of 400 W peak power or 200 W average power. The actual power output from each amplifier was adjusted by a real-time controller to maintain the desired field strength.



900 MHz 400W custom amplifier by LS Elektronik AB.

Each RF exposure chamber contained two half-wave dipoles mounted $\lambda/4$ in front of a reflector plate. The antennas were directed toward two “stirrers” to maximize scattering and obtain a homogeneous field within the chamber space. A computerized control system managed the exposure schedule, the stirrer rotation speed, exposure signal type and level.

(This combination of stainless steel cavity, high power RF and a paddle “stirrer” to modify the standing wave pattern is reminiscent of a microwave oven.)

The cage rack to house rats in each chamber was constructed from non-metallic materials to avoid disrupting the RF field. An automatic system to deliver drinking water to the animals employed stainless steel to avoid warming the water by absorption of RF energy.

Results

At the end of the trial, rats were euthanized then body parts were examined for development of tumors, including the brain, heart and liver. The most serious conclusion from the study was as follows:

“Under the conditions of this 2-year whole-body exposure study, there was clear evidence of carcinogenic activity of GSM-modulated cell phone RFR at 900 MHz in male Hsd:Sprague Dawley SD rats based on the incidences of malignant schwannoma of the heart.”

There was a similar conclusion for male rats exposed to CDMA-modulated RF. There was also *some* evidence that high exposure to 900 MHz RF was associated with tumors in the brains and adrenal glands of male rats.

The National Toxicology Program conducted a parallel study on mice exposed to cell-phone radiation at a frequency of 1900 MHz. In this case there was only “equivocal evidence of carcinogenic activity”. In this context, *equivocal* means “a marginal increase of neoplasms that may be test agent related”.



Empty RF exposure chamber showing horizontal and vertical paddle stirrers to move standing waves around. [Pic credit NTP]

What does it all mean?

After the final report results were published, various people made their thoughts known. Close to the project was NTP Senior Scientist John Bucher who wrote the following:

“The exposures used in the studies cannot be compared directly to the exposure that humans experience when using a cell phone. In our studies, rats and mice received radio frequency radiation across their whole bodies. By contrast, people are mostly exposed in specific local tissues close to where they hold the phone. In addition, the exposure levels and durations in our studies were greater than what people experience.”

John Bucher still concluded: “We believe that the link between radio frequency radiation and tumors in male rats is real, and the external experts agreed.” He also said in a subsequent interview : “I wouldn’t change my behavior based on these studies, and I haven’t.”

Jeffrey Shuren, Director of FDA’s Center for Devices and Radiological Health stated that:

“After reviewing the study, we disagree, however, with the conclusions of their [=NTP researchers] final report regarding ‘clear evidence’ of carcinogenic activity in rodents exposed to radiofrequency energy.”

“In the NTP study, researchers looked at the effects of exposing rodents to extremely high levels of radiofrequency throughout the entire body. This is commonly done in these types of hazard identification studies and means that the study tested levels of radiofrequency energy exposures considerably above the current whole body safety limits for cell phones.”

“Our colleagues at NTP echoed this point in a statement earlier this year about their draft final report, including the important note that “these findings should not be directly extrapolated to human cell phone usage. We agree that these findings should not be applied to human cell phone usage.”

Jeffrey Shuren also stated that: “the current safety limits for cell phone radiofrequency energy exposure remain acceptable for protecting the public health.”

In earlier comments, Christopher Labos and David Gorski of ‘Science Based Medicine’, <https://sciencebasedmedicine.org/>, pointed out that the incidence of tumors in the groups of 90 male rats was low enough to be a cause for experimental concern.

“But there were other problems, notwithstanding the lack of applicability to humans. The rate of cancer was very low in the control group and inconsistent with historical controls. There was no consistent dose-response meaning that higher levels of RFR did not clearly increase the risk of tumor formation. Finally, the rats exposed to cell phones lived longer than the rats in the control group, and did not show any dose-response effect as the exposure level was increased.”

Christopher Labos' main suggestion regarding cell phone use is to stop using the phone while driving. Distracted driving is a greater risk than RF exposure.

"The link between cell phones and cancer in the NTP study is very likely due to random chance. The link between cell phones and traffic accidents is very real."

