Volume 6, Issue 1

9/2022

the exchange

SWODXA
WWW.SWODXA.ORG
SouthWest Ohio DX Association

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Club Call : W8EX

INSIDE THIS ISSUE:

The Prez says…..

Welcome back to school! Sorry. Have been spending time with the "grand-harmonics" so I am in the "back to school" phase. However, as always, conditions are changing and we need to be prepared for it. Are your antennas up to date? Any radials you can add to your antenna system? Any feature of your rig or operating applications that you need to brush up on? Any hams you might mentor as you do these things? Have you submitted an article? This edition starts our SIXTH year of publication—Please think of the newsletter!

The club officers have been very busy the past two months:

- We have a new fund raising opportunity that you will be EXCITED about!
- We have a procedural change coming that will eliminate a bit of annual confusion.
- Starting with the September meeting, we will have 3 new regular meeting reports; Current Band conditions and activity, Upcoming DXPeditions and Contests, and an update from our Ohio Section Manager (and DXer) WB8LCD, Tom.
- We have 7 months of programs already scheduled for club meetings!
- Bouvet Island is now only 6 months away
- A group of SWODXA folks will be part of a group to go to P5 (Just Kidding on this one)

We have a lot going on and I hope you will choose to be a part of it. If you miss a meeting, you miss a lot!

73, Bill—AJ8B

SWODXA Club News

Upcoming Club Dates and Topics

Meeting Date	Topic
September 8th	N1MM+ Refresh with K8ZT—Anthony Luscre—Just in time for contest season
October 13th	Building a Multi-Band Slot Antenna with W6NBC—John Portune
November 10th	Cleaning & Repairing Traps by K8UD—Steve Coy
December	Christmas Party!!!
January 12th, 2023	"Golden Anniversary of NCDXF - What have we done and where are we going?" by W0GJ - Glenn Johnson
February 9th	"QRP DXing and Contesting" by ND0C—Randy Shirbroun
March 9th	Rob Sherwood, NC0B

New Member Info—Mike, KM1R

Hi Mike!

I've been a ham since 1958 (the ripe old age of ten) and I was lucky to have WlBB as my Elmer. He and my father (ex) lAJC knew each other from the spark days). Stew sparked my lifelong interest in 160m DXing and contesting. Am active in DXCC and am on Top of the Honor Roll. (yes North Korea also ! hi hi)

Much of my family lives in Cincinnati, hence the connection to SW OH. My son actually has my like new R390-a sitting in his den where he listens to the Yankees on WFAN. (ouch) Am a lifelong REDS fan, even though they could use some (a lot) of help this season !

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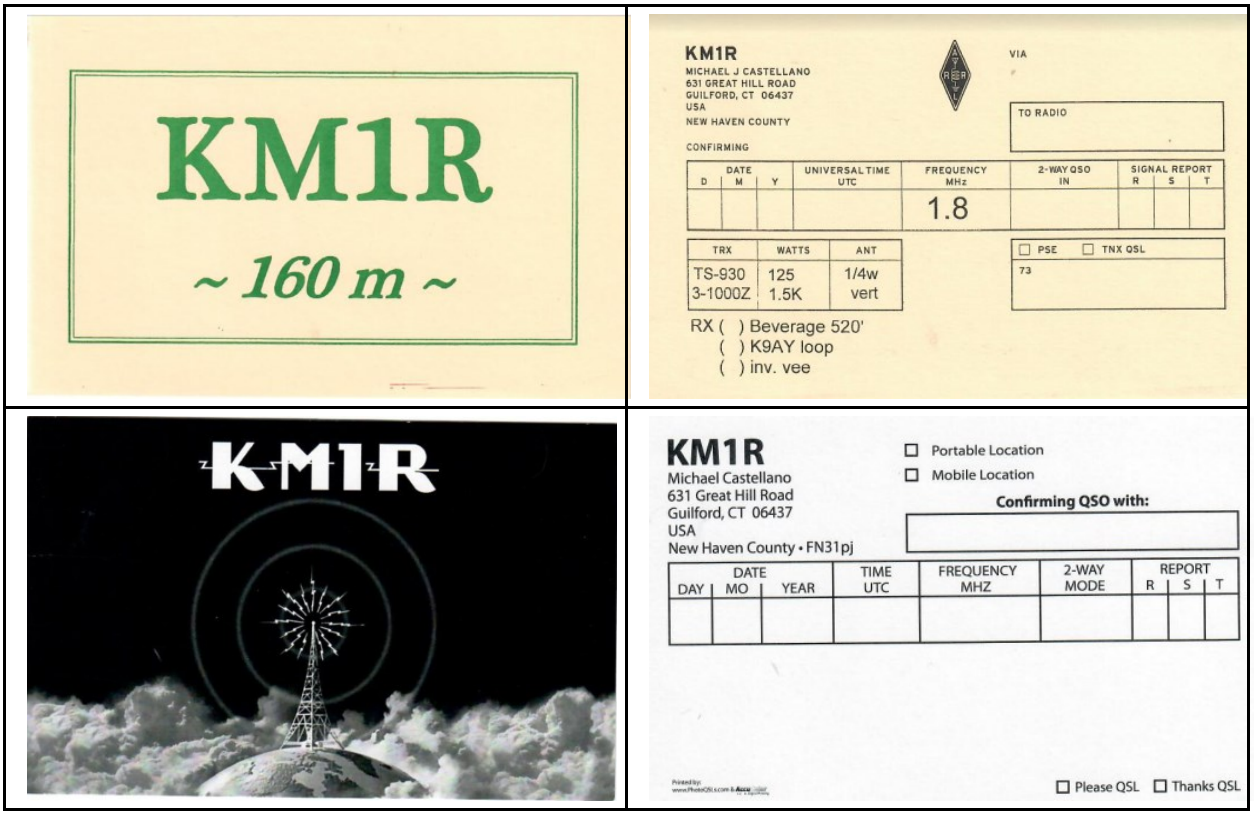
SWODXA Club News

On 160, I run a bunch of rigs from boat anchors to what I call "hi-tech". Mainly, it is a well beaten FT-1000D and an Alpha 76 or a pair of 8877's. For 160 AM, I have an RCA BTA-1r1 along with my R-390-a receivers. 1/4 w vertical over about 100 radials as well as a "double L" and beverages all over the place. I actually have a 60 ft. vertical, loaded and precisely tuned for 700 Kc (WLW) The xyl thinks I am crazy. For the HF bands: a 1968 vintage HY-Gain Log periodic liberated from an un-named embassy and my venerable Collins 5-line & 30$-1.

Anyway, that's the brag sheet! I do get out to Cincy 2-3 times a year •. I know I'll be seeing you guys!

Mike KMAR



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SWODXA Club News

Member Achievement—K8DV—Dave

Hey Bill

Hope all is well. With the latest confirmation of VK0MQ and the processing of my latest application on LOTW I am now on the DXCC HR.

Glad I worked this guy before all hell broke loose with the tornado.

Please update my SWODXA Ladder to:

HR yes
Mixed 335
CW 321
Phone 292
Digital 293
Challenge 2283
Comments 5B WAZ 9B DXCC

Congrats to Dave!!!

Member DXPedtion—W8GEX—Joe

Joe, W8GEX, and Janet, W8CAA paid a visit to Exuma in the Bahamas the week of July 17th. (Grid Square FL-23) Joe finished with 2,110 QSOs, mostly on FT8. They used an Icom IC-7300 with an Elecraft KPA500 and a fan dipole. Below are some pics!

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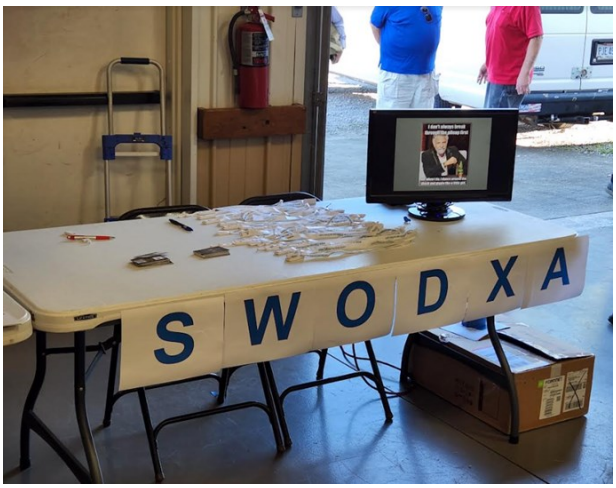
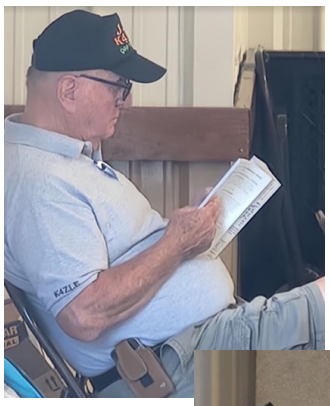
SWODXA Club News

Club Activity

On August 13th, SWODXA had a table at the Cincinnati Hamfest. We had several hams stop by to ask about the club and DX. The message to them was "If you even THINK that you might want to chase DX someday, you should at least roll up your sleeves for Bouvet this winter!" There were at least 14 club members who stopped by. (K8DV, K8CR, K4ZLE, K8ST, N8DX, N0FW, K8FL, KC8RP, K8CMO, W8EH, K2SY, W8WGT, and AA8KY) If I missed someone, please let me know ASAP! .Some pics are below





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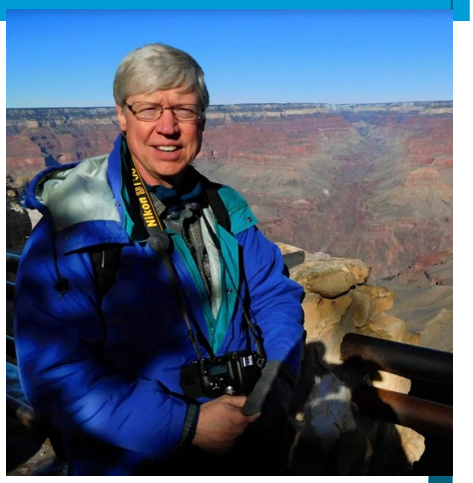
Museum Ship Weekend at the Marconi/RCA Wireless Museum, W1WCC



By Tom Inglin, NR8Z

Museum Ship Weekend is an informal operating event commemorating military and merchant ships preserved as museums. Certificates are available for contacting at least 15 museum stations. The event occurs the first weekend in June from 0000Z Saturday until 2359Z Sunday. More information is available at https://www.nj2bb.org/museum/. In 2022, 89 ships were active including Marconi's yacht *The Elettra* and W1WCC at the Marconi/RCA Wireless Museum. As a volunteer docent at the museum, I had a chance to operate W1WCC during Museum Ship Weekend.

The WCC Amateur Radio Association commemorates the legacy of Chatham Radio/WCC, the renowned RCA Radio marine coastal station in Chatham Massachusetts, on Cape Cod. The club station has 3 operating positions. There is a Kenwood TS950SDX paired with an Ameritron AL80B; a Drake T4XB/Collins 75S-3C pair and an ICOM IC746Pro. The Mackay Marine MRU-19/20A radio console exhibit from the SS Hope (WHNJ) can also be activated and often uses the callsign W1HNJ.

The club antennas are traditional flattop dipoles for 80, 40, 30, 20, 17 and 15 meters, an off-center fed dipole and a "Marconi T" with a 43' vertical element. All are mounted on original poles used by WCC. Low Band Systems band pass filters are used and there's a lot of copper wire buried under the site that the grounds are tied into. Logging is done with N3FJP software networked across the operating positions. The club station is active for special events like Straight Key Night, International Marconi Day, and Museum Ship Weekend. The station is often manned during museum hours one day a week as a demonstration exhibit. See more information at www.wccara.com and the W1WCC www.QRZ.com page.

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Museum Ships Weekend (cont.)

The Marconi/RCA Museum campus on Ryder Cover in Chatham, MA. The bottom left red-roofed building is the operations building and now the museum. The antennas are just below the museum out of sight. The two story red-roofed building sharing a parking lot with the museum is the education building.

For Museum Ship Weekend we primarily operated during museum hours with the station open to museum goers. We operated 100% CW when the museum was open and operated SSB during museum off hours to reach as many operators as possible. Ron, WA1RF, Bob, N1NFW and myself operated the club station while Ed, K1GGI activated the SS Hope console. We made about 750 QSOs on 40 through 15 meters. CW pileups were small and infrequent, SSB pileups were larger. Thanks go to Bill, AJ8B, for spotting me on the SWODXA club reflector. I really enjoyed the QSOs with club members.

Some History on the Chatham Radio/WCC Station

Cape Cod's significance in wireless is well known due to Marconi's long-gone Wellfleet station that transmitted the first message across the Atlantic in 1903. The Marconi/RCA station is located further South on beautiful Ryder's Cove at the elbow of Cape Cod in Chatham, MA. It was built by the Marconi Company in 1914 to be the operations and receiving site for an RF circuit between the US and Norway (the spark transmitters were located 30 miles West). With the outbreak of World War I, the Marconi Company never brought the station into operation. After the war, recognizing the coming end of spark technology, Marconi approached General Electric to acquire Alexanderson alternators. This got the attention of the US Navy and US government who grew concerned over foreign ownership of radio stations. In response, the Radio Corporation of America (RCA) was created in 1919 and acquired all the US assets of the Marconi Company along with access to radio technology from GE, AT&T and Westinghouse.

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Museum Ships Weekend (cont.)

In 1920 RCA opened the Chatham location with communication circuits to Norway (WSO) and Germany (WRQ) using receivers in Chatham and 200kw Alexanderson alternators in Marion, MA. In 1921, RCA converted the Chatham station to ship-to-shore messaging installing vacuum tube transmitters in Marion. With callsign WCC on HF, the station became the "World's Greatest Coastal Station" in operation until 1997, handling over 1,000 messages a day at its peak. For 76 years, ship-to-shore traffic was all CW with inbound and outbound messages initially using telegraph and later Baudot teletype.

The US Navy took over the station during World War II to copy encrypted German U-boat traffic. Intercepts were sent to Washington, DC to be decrypted and Chatham served as the control station for a chain of direction-finding stations from Greenland to South America. Following activation of the station in late 1942, convoy losses in the Atlantic dropped by more than half in the first year and continued to drop through the war. U-boat losses peaked at 250 in 1943. Rosters show over 400 sailors and 144 WAVES were assigned to Chatham through the war.

For ship-to-shore traffic, the station operated on MF at 500 kHz (436 kHz working, callsign WIM) and 2 MHz plus HF at 4, 6, 8, 12, 16 and 22 MHz The primary focus was on ships in the North and South Atlantic, Caribbean, Mediterranean and Persian Gulf. Receivers included Marconi, RCA and HRO models. In the late 1940s, with receiver technology improving, the transmitter site was moved to a salt marsh in Chatham about 3 miles south, simplifying remote control maintenance through nor'easter storms. The South Chatham transmitting site ultimately had 17 transmitters ranging from 2.5kW to 40kW. The antennas included a 350' vertical for 500/436kHz (antenna loading switched by relay at the base) with verticals for 2 and 4MHz. The HF antennas were dipoles or H-over-2 (aka Lazy H) wire antennas. www.chathammarconi.org. If your travels take you to Cape Cod, stop in!

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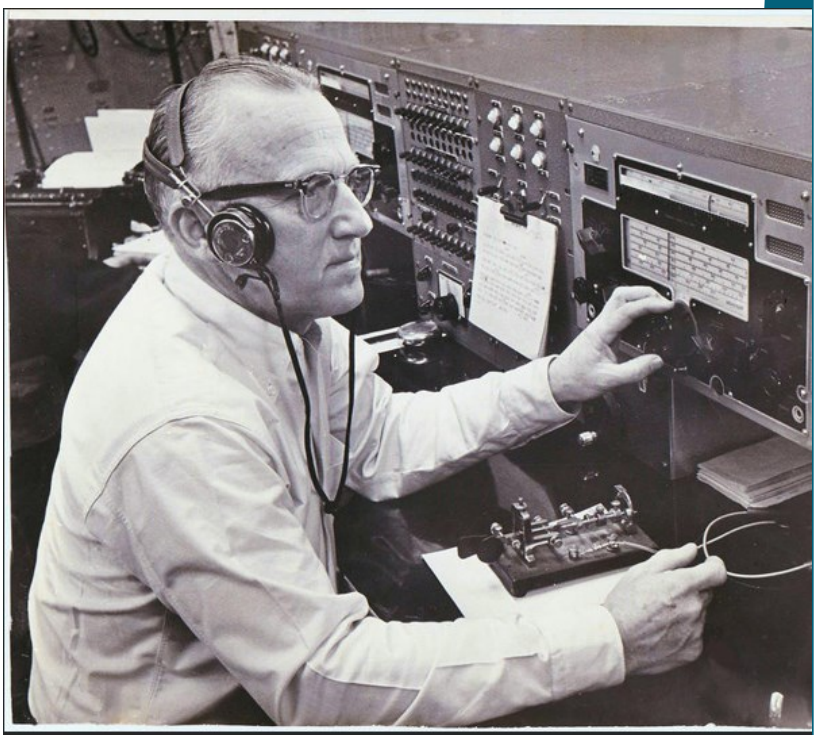

July 1956. 500 kHz international distress frequency position. Marconi – Atalanta receiver. W1FZT(sk) on watch

Museum Ships Weekend (cont.)

WCC transmitter building circa 1982, RCA Model T3 Type H transmitters, K1WT at the console

1980 500 kHz transmitter (40 kW)

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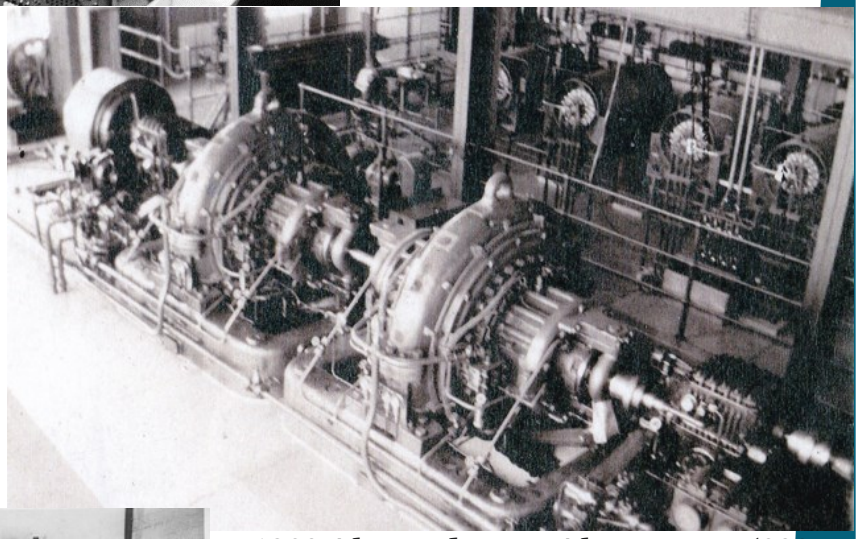
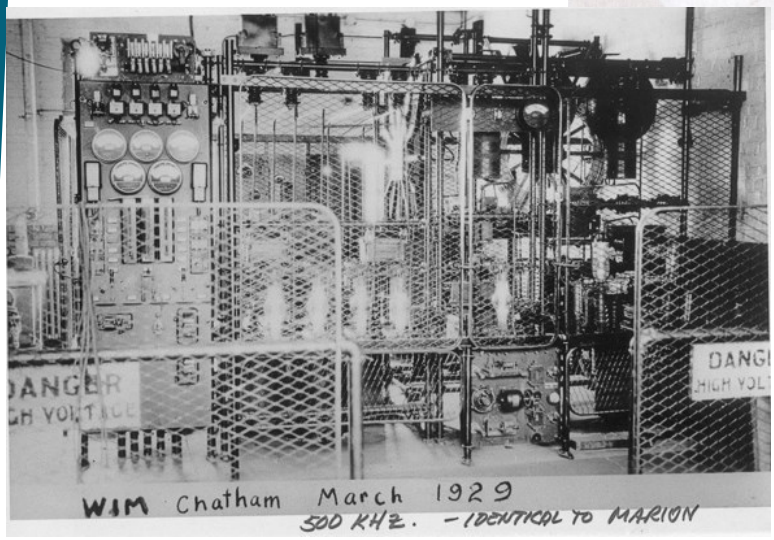
Museum Ships Weekend (cont.)

WCC 1967

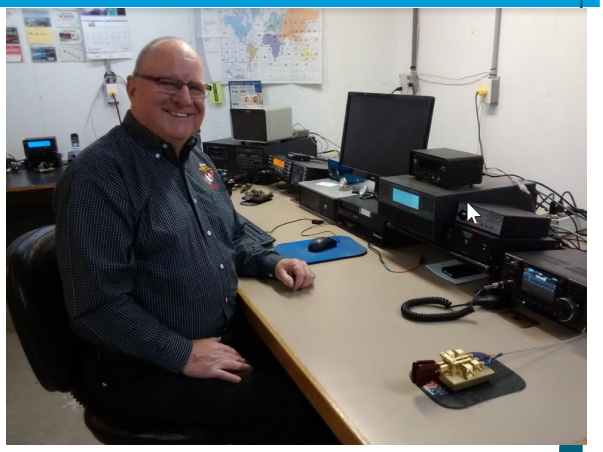


1920 Alexanderson Alternators (200 kw)



1929 500 kHz transmitter used at Marion, MA and as a backup at Chatham, MA

Carl & Jerry—Popular Electronics 1954-1964



Jay Slough—K4ZLE

Long before Covid 19 and Zoom meetings, in the earlier days of Packet Radio, we held a series of Digital Symposiums during winter break at Miami University, Middletown, OH. The primary organizers of that endeavor were Carl Morgan, K8CM, Hank Greeb, N8XX (SK), and yours truly. We were assisted by the Dial Radio Club of Middletown. Some of those who actively assisted are also members of the SW OH DX Association – for sure, Ernie, W8EH and Ron, N8QF.

We were one of the early adaptors of using the internet for remote presentations by using either Echolink or Skype for audio and TeamViewer for video. One of our remote presenters was Jeff Duntermann, K7JPD. Jeff's presentation was not directly related to packet radio or digital electronics but was about Carl & Jerry, two fictitious buddies whose antics and adventures appeared monthly in the pages of *Popular Electronics*. The monthly column was written by John Frye, W9EGV (SK). John was a service technician who wrote a couple of books on radio/TV repairs well as a technical column in *Electronics World*. It is reported that John was wheelchair bound for most or all of his life.

Jeff obtained permission from Popular Electrons to republish the Carl & Jerry stories in a series of anthologies. All 119 of those stories are available through 5 volumes. Volume 5 contains two additional stores not written by John Frye. More on that later.

As our hobby is maturing there seems to be a growing interest in our heritage. For as long as I remember, QST has had a page in each issue summarizing articles and items from the corresponding monthly issue 25, 50 and recently 100 years previous. They now include a section called "A Look Back" where articles from 30 years or so ago are republished in full along with some representative ads. The June 2022 issue of *CQ* had a feature article, CQ Classic discussing the beginning of their DX Marathon from 75 years ago. Maybe as we age, reality tells us there is more to look back upon than there will be to look forward to?

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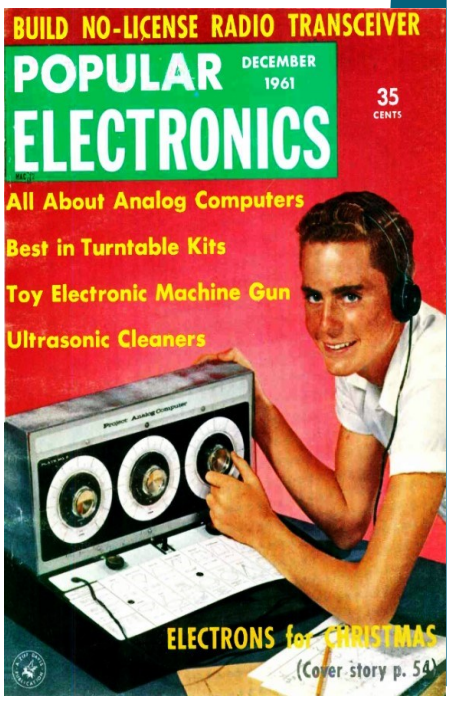


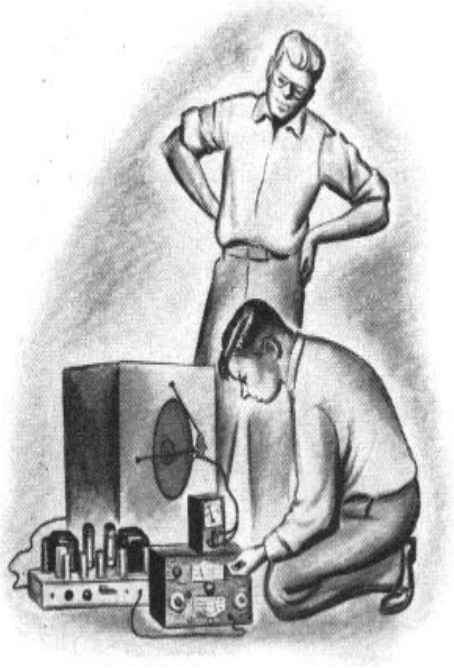
Carl & Jerry (cont.)

Shortly after Jeff gave his presentation, I bought the 5 volume set of reprinted stories and enjoyed reading about their adventures. Recently, I pulled the books off the shelf and began rereading them. For me, it has been fun reuniting with those boys who would have been slightly older than I was when the stories were first published. Back then, it was magic. Today, for me, it still is!

Many of the stories built upon articles from previous editions of *Pop 'Tronics*. Jerry was a chunky lad who had his lab (ham shack/workbench) in his basement. He seemed to be up on what was new in electronics, leading in the building/experimenting aspects of their escapades. On the other hand, Carl, his next door neighbor, was what we would think a nerd would look like; tall and thin with horn rim glasses, etc. Undoubtedly, both were nerds!

If you can put yourself in the context of when the stories were written, what was then the prevailing state of the art technology wise, and what community life was like in small town USA. It is easy to understand why kids like me were drawn into the hobby and were reading the new-stand issue every month while sipping milk shakes or malts in the corner drug store, listening to music on the juke box and drooling over the pretty girls with their poodle skirts, bobby sox and saddle shoes or penny loafers. Of course, we did not actually buy the magazines. We just read them and put 'em back on the shelf. After all, we needed money for the milk shakes and juke box! As an aside, do any of you old goats remember MIMI in *Mechanics Illustrated*?

Carl and Jerry would get into the darndest situations with their shenanigans implementing the latest of consumer available electronics and building their version of some scientific tool or gadget like their mini encephalograph. They helped solve crimes, save themselves from life-threatening situations using makeshift spark gap transmitters, save others lives, play stunts on folks, assist an 'older' pretty neighbor with her love life, etc., etc., etc. (She was in her early 20s with them in HS.)



My journey into the hobby began with a true galena crystal radio that I won by selling new subscribers on my paper route. My first transistor endeavor was with a CK722 that cost me north of $5.00 in single lot quantities (a week's worth of earnings from that paper route).

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Carl & Jerry (cont.)

That led to building my first 'handheld' transistor radio, to a regen receiver on a breadboard eventually to my ham license and a single tube crystal controlled TX built into a small file card box. It is easy for me to relate it to those stories from *Popular Electronics*. *A*s Archie Bunker would say, "Those were the days!"

The author, must have done much reading on current technology in order to make the stories seem realistic, current and educational. While actual circuits were never dissected, there was enough to pique our interest and send us back to the original article or to make a trip to the local library in an attempt to understand more of the subject at hand.