But seriously

From my own short time studying in a biology lab, I know that experiments on plants and animals are far more difficult to conduct than physics and chemistry experiments on inanimate matter. All kinds of effects can be taking place to skew the results in living organisms. I remember counting mutations of fruit flies by dividing a group of treated *drosophila* into separate piles. One of my supposedly 'dead' fruit flies got up from the first pile and walked over to the second pile. Which group was I supposed to count 'im in'?



One way to counter this type of effect — where one or two specimens exhibit seemingly random behavior — is to increase the sample size.

A better test?

Fruit flies are one thing, but sentient mammals are another thing altogether. Rats may not have the best of public relations, but I have qualms about using them in experiments involving harmful levels of radiation or lethal doses of chemical compounds. (LD50 or lethal-dose 50 = the average amount of a chemical substance capable of killing 50% of the test animals exposed.)

In clinical trials, randomized double blind studies that include a placebo are considered the "gold standard". Neither the patients nor the investigators should know who has received the drug — or any other treatment — under study.

Perhaps something similar could be arranged to investigate radiation from cell-phones. Rather than employing lab rats, we could take 1,260 people, split them into groups of 90 then give each person a free cell phone that radiates no RF (a dead phone) or a maximum of 5 mW, 50 mW or 500 mW. Don't tell anybody who has which. Let them use the phones for two years, then give them all a medical. (Can you see a flaw in this experimental design?)

Should we extend the experiment to free Chinese handi-talkies radiating 8 watts on 146 MHz? Or any

other frequency you care to choose, from 136 - 174 MHz plus 400 - 520 MHz...



More seriously

ARRL has published reports on RF Safety for Radio Amateurs along with practical recommendations for avoiding excessive exposure. See for example:

<http://www.arrl.org/rf-radiation-and-electromagnetic-field-safety> and <http://www.arrl.org/table-9-3>. Here are a couple of the ARRL recommendations as applied to mobiles and handi-talkies:

"No person should ever be near any transmitting antenna while it is in use. This is especially true for mobile or ground-mounted vertical antennas. Avoid transmitting with more than 25 W in a VHF mobile installation unless it is possible to first measure the RF fields inside the vehicle. At the 1-kW level, both HF and VHF directional antennas should be at least 35 ft above inhabited areas. Avoid using indoor and attic-mounted antennas if at all possible."

"With hand-held transceivers, keep the antenna away from your head and use the lowest power possible to maintain communications. Use a separate microphone and hold the rig as far away from you as possible."



Use a separate microphone.

The Food & Drug Administration (FDA) gives the following advice on cell-phone safety:

"If there is a risk from being exposed to radiofrequency energy (RF) from cell phones—and at this point we do not know that there is—it is probably very small. But if you are concerned about avoiding even potential risks, you can take a few simple steps to minimize your RF exposure.

- Reduce the amount of time spent using your cell phone
- Use speaker mode or a headset to place more distance between your head and the cell phone."

- NM9J

Peekskill / Cortlandt Amateur Radio Association

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Newsletter contributions are always very welcome!

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

PCARA Information

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

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

PCARA Repeaters

W2NYW: 146.67 MHz -0.6, PL 156.7Hz

KB2CQE: 449.925MHz -5.0, PL 179.9Hz

N2CBH: 448.725MHz -5.0, PL 107.2Hz

PCARA Calendar

Sun Dec 2: PCARA Holiday Dinner, Cortlandt Colonial Restaurant, 5:00 p.m.

Sat Dec 15: PCARA Breakfast, Turco's, Yorktown Heights, 9:00 a.m.

Mon Dec 24: Radio coordination, Church of the Holy Spirit, 1969 Crompond Rd., Cortlandt Manor. ~2:30 p.m. to 4:00 p.m. (to be confirmed).

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.

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

Dec 9: Yonkers ARC, Will Library, 1500 Central Park Ave, Yonkers NY. 11:30 am. Pre-reg. John WB2AUL, (914) 969-6548.

Dec 13: WECA, Westchester Co Fire Trg Center, 4 Dana Rd., Valhalla, NY. 7:00 p.m. S. Rothman, (914) 949-1463.

Dec 17: Columbia Univ ARC, 531 Studebaker Bldg, 622 W 132nd St, New York. 6:30 pm, Alan Crosswell (212) 854-3754.



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