If you are too young to remember the 50's and 60's, it might be worth reading these stories for pure entertainment and to understand the growth of electronics in the last 60 plus years. In the May 1957 adventure, titled "'Holes ' to the Rescue", the boys jury rigged a transistorized converter to a BC receiver to rescue an injured Air Force serviceman. Here is an edited excerpt from the end of that story:

""Jer," Carl said slowly, " this experience really has convinced me that transistors are here to stay. ... we were receiving that station from Tucson without ... a single tube. All we had ... was a bunch of negative electrons and positive 'holes' moving through some semiconductors. ... If this trend keeps on, a fellow is going to be able to pack a whole ham station into a shoe box!"

As the old Virginia Slims cigarette ads used to say, "You've come a long way, baby!"

The 5 books are still available through a print on demand source: lulu.com. Search for Carl & Jerry. Each volume is currently $15.92, excluding shipping and tax. According to the web site the order is usually printed in 3 - 5 days. However, if you are interested in reading the stories, I will make my copies available for loan. Due to past experience in loaning books, I must do so with the following conditions. The borrower gives me a $20 holder fee per book Upon return of the book, the full $20 is returned, so long as the book does not show wear beyond normal usage.

Interview with Palle, OZ1RH

After several QSOs with Palle, I knew he would be an interesting operator for our newsletter. He can be reached at palle@oz1rh.com

Hello Bill,

I have been quite busy building and organizing my 4 tower contest site. Please correct my spelling and grammar as English is not my mother language.

Palle, OZ1RH, contesting in 1968

AJ8B: How did you first get interested in amateur radio?
OZ1RH: In my 3rd or 4th year in elementary school, I wanted to do my math calculations with a classmate. We were living about 1 km apart in a suburban part of Copenhagen so a wired intercom was impossible. I figured out that wireless was needed and at the age of 11 I went to the local library to get a book on how it could be done. It was not that easy but I tried to make a super regenerative RX/TX for somewhere near 144 MHz In 1959-60 there were no cheap Baofeng's... and as a schoolboy I had no money anyway. In 1962 I spent 1 month in Bournemouth, England to learn English. In London on my way home I managed to buy a Wireless Set No. 19 from WWII. At the local radio club I studied for a license and passed both the equivalent of the Novice exam and the Extra class exam. However a CW speed at 12 wpm was also needed in order to get the license, so after using a B&O steel band wire recorder to play CW 10 minutes every day for some months I also passed the CW test and received my amateur license in 1963. In order to get the Extra class license I had to wait for my 18 years birthday, but I got it on that very day in 1965.

While still in school I managed to save a little money to buy a used Heathkit TX1 with the phase exciter SB-10, so I was QRV on SSB with 150 W input (2x6146) and a dipole for 80 m - almost QRO in those days. However I had used all my money so I still had to use the Wireless Set No. 19 as RX, not the best SSB RX. A year later I upgraded the RX to a Geloso G/214, not the best RX either but it had an crystal filter - next to unusable with only one crystal for peeking. It wasn't too stable either, but at least it was more stable than the UA-stations who should shout Hello as they were drifting past the QRG. A cubical quad went up and I started DXing mostly on 20 m. I still remember the pile ups on W9WNV when he was in rare places. If I did not get through I waited half an hour and then got him (that trick works today also).

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Interview with OZ1RH (cont.)

AJ8B: Do you have a favorite band or mode?
OZ1RH: Not really, my own call is mostly used for FT4/FT8 where I am QRV on all bands 160-10 m. I use the contest antennas on my contest site so my 100 W FT8 gets around. I prefer a SSB pile up in contests, but I can do FT4/FT8 with my left hand while reading/writing emails so I guess QLF soon gets a new meaning. BTW I wonder why so many are on FT8 when FT4 decodes better in difficult propagation conditions like aurora and multi path. I almost only see FT4 activity on 20 m.

AJ8B: What time of day and days do you like to operate?
OZ1RH: Anytime, but a real computer freak works best after midnight...this might apply to ham radio too.

AJ8B: Any secrets to your success?
OZ1RH: That depends what you call a success, but a low noise rural QTH with few neighbors and little TVI and one tower for each of the contest bands helps. The verticals for 80 and 160 m stand in wet soil or even water during winter time, no disadvantage either. And of course no contest without a decent and clean PA for each band.

AJ8B: Any tips that you can share?
OZ1RH: Use a good clean transceiver with low sideband noise, I use Elecraft K3S and K4D (HD coming). See and understand the Sherwood Engineering lists at www.sherweng.com/table.html A lecture from Rob Sherwood, NC0B is at https://rsgb.org/main/blog/tonight-at-eight-archive/2021/05/28/7-june-tbc/

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Interview with OZ1RH (cont.)

AJ8B: Describe what you are currently using:
OZ1RH: My station has several Elecraft K3s and two K4(H)D. The PA's are OM Power 3500A, Emtron DX-4, ARD 230M (3x3CX800), Expert 2K-FA and a SB-220 as backup. A Russian PA with 2xGU78b is QRT after sending 3 kV around in the shack due to an unpleasant short.

^ 10 m 5 elm QD beam 40 m 4 elm OB4-40 ^ ^80 m dipole ^ 3 elm OB11-3

AJ8B: What advice do you have for those of us trying to break pile ups to work DX?
OZ1RH: **Listen and imagine how the pile up looks like at the other end.** Find out how the operator handles the pile up and adjust your calls after that. And always obey the orders coming from the DX-station. If the DX-station is not operating well he will most likely figure it out and try to handle his pile up in a better way. Been there, done that..

5 Element beam for 28MHz on 21M Mast

If the pile up is on your call you must be consequent and never answer the stations calling you when they were not asked to. Obey your own orders. If you call QRZ W6 and a strong W7 calls you don't answer him even when he is a multiplier or an easy QSO. If the folks calling you figure out you just take any station no matter what you have called for, they all start calling you all the time resulting in QRM so you can't copy anything. If you give stupid orders you will find out, been there too: I had a nice pile up of Japanese stations when I heard a station with JA in the suffix. I called QRZ the JA and guess what: 100 JA's started calling me. Learning by doing.

BTW, Japanese and US stations are very polite and do what they are told, which makes the pile up easier to handle quickly. I am sorry to say that a pile up of European stations is more difficult to handle as they often just call no matter what is asked for.

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Interview with OZ1RH (cont.)

AJ8B: You mention on your webpage that you are building a contest station. The pictures are impressive! Can you give us an update on this station?
OZ1RH: In mid-2020 I moved to a relative RF-quiet farm with 400x100 m ground with only a few neighbors. Plans are for 6 stations each with Elecrafs K3s or K4HD, verticals (or 4SQ?) for 160 m and 80 m placed far apart on the lowest and most wet part of the area and beams for the higher bands with one tower for each band. The 4 elm for 40 m is placed on a 25 m tower at the highest part of the area which is 5 meters higher than the surrounding ground. We don't have real mountains in Denmark. The tower for the 10 m beam is closest to the house to minimize the cable loss. The towers for 20 m and 40 m are some 200 and 300 m away. To get the cable loss below 1 dB 7/8" coax is needed at 14 and 7 MHz!

AJ8B: What is your favorite contest?
OZ1RH: For more than 30 years I have participated in the OZ9EDR/P field day on the first weekend of September. Here we have a kW station for each of the 5 contest bands on HF (no 160 m in our field day). In this Danish field day we do both SSB and CW and a DXCC count as a multiplier both on SSB and CW. This is a Multi-Multi contest with portable antennas and power from generators.

I also like the IARU contest where I have been a member of the OZ1HQ team for 40 m SSB for several years. We have several TX and RX antennas and may work over 2.000 QSO's in 24 hours.

In Region 1 we have a field day for all VHF, UHF and SHF bands where I have been in the OZ9EDR/P team and we have also been quite active at the monthly activity contest on 50, 144 and 430 Mhz.

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Interview with OZ1RH (cont.)

AJ8B: Any QSLing hints?
OZ1RH: I don't like writing QSL cards so I just upload all my QSO's to LoTW.

AJ8B: What coaching/advice would you give new amateurs?
OZ1RH: Go to your local club and get advice, but remember to get on the air. Don't start buying a handie but get an old Icom-7100, IC-706, Yaesu FT-857 og similar cheap used rig so you can start accessing the local repeaters on VHF and UHF and then later get on HF with the same radio. Get an automatic antenna tuner also so you can TX on almost any wire on HF. Don't use all your time modelling antennas or writing emails, get on the air - I speak from experience as I sit behind my pc right now :)

AJ8B: If I were to stop by for a visit, what local place would you want us to visit?
OZ1RH: Start visiting my place where you can work some QSO's and I will tell you where to go. Apart from my antennas there is nothing to see right here, but some 40 km away you should visit:

Roskilde Cathedral https://roskildedomkirke.dk/english/
The Viking Ship Museum www.vikingeskibsmuseet.dk/en/
Land of Legends Lejre www.lejre-center.dk/English.425.0.html
and around Copenhagen there are lots of castles and churches more than 500 years old.

AJ8B: What local food would you want me to try?
OZ1RH: Danish pastry would be a joke, apart from the fact that the real Danish is quite different from the US version. Seriously you should try Danish Smørrebrød https://en.wikipedia.org/wiki/Sm%C3%B8rrebr%C3%B8d

AJ8B: Thanks for taking the time to answer my questions. Is there anything you would like to share with us?
OZ1RH: Well, eyeball QSO's...

73, Palle, OZ1RH.
palle@oz1rh.com
www.qrz.com/db/oz1rh
www.qrz.com/db/oz5w
www.qrz.com/db/oz9edr

Recently I had 1,3 km 1/2" coax and two 25 m mobile towers type SMAG 25/6 delivered. They weigh 4 T each...
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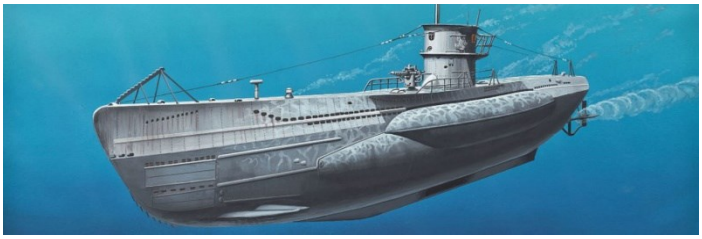
https://photos.app.goo.gl/YAYP1xBhSPkCdURW8
https://photos.app.goo.gl/NQRoccqnbaKkT4mb7

U-BOAT Radio by Colin McDonnell—M0EAO

I read this article in The Journal of The Radio Amateur Old Timers' Association. I was given permission to reprint it by the author as well as the editor, David, G3ZPF. I enjoyed it and I hope that you do as well.



During the 2nd World War Britain relied almost entirely for its supplies of oil and other materials on shipping convoys crossing the Atlantic Ocean. The main threat to these convoys was attacks by German U Boats that were sinking large numbers of allied ships. Most of these U Boats were of the type 7 ocean going class.

The type 7 was a submarine of about 770 tons displacement when on the surface and normally had a crew of about 45 officer and men. It could travel at a speed of almost 18 knots on the surface running on its diesel engines. The type 7 U Boats were equipped with a variety of radio equipment. Normal HF transceivers made by Telefunken covering 1.5 to 30 MHz were used for ship to shore communication when in home waters and U boat to U boat when at sea. These transmissions could only be carried out when the U Boats were on the surface and their transmitting and receiving antennas were clear of the water.

One of the most important receivers in the U boat was the Telefunken T3 PLL38. This receiver covered the frequencies of 15 to 33 kHz and also 70 to 1200 kHz and was connected to a Direction-Finding loop antenna on the boats conning tower and was used not only for DF but due to receivers very low frequency (VLF) capabilities could also receive signals under water when the U boat was submerged. Radio waves at VLF can penetrate sea water to a depth of at least 10 meters.

The Germans had several VLF transmitters based in Europe that sent signals to their U boats according to a pre-arranged schedule while the boats were submerged. The most powerful of these VLF transmitters had the code name Goliath and was situated in German Saxony. The Goliath TX operated on frequencies around 16.5 kHz and could put out staggering powers of anything between 100- and 1000-kW Goliath's transmissions could be picked up all over the North Atlantic Ocean and even the Caribbean.

Despite their devastating effects on shipping in the Atlantic the U boats had to eventually return to their bases in northern France for refueling and provisions. This they did by running across the Bay of Biscay at night on the surface powered by their diesel engines.

RAF Coastal Command aircraft patrolled the Bay of Biscay but due to the U Boats small visible profile almost all returned safely to their bases in France.

But two new innovations were about to change their fortunes. The first was the Leigh light and the second was 1.5-meter Anti Surface Vessel (ASV) radar.

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U-BOAT RADIO (cont.)

The Leigh Light was a relatively small Carbon Arc airborne searchlight of twenty-two million candle power output. The 1.5-meter ASV radar had a minimum range of just under one mile before the signal was lost due returns from the sea surface, known as clutter, blocking out the signal.

The RAF method of attack was for the radar operator to direct the pilot to fly at 250 feet towards the target. This was somewhat risky as the early aircraft had barometric altimeters that had to be set to zero at the sea level pressure. Known in the international Q code as the QNH. The sea level pressure over the Bay of Biscay was never known with any great accuracy and as a variation of one millibar in altimeter setting equates to a high of approximately 30 feet any mistakes in altimeter setting could have a serious outcome.

The pilot flying on instruments approached the target until the radar operator lost the target at just under one mile the Leigh Light was then switched on illuminating the U boat. Only then did the pilot look up from his instruments drop down to 50 feet and carry out a depth charge attack.

The effect on the U boat crew can well be imagined. They would not hear the aircraft approaching due to the noise of their diesel engines and seawash. The first they would know was being illuminated by a blinding light followed almost immediately by being depth charged.

A great number of U Boats were sunk by this method of attack and from reports of the few that did make it to their bases the Germans rightly surmised that the RAF must have been using radar.

To counter this the Germans fitted their U boats with a radar detection receiver known as the Metox FuMB 1 which covered all known British airborne radar frequencies from 2.5 meters to 53cms.

The major drawback of Metox receiver was that it required a temporary cruciform shaped type of frame aerial in the conning tower held up by a crew member. This was known to the crew as the Biscay Cross.

In the event of a signal being picked up by the Metox receiver the aerial and its coaxial cable had to be taken down through the watertight hatch in the conning tower before the U boat could dive. This took time and something the U boat did not have. Nevertheless, U boat losses were reduced.

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U-BOAT RADIO (cont.)

The situation changed once again when a captured RAF airman, for reasons known only to himself told his captors that the RAF were homing on radiation from the Metox receiver itself. The Germans immediately carried out laboratory tests and found the Metox was indeed producing a very small amount of RF radiation. Most receivers do. They immediately ordered all U boats to turn off their Metox sets. The Metox receiver was then redesigned and completely screened. This made no difference of course!

The Germans eventually discovered that the RAF were using 10cm search radar and fitted the U boats with yet another warning receiver. This was the Telefunken FuMB7 Naxos that covered the S band from 12 to 9cms.

The Naxos receiver suffered from similar problems to the Metox receiver and relied on a small dipole antenna being held aloft in the Coning Tower. In addition, the dipole had no gain and was not directional. This made warning of attack even shorter.

In the ever-changing electronic war of development and counter development the British now started fitting their aircraft with 3cm radar which was made possible because of the British invention of the Magnetron.

The Germans countered this by fitting the U boats with another radar warning receiver the Telefunken FuMB36 which covered 3cm transmissions. But the British were still ahead of the game for not only could their 3cm ASV radar produce the staggering power of 200kW it was also fitted with a power attenuator. Thus, once the radar operator had gained a contact on a U boat, he could gradually reduce the power which gave the U boat the impression that that the attacking aircraft was not getting any closer. The usual outcome was another U boat and its crew going to a watery grave.

By this time the 2nd world war was entering its final stage and as a final resort the Germans started fitting all their U boats with snorkel tubes.

The snorkel tube was a device with a float valve in its top that protruded above the surface of the sea and allowed U Boats diesel engines to draw in air so that the U boats could run submerged.

The snorkel tube had several disadvantages. One was if it became submerged due to wave action then diesel engines drew their air from within the U boats causing a partial vacuum. This caused pain in the crews' ears and in extreme cases ruptured ear drums.

Another problem with the snorkel device was that it could be detected by the searching aircraft radar. To counter this the Germans developed a multi layered rubber material impregnated with graphite granules which they called Sumpf. This material was applied to the snorkel tube to absorb the search aircrafts 3cm radar pulses. They also fitted a 3cm dipole for their 3cm warning receiver. The Sumpf anti radar material worked reasonably well in absorbing radar pulses but the 3cm dipole gave excellent strong returns to the search aircraft radar!

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Interview with Suramto, YC1AYO/YB1YO

I have invited several YB hams that I worked to answer questions for the newsletter, but only Suramto, YC1AYO, answered the call. Thanks to Suramto for this interesting session.

First of all, I'm sorry my English isn't very good. Let me first introduce my name, Suramto, I was born November 4, 1962, I retired from work in 2021. Now I have a lot of time to enjoy my hobby, playing radio, especially for DXing. Before I retired, I played radio on average 1 hour on weekdays. at night and 3 to 4 hours on holidays.

AJ8B: How did you first get interested in amateur radio?
YC1AYO: I became interested in radio amateur activities, especially DXing and contests after I joined the dx club YB-Land DX Passion Is.

AJ8B: Do you have a favorite band or mode?
YC1AYO: I like the low band with CW and RTTY modes.

AJ8B: What time of day and days do you like to operate?
YC1AYO: Now I have a lot of time almost every day I start operating from 13:00 UTC to 17:00 UTC.

(Cont. on Next Page)

U-BOAT RADIO (cont.)

And so, the war eventually ended. The Battle of the Atlantic was the longest running campaign of the 2nd world war. Approximately 100 thousand people of all nationalities lost their lives.

As for the U Boats of which 842 were operational 781 were sunk. A loss rate of 93 percent. The highest loss rate for their size of a branch of the services both allied and German.

Interview with Suramto, YC1AYO/YB1YO (cont.)

AJ8B: Any secrets to your success?
YC1AYO: The first thing I do is have a good antenna so that I can RX and TX well, the second must understand about propagation because in doing DXing "PROPAGATION IS A GOOD FRIEND FOR DXING"

AJ8B: Any tips that you can share?
YC1AYO: When I enter a contest 1 week before the contest, I first study the rules of the contest, which points make the score big, I make a propagation prediction with VOACAP, after that I make a schedule for when I will operate in what band and what time according to the propagation prediction accordingly. with analysis from VOACAP

AJ8B: Describe what you are currently using:
YC1AYO: I made 2 sets of lines,

Line 1 for contest (radio Icom 7610 and Amplifier 0.5 KW

Line 2 for daily DXing (radio icom 7300 and Amplifier 0.3 KW)

AJ8B: What advice do you have for those of us trying to break pileups to work DX?
YC1AYO: Use a good antenna with a minimum antenna height of 1/2 lamda (at least 20 meters) understand propagation well very efficient for DXing. To get DXCC there are 3 suggestions:

1. DXing regular
2. Work DXpeditions
3. Enter the contests

AJ8B: What is your favorite contest?
YC1AYO: I really like the CW and RTTY fashion contest.

(Cont. on Next Page)

Interview with Suramto, YC1AYO/YB1YO (cont.)

AJ8B: What coaching/advice would you give new amateurs?
YC1AYO: For amateurs who are just learning to listen to good QSO so that they will understand how to operate radio well, there are 2 things that must be understood for HF radio operation, namely antenna and propagation problems, 2-way QSO will occur if you can RX and TX well.

AJ8B: If I were to stop by for a visit, what local place would you want us to visit?
YC1AYO: If you want to vacation in Indonesia, Bali is a good place

AJ8B: What local food would you want me to try?
YC1AYO: If you don't like spicy dishes, Gudek is right, if you like spicy dishes, Rica Rica is right.

AJ8B: Thanks for taking the time to answer my questions. Is there anything you would like to share with us?
YC1AYO: Previously, I'm sorry that's all I can say, if you have time, please see the YB-Land DX Passion Is Club log. (https://ybdxpi.net/) Now there are 1,000 members at YBDXPI sharing their levels and achievements.

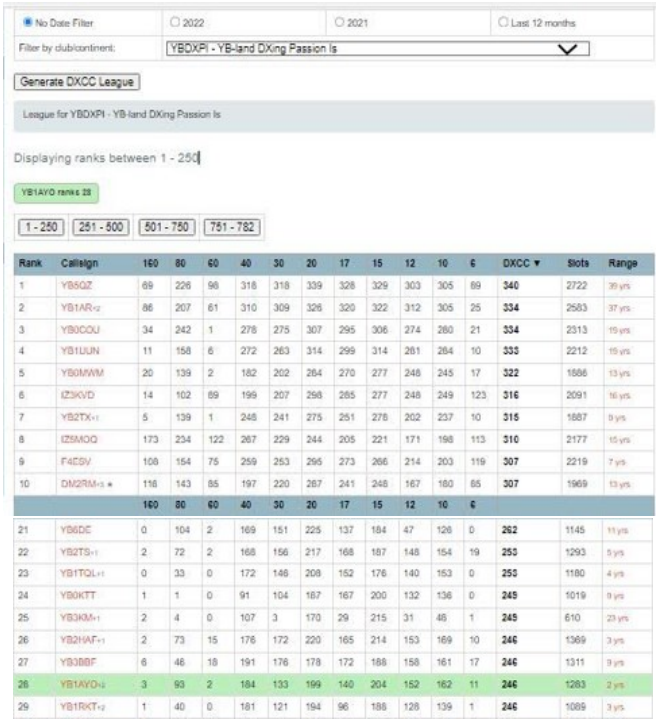
Thank you healthy greetings
de YB1YO

2022 IARU HF World Championship Go

Single Operator, CW Only, Low Power

<<First <Prev Page 1 of 1 Next> Last>>

Rank	Category	Call Sign	QTH	Score
1	SO-CW-LP	AH6KO	KH6	627,300
2	SO-CW-LP	YB1AYO	YB	176,646
3	SO-CW-LP	YC9FAR	YB	75,852
4	SO-CW-LP	YF8HYV	YB	73,627
5	SO-CW-LP	YB1JCD	YB	35,360
6	SO-CW-LP	VK3GF	VK	24,780
7	SO-CW-LP	YC0RNC/1	YB	23,562
8	SO-CW-LP	YB9GDP	YB	23,520
9	SO-CW-LP	VJ3U	VK	20,706
10	SO-CW-LP	VL6L	VK	15,561
11	SO-CW-LP	DU1VGX	DU	14,625
12	SO-CW-LP	VK3OU	VK	6,720
13	SO-CW-LP	YE4IJ	YB	4,860
14	SO-CW-LP	YC1EYS	YB	306
15	SO-CW-LP	4F3FSK	DU	45



Rank	Callsign	160	80	60	40	30	20	17	15	12	10	6	DXCC ▼	Slots	Range
1	YB5QZ	69	226	98	318	318	339	328	329	303	305	89	340	2722	39 yrs
2	YB1AR+2	86	207	61	310	309	326	320	322	312	305	25	334	2583	37 yrs
3	YB0COU	34	242	1	278	275	307	295	306	274	280	21	334	2313	19 yrs
4	YB1UUN	11	158	6	272	263	314	299	314	261	284	10	333	2212	15 yrs
5	YB0MWM	20	139	2	182	202	264	270	277	248	245	17	322	1886	13 yrs
6	IZ3KVD	14	102	89	199	207	298	265	277	248	249	123	316	2091	16 yrs
7	YB2TX+1	5	139	1	248	241	275	251	278	202	237	10	315	1887	9 yrs
8	IZ5MOQ	173	234	122	267	229	244	205	221	171	198	113	310	2177	15 yrs
9	F4DSV	108	154	75	259	253	295	273	266	214	203	119	307	2219	7 yrs
10	DM2RM+3 ★	116	143	85	197	220	287	241	248	167	180	65	307	1969	13 yrs
		160	80	60	40	30	20	17	15	12	10	6			
21	YB6DC	0	104	2	169	151	225	137	184	47	126	0	262	1145	11 yrs
22	YB2TS+1	2	72	2	168	156	217	168	187	148	154	19	253	1293	5 yrs
23	YB1TQL+1	0	33	0	172	146	208	152	176	140	153	0	253	1180	4 yrs
24	YB0KTT	1	1	0	91	104	167	167	200	132	136	0	249	1019	9 yrs
25	YB3KM+1	2	4	0	107	3	170	29	215	31	46	1	249	610	23 yrs
26	YB2HAF+1	2	73	15	176	172	220	165	214	153	169	10	246	1369	3 yrs
27	YB3BBF	6	46	18	191	176	178	172	188	158	161	17	246	1311	9 yrs
28	YB1AYO+1	3	93	2	184	133	199	140	204	152	162	11	246	1283	2 yrs
29	YB1RKT+2	1	40	0	181	121	194	96	188	128	139	1	246	1089	3 yrs

Countdown to

W4DXCC by SEDCO

September 23-24, 2022
LeConte Hotel and Convention Center, Pigeon Forge, TN
Formerly: Mainstay Hotel and Conference Center
****THIS IS THE SAME LOCATION!!** Just a name change**

W4DXCC by SEDCO is a DX and Contest Convention held in Pigeon Forge, Tennessee and it's our 17th year. If you're a DXer, Contester or just interested in amateur radio you should attend this event.

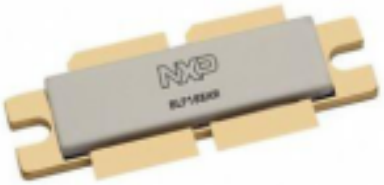
The attendees enjoy the fellowship of other hams and share experiences. They meet old friends and make new ones. Once you attend you will be back every year. Representatives from TOP equipment manufacturers will be on hand to demo new equipment and answer your questions one on one. It's an easy drive from 2/3rds of the country.

This will be the most informative and relaxed DX and Contest convention you have ever attended, not to mention the many great prize drawings.

Radio BootCamp
Each year convention attendees can attend a day long Radio BootCamp training session on Friday. Experienced hams teach new and old hams about building shacks and antennas, learn how to operate better while DXing and Contesting. There is something for every ham, new and old.

It's time to make your reservations

1) Call LeConte Hotel and Convention Center at 865-428-8350 to book your room, ASK for W4DXCC by SEDCO special rates –
2) Go Online at **W4DXCC.com** for Convention and Banquet tickets.



For More Details Visit us at
www.W4DXCC.COM

NCJ Product Review—KD9SV Reversible Beverage-On-Ground

By Carl, K9LA (k9la@arrl.net)

Several years ago, I acquired a Shared Apex Loop array from Array Solutions to help with my contesting (and DXing) efforts on the low bands. I would have preferred to install four (or eight) long Beverages around the compass, but our property won't allow that. So I settled for the SAL- 20 model (the model with a 20-foot horizontal length for each triangular loop) due to its small footprint (40-foot diameter). It was a compromise in RDF (Receiving Directivity Factor), but it fit our property and it opened up a new layer of QSOs for me. See the April 2014 **QST** for my review of the SAL-20

Recently Beverages laying on the ground (BOGs) have gained popularity with the low band crowd due to the ease of installation, very respectable performance and shorter length. The shorter length aroused my interest, as I may be able to install a pair of two-direction Beverages to cover NE-SW and NW-SE on our property. So when Gary Nichols KD9SV offered me his 200- foot long RBOG for evaluation, I jumped at the chance.

The KD9SV RBOG consists of a feed transformer, a reflection transformer, two-conductor wire and a control box. For two-direction performance, you need to provide two RG-6 coax feed lines that run from the feed transformer at the antenna to the control box in the shack. The control box (see Figure 1) includes a 160-Meter band pass filter, a 20 dB preamp and a termination for the coax on the unused direction. The preamp and filter are bypassed for operation on frequencies higher than 1.8 MHz. A 12 VDC source is also needed for the control box.

Figure 1 – Control Box

I originally planned to install the RBOG in our neighbor's field to the west of us. But we had so much snow last winter that the pond in the field was considerably expanded. Thus I had to go to Plan B – install it along the north property line that runs partially along and partially in the woods. I cleared a path with the lawn tractor, raked the debris down to dirt level, and laid the two-conductor wire along an ENE-WSW line.

Prior to the installation, I measured the preamp compression characteristics and the response of the 160-Meter band pass filter.

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KD9SV Reversible Beverage-on-Ground (cont.)

Figure 2 shows these results. The preamp has an input 1 dB compression point of -20 dBm (with a gain of about 20 dB, the output P1dB is around 0 dBm). The 160-Meter band pass filter has a typical response for a parallel-resonant LC circuit.

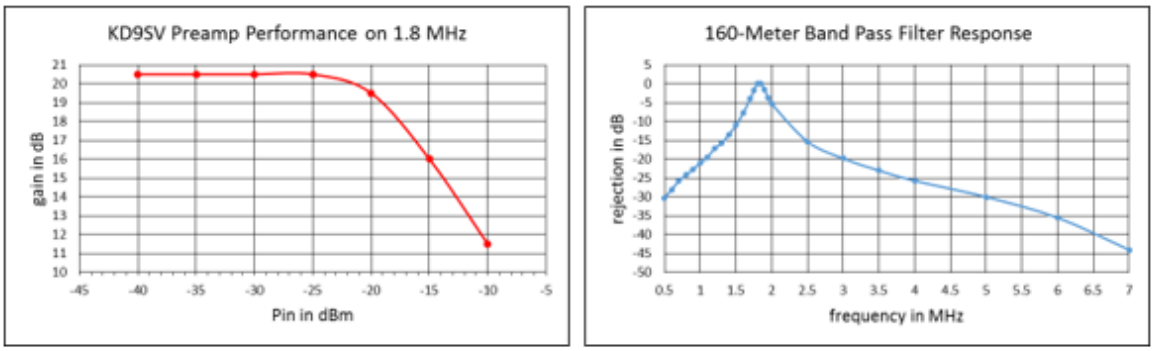

Figure 2 – Preamp and BPF Performance

The measured P1dB of the preamp is about 20 dB lower than the specification on the FET data sheet. It is lower because the FET in the RBOG preamp is lightly biased (lower quiescent current) compared to the data sheet condition. With 160-Meter aficionado John Goller K9UWA only 2.3 miles to the northeast of my QTH, I wondered if his transmit signal via ground wave could cause the preamp to go into compression. So we set up a test – when K9UWA keyed his radio at 1.0 kW, his signal on my inverted-L (maximum gain around 0 dBi in the main lobe) was around -23 dBm (that's about S9 + 50 dB). With the maximum gain of the BOG in the main lobe around -20 dBi, I don't expect any problems with the lower P1dB.

I had planned to do an extensive on-the-air evaluation of the RBOG system with European signals, but unfortunately 160-Meters has not been cooperative. My back-up plan was to listen to W1AW on 1802.5 KHz in the evenings (a path distance of around 1200 km). The signal-to-noise ratios (SNRs) of W1AW in Table 1 are representative for three different nights (with two nights at two different times) for my transmit inverted-L, the SAL-20 pointed NE and the 200-foot RBOG running ENE-WSW. I should point out that you *must* calibrate your S-meter to do these measurements.

Date	Time (UTC)	Xmit—Inverted L	SAL-20	RBOG
May 7th	0025	5 dB	11 dB	19 dB
May 7th	0040	24 dB	33 dB	35dB
May 13th	0020	14 dB	10 dB	12 dB
May 13th	0030	9 dB	7 dB	11 dB
June 4th	0056	17 dB	21 dB	32 dB

(Cont. on Next Page)

KD9SV Reversible Beverage-on-Ground (cont.)

Note the interesting results on 13 May – at the early time the SNR was actually higher on the inverted-L than on both the SAL-20 and RBOG. I don't believe I screwed up the measurements, as I've experienced the Inverted-L every once in a while beating the SAL-20. I believe this is due to how noise arrives at your location in terms of azimuth and elevation angle – the directional characteristics of noise can vary day-to-day and hour-to-hour, as do the arrival elevation angles of the desired signal. In fact, I believe two antennas with the same RDF could perform differently because RDF assumes noise arrives from all directions – but it doesn't.

In addition to the SNR measurements of Table 1 and listening at other times, the RBOG is really impressive when using your ears and the signal is near the noise. Most of the time the RBOG beat the inverted-L and the SAL-20. Nothing against the SAL-20 – most of the time it beat the inverted-L. As stated earlier, the SAL-20 is a good choice for space-limited QTHs – it will offer QSOs that you may otherwise not be able to complete.

I'm really interested in seeing what happens to the performance of the RBOG this fall and winter. Since it's on the ground and near many trees, it will be covered up with leaves – both dry leaves and wet leaves after a rain or snow. If the wet leaves introduce more loss, then the performance could suffer. The solution, as mentioned by several on the topband reflector, would be to keep the two-conductor wire clear of leaves (and other debris). Also, two other evaluators (K3UL and K2CUB) of the KD9SV RBOG report that snow last winter didn't appear to affect the performance – that's not too surprising as the density of snow can be low, and the conductivity and relative permittivity of not-too-dense snow at 1.8 MHz is not prohibitive.

I'm always interested in antenna modeling, so Jim Wolf KR9U and I modeled a BOG close to ground using NEC 4.1, which uses the GN2 ground code. This effort was spurred on by the work last spring (to eventually be published in QEX) of Rudy Severns N6LF. He used NEC 4.2, which uses a more complex ground code – GN3 – and compared simulated results to measured results of four antennas: a 300-foot center fed dipole that was moved from 4 feet above ground to 1 inch above ground in several steps, a 40-foot dipole buried 1 inch below ground, a tall vertical wire with one ground rod and his 450-foot long BOG. With all four antennas, his simulated results agreed very well with measured results as long as he paid attention to the modeling rules in NEC, paid attention to the insulation on the wire and used measured values of his ground conductivity and permittivity (as opposed to the canned 'poor', 'average' and 'good' values).

Our first modeling exercise was to compare the NEC 4.1 results to N6LF's NEC 4.2 results on the 300-foot dipole (remember, it was always above ground). The modeled results from 4 feet above ground to 1 inch above ground were extremely similar to Rudy's results, giving us confidence to model a BOG at 0.25 inches above ground using NEC 4.1.

(Cont. on Next Page)

KD9SV Reversible Beverage-on-Ground (cont.)

Some interesting trends we saw with our modeling efforts with BOGs:

1) Just like normal Beverages several feet above ground, BOGs appear to have preferential lengths for best F/B
2) BOGs can be too long – on 160-Meters, a good length appears to be 200 feet
3) The decreased BOG gain will benefit from the use of a preamp

In spite of the limitations of the model (for example, how well does NEC model the transition from air to ground?), broad trends were discerned. Figure 3 shows the modeled results for a 200- foot long BOG at 0.25 inches above average ground (we used average ground as at the time of this writing we don't know our ground characteristics) with a 240 ohm termination. These results should be regarded as *PRELIMINARY*. The RDF is decent (9.3 dB) for a "short" antenna, but the F/B at expected elevation angles (about 11 dB) isn't spectacular.

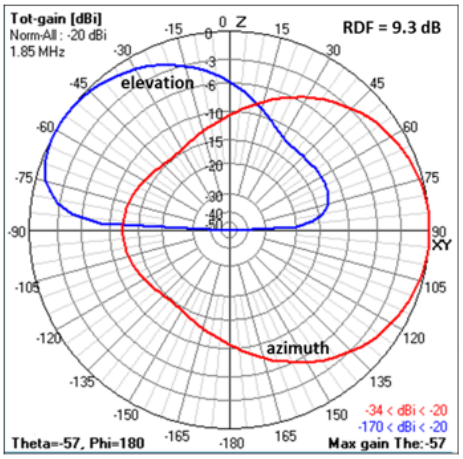

Figure 3 – Preliminary Simulated Results

In summary, the KD9SV RBOG performed well under my limited evaluations, and most of the time it should give very respectable results. But the RBOG takes up more space and you need at least one more two-direction system to have the minimum "around-the-compass" coverage. Having said that, I have no plans to take down the SAL-20, as I believe in the old adage "you can't have too many antennas on 160-Meters".

The KD9SV RBOG is sold through DX Engineering, and details about it can be found at http://www.dxengineering.com. When you visit the DX Engineering web site, do a search on KD9SV Products.

Pioneers of Physics, Mathematics, and Electronics

We are continuing our historical series but taking a slightly different tac. You may know that I am a member of the Radio Amateurs Old Timers Club of the UK as well as Australia. This article appeared in the Australian journal and I was really fascinated by it. This is reprinted with permission of the author, VK7ZAS, and the editor, Bill, VK3BR.

The Shocking Discovery of Electric Fish: the 250th Anniversary

By VK7ZAS, Paul Edwards

While researching my family history I discovered that a distant great uncle, a wealthy 18th century nabob turned 'gentleman scientist' named John Walsh, was an early electrical researcher. Encouraged by Benjamin Franklin, Walsh undertook a historic scientific expedition to the French coast in the summer of 1772, just 250 years ago. There he showed that the marine torpedo ray, long-known for its mysterious ability to induce 'torpor' in nearby fish, employed electric shocks to paralyze its prey. Walsh's experiments helped lay the foundations of modern electrophysiology and led indirectly to the invention of the voltaic pile[1].

Electrical science in the 18th century

The generation of static triboelectric2 charge by rubbing materials like amber (elektron in Greek) to produce sparks and to attract and repel objects was well known to the ancients. However, electrical science did not advance much until the early 1700s when the first frictional generators of static electricity were invented. These often took the form of a rotating glass disk as in the Plate Machine below. During each rotation the metal comb B-G wipes the positive charge off the previously rubbed glass plate and transfers it to the prime conductor C where it deflects the Henley Electrometer.

Electric machines quickly became fashionable sources of noisy spectacular public and private entertainment. Later generators utilized the phenomenon of electrostatic induction to achieve greater charge separation and higher potentials. The subsequent invention of the Leyden jar capacitor in 1745, and Franklin's parallel plate capacitor, enabled charge to be accumulated and stored at high potential for later demonstrations, electric shock therapy and scientific experiments.

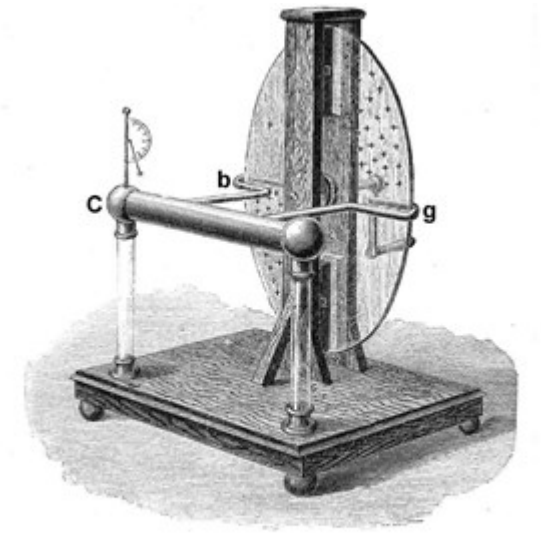

Figure 1 - Frictional electric Plate Machine shown with Henley Quadrant Electrometer (1770) on the left hand side connected to the 'prime conductor' (C).

Benjamin Franklin, lightning conductors, the 'electric fluid' and electric fish

Franklin, a self-educated successful businessman, first witnessed a demonstration of electricity in his home town of Boston, Massachusetts in 1743.

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Electric Fish (cont.)

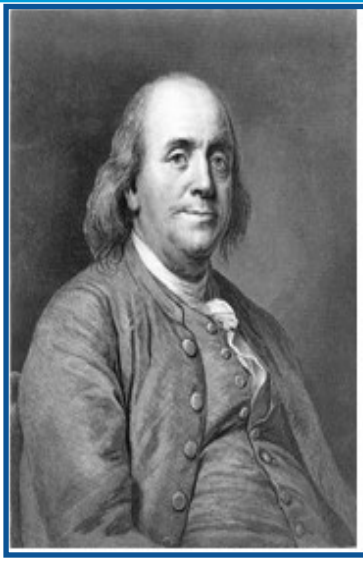

Figure 2 - Benjamin Franklin FRS 1706-1790. Leading 18th Century 'electrician', inventor, and US Founding Father. *(From Wikipedia).*

When he arrived in London 15 years later, he had become a world- leading electrical researcher or 'electrician' (to use his own term) and had been awarded the Royal Society of London's prestigious Copley Gold Medal. Franklin had invented a (controversial) lightning rod and the Franklin Square parallel plate capacitor. He had already proposed and executed his famous (some say foolhardy) experiments with kites and lightning rods which extracted and stored the 'electric fluid' from thunderstorms in Leyden jars, thereby showing the link between machine-made electricity and atmospheric electricity. He had also proposed a radically new single- fluid theory of electrification in terms of positive (excess) charge, negative (deficit) charge and equilibrium neutral (zero net) charge.

The theory supplanted the 'two fluid' theory of the time. However, it retained the arbitrary labelling of charged vitreous bodies (like rubbed glass) as 'positive', and charged resinous bodies (like rubbed amber) as 'negative'. This arbitrary choice labelled the electron (discovered over a century later) as a 'negative' charge carrier. As we now know, positively charged vitreous surfaces are actually in deficit of mobile electrons which must consequently be labelled as negative charge carriers! It also set in concrete the sign of potential differences and the direction of electric fields and current flow.

Franklin's single-fluid model neatly accounted for attractive and repulsive electrostatic forces and electrostatic induction whereby opposite ends of a neutral charged conductor become oppositely charged. It also accounted for charge storage (separation) in the Leyden jar. In his model of atmospheric discharges, both machine-made and natural, excess positive charge flowed to make good the deficit and so restore charge equilibrium (neutrality).

Some 270 years later we take for granted the diverse mix of charge carriers in the flow of Franklin's 'electric fluid': negative electrons, negative and positive atmospheric ions, anions and cations3 in electrolytes and living cells, holes in semiconductors, all moving down their potential gradients.

With atmospheric electricity 'in the jar' following his kite experiments, Franklin and others next turned their attention to animal electricity, specifically fish electricity. English scientific interest in 'electric' fish had grown following publication in 1748 of an account of Commodore George Anson's Pacific voyages which described an encounter with a South American torpedo eel.

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Electric Fish (cont.)

Freshwater torpedo eels were well known to European settlers in the New World, probably because of the paralyzing 'shocks' they could deliver to fish, man and beast. These shocks were much more intense than those delivered by the torpedo rays of the Mediterranean to the Greeks and Romans of antiquity who used them for medicinal purposes, to cure gout and other maladies.

The prevailing wisdom, according to influential French academician René-Antoine de Reaumur (better known for his temperature scale), attributed the effects of the torpedo ray to intense mechanical vibration originating in rapid muscular contractions.

However, Dutch and American scientific opinion began to favor an electric origin for the effects although no sparks could be produced, sparks and loud noises being deemed an essential element of genuine 'electric' phenomena.

Physician and naturalist Edward Bancroft was one of Benjamin Franklin's scientific and political associates. Shortly after coming to London in 1767 he published a 400 page Essay, a comprehensive natural history of Dutch Guiana where he had worked as physician on a slave plantation. He rejected Reaumur's theory of mechanical shocks on the basis of his own observations and earlier Dutch observations of the freshwater 'torporific eel', suggesting instead that "the shock is produced by an emission of torporific, or electric particles". He based this assertion on the similarity of the shock administered by enraged South American eels contacted via an iron rod with "ten or a dozen persons …. holding hands" with that from an electric machine.

Bancroft's best-selling Essay caught the attention of the London scientific community, including Franklin and Colonel John Walsh MP, a wealthy member of parliament, recently elected a Fellow of the Royal Society.

Franklin encouraged Walsh to test Bancroft's assertion that the torporific eel and the Atlantic torpedo ray, known to frequent the shores of the Île de Ré near the town of la Rochelle, both delivered electric shocks.

Walsh's torpedo ray expedition to La Rochelle and Île de Ré

John Walsh was born in Madras in 1726. He initially served there as a clerk in the East India Company with Robert Clive, ('Clive of India'), who married Walsh's cousin Margaret Maskelyne. He remained close toClive in his meteoric rise to military fame and fortune, represented his interests in parliament and shared in the enormous wealth accrued by British 'Nabobs' in the British conquest of India.

He returned to London from India in 1759 following the highly profitable Battle of Plassey. He was said to be *"a man of great courage, gross appetites, abrasive manners, and high intelligence."*

Figure 3 - Lieutenant Colonel John Walsh MP FRS.

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Electric Fish (cont.)

Franklin arrived in London from the American Colonies at about the same time as Walsh returned to London from India. They would have met at Royal Society meetings where Walsh, the wealthy amateur, rubbed shoulders with some of the leading scientists of the day, including eccentric physicist Henry Cavendish, 'electrician' Joseph Priestley (the discoverer of oxygen) and leading anatomist John Hunter.

Fired by Bancroft's essay on electric fish, and armed with a list of suggested experiments planned jointly with Franklin, John Walsh, his 15 year old nephew Arthur Fowke and Arthur's tutor David Davies set out for France in June 1772. His correspondence with Bancroft, Franklin, Priestley and others show that he had made himself familiar with the electrical science literature. His library included the authoritative century-old work on torpedo rays by Stefano Lorenzini and the monumental History of Electricity recently published by Joseph Priestley.

The expeditionary party travelled via Paris to the town of la Rochelle, Reaumur's birthplace, close to where he had formulated his mechanical theory of the torpedo's shock.

Walsh attended several meetings of the French Royal Academy in Paris and met a number of French academicians. He also purchased an electric machine incorporating Lane's spark gap electrometer with the intention of comparing the effects of a machine-charged Leyden jar with those of the torpedo.

Walsh requested the assistance of local fishermen in securing suitable torpedoes for dissection and electrical 'shock testing'. Also, knowing the importance of reliable eyewitnesses, he enlisted the help of a number of the town's prominent citizens, including the mayor and several local academy members.

One of his first actions was to ask the fishermen to confirm the similarity between torpedo shocks and those from his lightly machine-charged Leyden jar. They also confirmed earlier reports that shocks from the larger specimens (probably of the species Torpedo nobiliano) could often be felt through several meters of wet fishing net all the way up the arm to the shoulder. With these anecdotes in mind, Walsh searched for large vigorous specimens and spread his net to the nearby Île de Ré to secure them.

Walsh and his locally augmented team worked systematically and chalked up a series of experimental successes and failures. Two weeks after his arrival he wrote enthusiastically to Franklin "the effect of the torpedo appears to be absolutely electrical!". He based this statement on the fact that the shocks did indeed feel just like those from a charged Leyden jar or flat capacitor, were transmitted solely by conductors and not by insulators, and required a closed electric circuit between the top and bottom surfaces of the ray (Fig 4).

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Figure 4 - Walsh's crucial experiment. An electrically conducting path from the top to the bottom of a torpedo ray is completed by two shocked experimenters.

Electric Fish (cont.)

The crucial experiment, in which Walsh and his nephew Arthur joined hands to complete the circuit and so receive a shock, took place on 9th July 1772 and was repeated with larger rays from Île de Ré and chains of up to seven shocked recipients. Walsh asked Franklin to "please acquaint Dr Bancroft of our having thus verified his prediction concerning the torpedo". The letter later formed part of Walsh's account of the electrogenic character of the torpedo ray published in the Philosophical Transactions of the Royal Society in 1773.

In India, Walsh had been a close military aide to Robert Clive, the man largely responsible for the militia. Moreover, he had evidently travelled to France without a passport ! Not entirely surprisingly, two days after writing to Franklin and moving his party to the fortified island of Île de Ré in search of bigger fish, hopefully capable of generating a visible spark, Walsh was threatened with arrest as a spy and ordered to leave the island. Luckily, the instruction was rescinded, probably due to the intervention of the influential Mayor of La Rochelle, M Seignette, a descendant of Pierre Seignette, discoverer of Rochelle Salt circa 1675, now well known as a piezoelectric crystal.

After returning to La Rochelle from the island he gave several public demonstrations of the propagation of the shock around a closed circuit, the final one to a distinguished military audience following a dinner unexpectedly given in his honour by the local Commandant, who apologized for the earlier mis- understanding, attended by forty of his officers.

Despite his otherwise successful expedition, Walsh was far from happy. He had failed to raise a visible spark from the torpedo. He knew that his failure would be seized on by the electric fish sceptics - 'genuine' electricity being then invariably associated with noisy sparks. In a second letter written from Paris on his way home, Walsh told Franklin of this puzzling failure *"notwithstanding the vigour of the fresh taken torpedos at the Île de Ré"*. Three years were to pass before he succeeded in vanquishing the sceptics by triumphantly coaxing a visible spark from a freshwater electric eel imported from South America.

Modelling the Torpedo Electric Organ

On his return, Walsh presented anatomist John Hunter with several torpedos from Île de Ré, preserved in brandy, plus a number caught locally off the English coast. Hunter reported the results of his dissections in a paper published by the Royal Society together with Walsh's 1773 account of his experiments as communicated earlier to Franklin. Endorsed by Sir John Pringle, the society's president, Walsh's letter to Franklin earned him the Society's prestigious Copley Gold Medal in 1774.

Hunter described the close-packed columnar structure of the torpedo's two electric organs, consisting of 500 - 1,000 columns situated between its upper and lower surfaces, each column comprising hundreds of thin (0.2 mm) discs, the bottom of each disc connected to the torpedo's nervous system by an extensive tree of branching nerves.

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Electric Fish (cont.)

Hunter anticipated modern physiologists by suggesting that the nerves served to activate and fire the fishes' electric weapon.

The famous Swedish biologist Carl Linnaeus, responsible for introducing the modern binary classification of plants and animals, was delighted. He wrote to Walsh: *"it confirms the hypothesis which Ihave already adopted of an electric force in the nerves"*.

The study of animal electricity was taken up by Galvani whose historic experiments on frogs' legs led indirectly to Voltas's discovery of the electrochemical cell and his invention in 1799 of an 'artificial electric (fish) organ' - the voltaic pile, a column of series- connected cells (see Fig 5).

Stimulated by Hunter's dissection and Walsh's observations, physicist Cavendish constructed an artificial torpedo. He modelled the electric organs with shoe leather soaked in brine placed between pewter plates connected to an external battery of 49 parallel Leyden jars (see Fig 6).

Not only did Cavendish reproduce the torpedo's spark-free shocks in and out of water, but he also mapped the flow of current around his artificial fish (Fig 6a), showing that sea- water did not short circuit the discharge as some sceptics had claimed. He also extended Franklin's single-fluid model of electricity to describe the hydraulics of the 'electric fluid' by distinguishing between its quantity (charge Q), proportional to the number of Leyden jars connected in parallel, and its 'pressure' (potential V) as measured with his Lane spark gap electrometer (Fig 6b), thereby anticipating Alessandro Volta's 1778 'law of capacitors' (Q = VC).

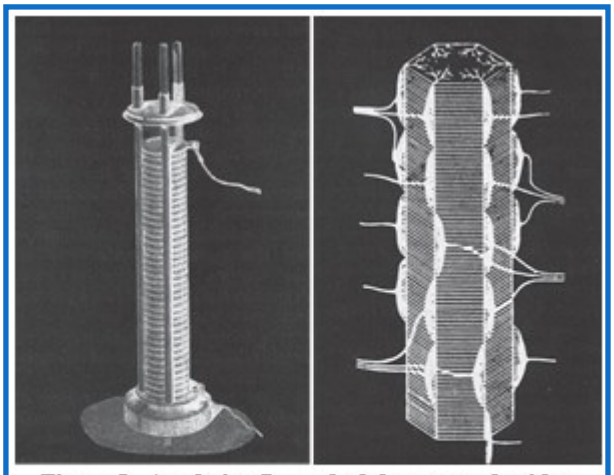

Figure 5 - A voltaic pile on the left compared with a sketch of a column of electrogenic cells from which Volta is said to have received inspiration for his 'artificial electric organ'.

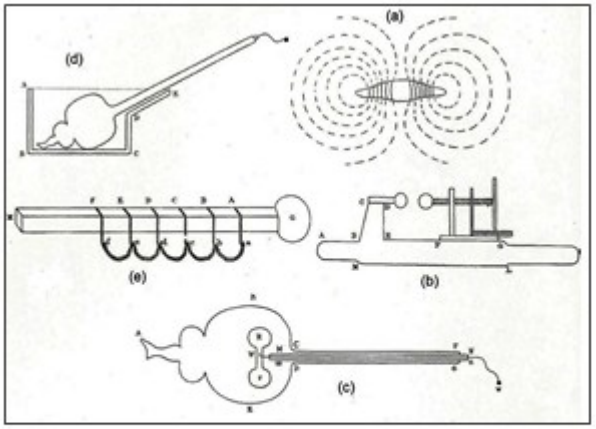

Figure 6 - Cavendish's model torpedo showing (a) current flow in seawater (b) Lane's spark gap electrometer (c) Model structure (d) Submerged model (e) Cavendish's brass chain rheostat.

The Spark

Following Hunter's dissections and Cavendish's successful modelling of the torpedo ray, interest grew in the other known electric fish candidate, the South American freshwater electric eel, Electrophorus electricus[4].

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Electric Fish (cont.)

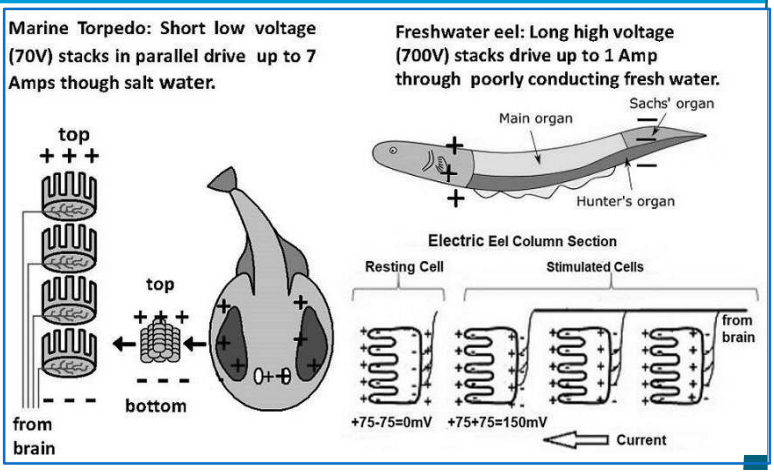

Figure 7 - The electric organs and cells of the marine electric ray and the freshwater electric eel showing their adaptation to different electrical environments. *(Adapted from Wikipedia).*

While Walsh and others were investigating the torpedo in London, American researchers had successfully imported healthy eels to Philadelphia before the war with Britain intervened.

Walsh met American physician Hugh Williamson in London in 1774 and later formally communicated Williamson's work on electric eels to the Royal Society. Although he was unable to coax a visible spark himself, Williamson's work persuaded Walsh that eels were more promising 'spark generators' than rays. It had become abundantly clear that the 'pressure' (voltage) generated by the Electrophorus was an order of magnitude higher than that generated by the Torpedo.

In hindsight, Walsh's failure to raise a visible spark from the Atlantic rays was only to be expected given the minimum 3 kV potential needed to bridge a 1 mm air gap. The Australian coffin ray, discovered on the east coast in the late 18th century, might just have done the trick as it reportedly generates 200 V pulses, but the fish was unknown in England.

We now know the reason for the disparity in voltage between eels and rays. Maximizing energy transfer and/or minimizing energy expenditure is achieved by impedance matching the generating organs to the resistive loads presented by the surrounding water. Fresh-water eels need higher voltages to drive current through low conductivity freshwater while marine fish like the rays need higher current capability and lower internal resistance to match the higher conductivity saltwater environment. Fig 7 above indicates how these electric fish have adapted to their very different resistive environments.

The ray has evidently adapted to its environment by developing numerous columns of cells connected in parallel between large-area, low skin-resistance terminals on its upper and lower surfaces in order to lower its internal resistance. As an illustration, the electric organs of the representative torpedo ray, modelled below, contain a series-parallel battery of a million electric cells, each cell capable of generating a short (5 ms) 70 mV pulse on command from the brain. The cells are arranged in 1,000 parallel columnar stacks with 1,000 cells in each stack, connected in series as in Volta's pile. Triggered synchronously, these cells provide +70 V pulses at the top of each column under 'no load' conditions when the fish is out of water. If the individual cells generate 70 mV with an internal resistance of 10 ohms, then the battery will also have an internal resistance of 10 ohms and a short circuit current capability of 7 A.

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Electric Fish (cont.)

The eel has adapted by developing longer high voltage cell stacks at the expense of higher internal resistance. It has fewer electric columns but they are much longer, contain more cells (typically 5,000 or more), and stretch from head to tail. The world record of 860 V is currently held by Electrophorus voltai, a formidable creature of the pure waters of the upper Amazon basin, believed to hunt in packs.

In August 1776, Walsh finally succeeded in demonstrating the elusive spark to a distinguished audience from the Royal Society in the darkness of his private aquarium at his Mayfair residence. He had fashioned a narrow spark gap, probably less than 100 microns wide, from a sheet of tin foil. The demonstrations briefly became the fashionable talk of the town. His final success silenced most of the sceptics although it was quickly forgotten when he failed to publish his results. These, including the eel's mysterious ability to detect and locate submerged conducting bodies, were only recently resurrected by physiologist Marco Piccolino.

The torpedo electric cell British physiologists Andrew Huxley and Alan Hodgkin, together with Australian John Eccles, were awarded the 1963 Nobel prize for their electrochemical model of animal cell activation.

The electric cells of electric fish are believed to have evolved from muscle cells in which the usual mechanical response to signals from the brain has been replaced by an electrical response. Each disc-shaped electric torpedo cell is enclosed by insulating tissue and by thin (5 nm) upper and lower membranes which act like leaky charged capacitors of around a microfarad each. The cells and their surroundings are filled with electrolytes of sodium chloride and potassium chloride with high potassium ion concentrations inside and high sodium ion concentrations outside the cells. Most of the cell's electric energy is stored in the resulting ion concentration gradients across the cell membranes, not in the membrane capacitors as Cavendish's model might suggest. The cell concentrations and resulting gradients are maintained by sodium/potassium ion pumps energised by the fish's metabolism. Membrane potentials, typically between 70 and 90 mV, regulate the outward leakage of potassium ions and the much smaller inward leakage of sodium ions.

In equilibrium, when the cells are resting, zero net current diffuses through the membranes.

As shown on the right of Fig 8 below, the opposing upper and lower membrane potentials then cancel so that the net terminal voltage across each cell is zero.

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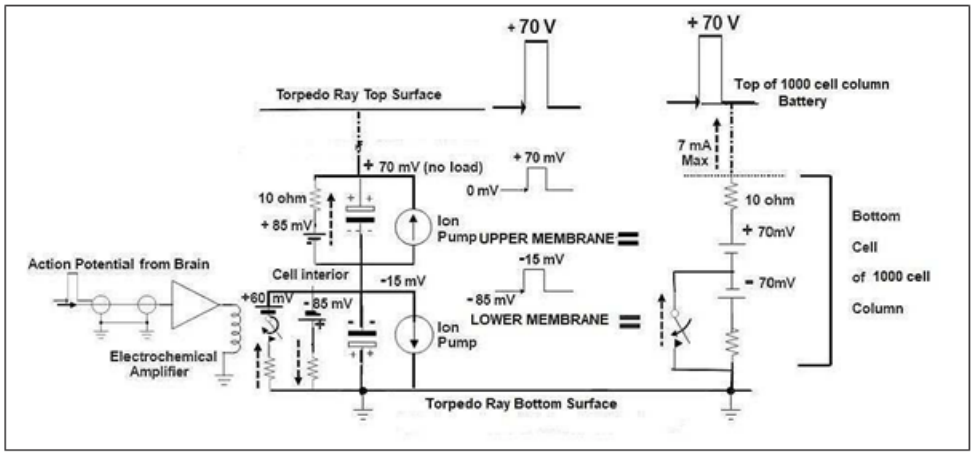

Figure 8 - Simplified model of a torpedo ray electric cell. This illustrative example shows a cell at the bottom of a column of 1,000 series-connected cells. The column battery provides open circuit 70 V pulses and 7 mA short circuit current pulses when activated.

Electric Fish (cont.)

However, when the lower cell membrane is chemically activated by an action potential from the brain, the lower of the two membrane potentials is partially short circuited so that the net terminal voltage briefly rises to +70 mV and the open circuit voltage of the 1,000 cell stack rises to +70 V (when the fish is out of the water!). In this example, the 1,000 parallel stacks raise the short circuit current capability to 7 A peak (Fig 7).

The left side of Fig 8 below shows a more detailed model of the cell discharge. Chemically fueled sodium and potassium positive ion 'pumps', shown here by constant current sources, maintain the ion concentrations and the negative potential inside the cell at minus 85 mV. This negative membrane potential blocks the outward current flow of potassium ions which would otherwise be driven by the potassium ion concentration imbalance, shown here by a negative 85 mV 'diffusion potential' and 10 ohm channel resistance.

The arrival of an action potential from the brain triggers the release of a chemical neurotransmitter. This opens up a high conductance sodium channel, represented by the relay-switched positive 60 mV emf and channel resistance. Positive sodium ions then flood into the cell across the lower membrane, briefly raising its potential to minus 15 mV, close to the mean of the sodium and potassium diffusion potentials. If the fish is out of water then the net potential across each cell consequently rises to plus 70 mV as shown, but no external current flows. On the other hand, if the fish is in its low resistance natural saltwater habitat, a capacitive current flows briefly and partially discharges the upper cell membrane capacitors causing the cell voltages to drop. This unblocks the potassium ion channels, current is driven out through the upper membranes by the concentration gradients and up through the columns thereby disabling and sealing the fate of nearby fish. This natural 'ion concentration flow battery' has inspired the fabrication of artificial bioelectric storage devices using the same principle.

250 years later, the central role of electric fish in early electrical research is largely forgotten. Of course physiology and neurophysiology flourish and we now take for granted the electrical basis of living plants and animals. Electric fish research continues in its own right with an increasing understanding of the sophisticated electrical methods used by aquatic creatures to navigate, communicate, socialize, defend, hunt and sustain themselves in an electrically conductive environment.

Footnotes

1. The voltaic pile was the first electrical battery that could continuously provide an electric current to a circuit. It was invented by Italian physicist Ale sandro Volta, who published his experiments in 1799.
2. The triboelectric effect is a type of contact electrification on which certain materials become electrically charged after they are separated from a different material with which they were in contact.
3. Anions are negatively-charged ions (meaning they have more electrons than protons due to having gained one or more electrons). Cations are positively-charged ions (atoms or groups of atoms that have more protons than electrons due to having lost one or more electrons).
4. *Electrophorus electricus* is the most well-known species of electric eel. It is a South American electric fish. Until the discovery of two additional species in 2019, the genus was classified as the monotypic, with this species the only one in the genus. Despite the name, it is not an eel, but rather a knifefish.

Interview with Rene, FR4OO

Rene was one of the most interesting QSOs in recent years. I listened to his other QSOs and came to appreciate what a solid operator he is. He gladly agreed to answer our questions. He can be reached at fr4oorp@gmail.com

AJ8B: How did you first become interested in amateur radio?
FR4OO: I started with the CB in 1981 with friends (with a small 22 FM channels then the BLU), then licensed in 2009.

AJ8B: Do you have a favorite band or mode?
FR4OO: Voice +++ in priority, digital (ft8/ft4/sim31/jt65/jt9 etc..) Sat LEO and QO100

AJ8B: What time of day and what days do you like to operate?
FR4OO: There is no precise time, as soon as I have some free time, and the WE +++, my station is always in std bye.

AJ8B: Any secrets to your success?
FR4OO: There is no secret, just being there at the right time.

AJ8B: Any tips you can share?
FR4OO: know how to share your knowledge, your experiences, and help young people who are starting out.

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FR200 Interview (cont.)

AJ8B: Describe what you are currently using.
FR4OO: My HF station icom 7300 + MC30 antenna mosley pro67B + comet CHA250BX2 / icom 7000 on mobile VHF/UHF icom 9700 for sat + 10 elts vhf and 10 elts uhf and 16 elts shf / QO100 dish offet 80cm + propeller 5 turns house.

AJ8B: What is your favorite contest?
FR4OO: I have never been attracted by competitions but I gladly respond to those who melt it, just some pile up in HF.

AJ8B: What coaching/advice would you give to new amateurs?
FR4OO: Humility, courtesy and simplicity, and above all listen to the frequency before launching your call, to see if it is not already busy

AJ8B: If I had to stop for a visit, what local place would you want us to visit? \
FR4OO: If you come to the REUNION, I will tell you the site of the volcano which is beautiful, our mountains and our local culinary dishes very appreciate. (the rougail sausage, the massalé cabri or chicken, the yellow rice etc...) the fairground market of St Pierre or that of St Paul on Saturday morning. (with these smells of spices) there are many things to discover, and to do.

AJ8B: Thank you for taking the time to answer my questions. Is there anything you'd like to share with us?
FR4OO: I live on the island of REUNION (also called the Intense Island) located in the Indian Ocean where it is good to live, we speak French. its fauna and flora are to be seen, the mixture of race and religion rub shoulders and get along.

Generally Speaking—Paul, VE1DX

Paul, VE1DX, has given me permission to reprint any or all of these previously published stories. The style is different and each has made me think a a bit about the point that was trying to be made. I hope you find these interesting. Paul explains "The stories below are based on the characters and writing style developed by Hugh Cassidy, WA6AUD (SK) , the editor of the West Coast DX Bulletin from 1968 until 1979. While I'm no Hugh Cassidy, I found it easy to copy the writing style and use the characters he'd invented in the WCDXB to get my message across. Now and then, an interesting, controversial, or just plain funny topic surfaces in the DX world. If I have the time and inclination, I write about it "

One of the Local QRPers came beating his way up the hill the other day, puffing and sweating as the first signs of early summer took their toll. It really wasn't very warm, but the QRPer looked like he'd spent quite a few hours sitting in front of the rig this winter. We'd seen this before, and once the antenna and tower work began in earnest, he'd be back in shape.

He flopped down in the chair beside us, wiped a bit of sweat from his brow, and asked, "What is the best DX rig?" We thought for a moment and then used the old trick of answering a question with a question, "Why do you ask?"

"Because all the Big Guns at the DX club were arguing about it at the meeting last night. One of them has one of those TS-2000 rigs, and he swears nothing can touch it! But another one bought a FT-1000MP over the winter, and he was just as adamant it was the best DX rig. And then this other guy who has 340 or 350 worked said he was happy with his TS-430, and that if you spent any more on a rig, it wouldn't make any difference!"

We nodded and peered over our bifocals at the QRPer with a non-committal look. He took a deep breath and continued on. "Last fall I bought a FT-847. It's a middle-of-the -road rig. And with my 600-watt amp and tri-bander, I worked a lot of DX with it these past six months. Now I'm beginning to wonder. Maybe if I had a $5000 rig, I'd have worked more DX. And if a lot of DX is good, more must be better. Maybe I should buy an FT-1000MP or an IC-781. What do you think?"

We thought about our FT-101 that was still grinding away after 25 years, and of all the DX we'd worked with it. Often we'd been temped by the glossy ads and the new bells and whistles, but we'd stuck to our DX guns. Maybe if we had bought a new rig every few years, we'd have worked more DX. But maybe we wouldn't have, either.

The QRPer was tapping his fingers on the table, waiting for an answer. We took our time, and then replied. "You've heard the Old Timer say that all things are relative, although some more so, right?" The QRPer nodded and replied impatiently, "Yes, yes, I know! He always says that. It's what Albert always said too. But what's it got to do with buying a new rig? Should I dig into my savings and get one of the new high end rigs or not?"

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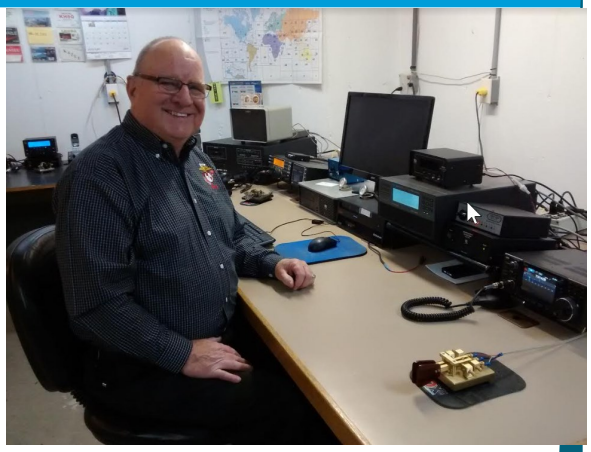
What's Knot to Know?

By Jay, K4ZLE.

As I was updating my OCF and hex beam for the fall/winter season, I had to refresh my knowledge of knots. I recalled this article by Jay and his permission



Since this issue transcends the period from summer to fall and since most serious antenna work is done in the late fall and winter months, when it is truly miserable outside, I thought an adaptation of that material might be appropriate.[1] The following eight knots are the ones I use most often. The experienced rigger may have his own list of favorites, but these eight knots most like will be amongst them. The goal of this article is to identify good knots to know and where they are best used. It is beyond scope to teach one here how to tie them. Therefore, there are no illustrations published with this article, but the interested reader can find plenty of examples and training materials on the internet. A couple of good sites to start are: www.netknots.com and https://247scouting.com/web/BSA160/attachment/document_14710179870_2939.pdf

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Generally Speaking (cont.)

We weren't about to advise anyone on how much money to spend on a rig, so we decide to hit him with one of the Eternal Enigmas of DXing. "That's the special theory of DXing the Old Timer kept telling you. You obviously haven't heard of the general theory of DXing, have you?"

"What's that?", he said, standing up and staring at us, "and what does it have to do with buying a new rig?"

We looked at him and replied in a knowledgeable tone, "DXers believe that, generally speaking, he who has the best antenna will work more DX. And generally speaking, he who spends more time in front of the rig will work more DX. And generally speaking, he who has the biggest amp will work more DX. So maybe the general theory of DXing implies he who has the most expensive rig will work the most DX too. But it never has been proven. Albert spent years working on a unified DX theory, and he never figured it out."

The QRPer looked confused, and he just stared at us. We stared right back at him, and said, "Generally speaking, however, Albert did prove that he who has the best propagation wins. That is why DX IS!"

He jumped to his feet and bellowed, "What kind of answer is that?" We shrugged as he stomped out the door and down the hill, probably no wiser than he had been a few hours earlier. Someday he would probably understand, but maybe he'd have to go through a half dozen expensive radios before it sunk in.

What's Knot to Know? (cont.)

Square Knot

This is probably the first knot a sailor learns to tie, since the black neckerchief on their ceremonial dress uniforms, a.k.a. the traditional crackerjack suit, is tied in a square knot. The square knot is also known as a reef knot, since sailors would use this knot to reef their sails back in the Navy of yore when ships were made of wood and sailors were men of iron![2] The square knot is used for this purpose because it can be easily untied with one hand, allowing the gob to hang onto the rigging with the other hand. A square knot is easy to tie and to untie. It is useful for tying two ends of a line or rope together where safety is not an issue. It should be used where the ropes are of equal size. It is not advisable to use this knot where the ropes are of different size or they are wet, as the knot will easily collapse under these conditions. In antenna work a square knot is most useful to tie bundles, but should not be used for lifting. A similar looking knot is the granny knot, but unlike the reef knot, a granny is not easy to untie, especially once it has been under tension.

Half Hitch

The half hitch is possibly the simplest knot to tie at the end of a line. It is used primarily to secure the line to another object such as a tower leg, post or mast. However, by itself, it is not considered safe. It is a good 'finishing' knot used in conjunction with other knots to make them more secure or as part of another knot or hitch. I would never use a single half hitch by itself. For sure, two half hitches should be used if you want any degree of security/safety.

Sheet Bend

The knot of choice for joining lines of unequal size is the sheet bend. The sheet bend holds well under tension, but will tend to slip when the line is slackened. While not named because it can be used for this purpose, one can attach a line to the corners of a sheet or tarpaulin using a sheet bend in order to tie it down. A variation, the double sheet bend, will hold better and is still easy to untie. Adding a couple of half hitches on each free end of the sheet bend will help it hold when slackened.

Clove Hitch

The clove hitch is a great knot for attaching to a round object, such as a round fence post. It is most secure when tension is exerted perpendicular to the object it is tied around. Unless it has been tensioned from both directions away from the knot it is easily untied . One can also manipulate one end of the line into the knot and adjust the knot to loosen or tighten the line on one side or the other of the knot, allowing one to "slide" the rope in a controlled manner around the object to which it is secured.

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What's Knot to Know? (cont.)

Timber Hitch

The timber hitch is the knot to use to move or hoist round masts or poles, especially heavy ones. If lifting a mast vertically, I like for my bottom knot to be a timber hitch. I then use a clove hitch or several half hitches spread up the mast to keep it vertical. As the mast is hoisted above me, unless it is very heavy, I can relieve vertical pressure and easily slip the other knots off the top of the mast of 'slide' them toward the timber hitch.

Taut-line Hitch

I like to use this knot when securing temporary guys. It is easy to adjust and does a reasonable job holding the guys so long as the line stays taut. If the lines are allowed to slacken, as can happen in windy conditions, the knot can loosen and not hold. That is why I only use it for temporary guys. It can be made more secure by finishing with several half hitches.

Trucker's Hitch

To me this is the knot of choice whenever I want to pull tension on a line and ties something down. It is called a trucker's hitch because is used to securely tie a load to the bed of a trailer. The following web site gives a bit more information and shows you how the knot is tied: http://www.survivalworld.com/knots/truckers_hitch.html.

Bowline

For me personally, this is a fun knot to tie. It is the best knot to use if you want to create a single loop that will not tighten or slip under strain. It is easy to untie even after having been placed under tension. This is the knot rescuers use to tie around someone to hoist them as the loop does not become smaller and constrict under strain. After tension is removed it can be untied easily.

I realize that this is not a tutorial on knot tying. My intent is to introduce you to the names of some very useful knots in antenna work and to encourage you to investigate them further on your own, even to the point of getting a two or three foot length of light rope or heavy string and practice tying them your self. Once you get familiar with them, you will easily adapt to "what knot to know" or more clearly stated, you will know what knot to use for a given purpose. Let me close by directing you to a very useful reference that not only includes knot knowledge but is a plethora or information on all types of rigging issues. That reference is the US Army Field manual FM5-125, *Rigging Techniques, Procedures and Applications*. You can download it free from many sites on the internet including this one: https://www.marines.mil/Portals/1/MCRP%203-17.7J%20With%20Ch.%201%20z.pdf

To paraphrase a familiar saying, "Have fun, enjoy the chase and don't get your skivvies in a knot!"

[1] I say that somewhat tongue-in-cheek, but the truth is that once the bad weather hits, we find the weaknesses in our summer's work in maintaining our old antennas and installing the new ones. You have heard the old saw, *If it survived the winter it was too small*? It follows to reason that if it doesn't survive the winter and you want to operate, some form of antenna work will be necessary in the winter.

[2] For the uninformed, sails have sections with bits of rope attached (reef points) than allow one to pull portions of the sail together thus reducing the effective surface area. This is especially used in stormy weather.

[3] For the purist, I am aware there is a difference between ropes and lines, but for simplicity, I will use the terms interchangeable herein

Interview with HA3NU—Laszlo

If you have worked Hungary, you have most likely worked HA3NU! What a signal and what an operator. He can be reached at ha3nu@dx.hu

AJ8B: How did you first get interested in amateur radio?
HA3NU: Our neighbor HA3NR and my brother HA3NS called me to the local radio club HA3KNA. It was in 1970 when I was only 12.

AJ8B: Do you have a favorite band or mode?
HA3NU: I work on HF only and actually I like the band which is in "good shape". Of course at sunspot minimums and winter rather on the lower bands and at maximums on upper bands.

My favorite mode is CW and I like the high speed traffic. I member of several CW clubs including eg. EHSC (for this you have to be able to communicate with 60 WPM speed).

AJ8B: What time of day and days do you like to operate?
HA3NU: Until around 2010 I was QRV on almost every day, recently rather at weekends. It is because the activity on CW and SSB decreased due to FT8 (the mode I don't use) There is no dedicated time, I work when I have time and the conditions are good.

AJ8B: Any secrets to your success?
HA3NU: Maybe it's not immodesty to say that I'm not an average HAM. Until the mid of 90's I was an active HST (High Speed Telegraphy) contester and I gained second place in the HST World Championship and first place in Eu championship. I'm also 3 times World Champion in IARU HF World Championships in High Power categories. For these results you have to be not only enthusiast but fanatic, have to spend many thousand hours in the bands and have to invest a lot's of work. I never tried any other hobby only my beloved one: HAM RADIO.

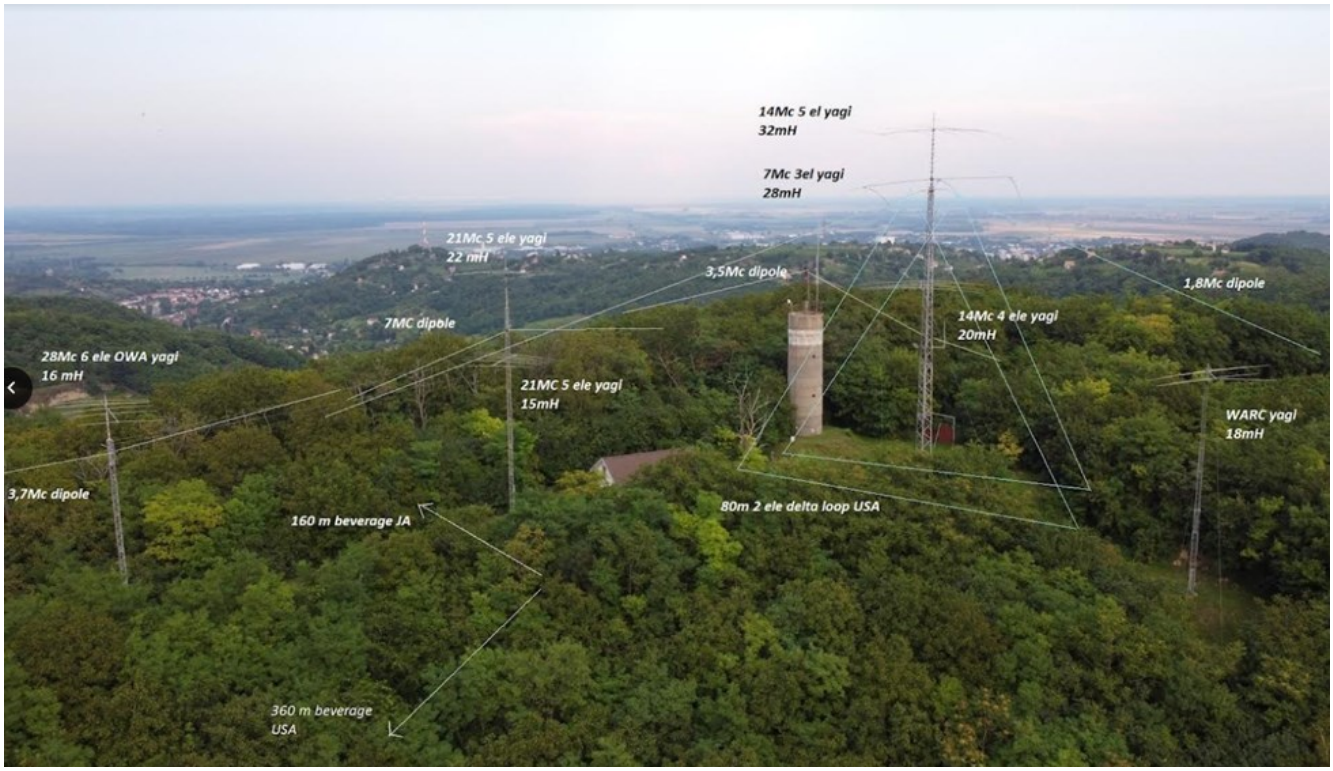
AJ8B: Any tips that you can share?
HA3NU: I think it is a good idea to set goals eg. to achieve an award or reach 5000 QSO's in a year etc. this helps development and motivates to reach new goals.

AJ8B: Describe what you are currently using:
HA3NU: The current setup: FTDX5000, FT1000MP, 2x OM PA, antennas: 10m: 2x 6el OWA Yagi (18/13mH), 15m: 2x 5el Hygain Long John (23/16mH), 20m:5 el (32mH) and 4 el (20mH) Hygain Long John,

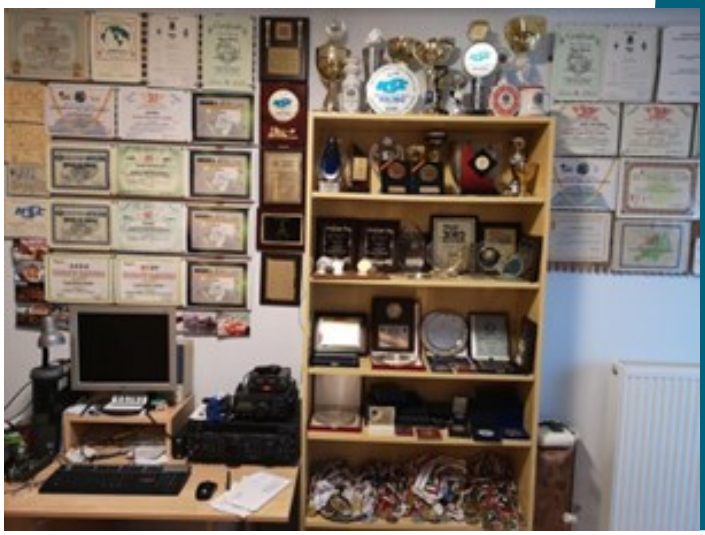
(Cont. on Next Page)

Interview with HA3NU (cont.)

40m: 3 ele full size Yagi (28mH), dipole (21m), 80m: 2el delta loop (fix USA) and Invee dipole (15mH), 160m Invee dipole (25 mH) WARC: 3 el yagi (18mH).
QTH: hilltop location but not too high: 273m asl.



AJ8B: What advice do you have for those of us trying to break pileups to work DX?
HA3NU: I was both sides of the pileups. When we operated from Palestine we had huge pileups, also from Ceuta and Madeira and the other side I worked during decades with modest (little pistol) station and I learned to struggle in pileups. Very important always observe how the DX picks up the stations and try to follow the calling stations in the split. If no split operation try to call the DX a bit up/down from zero beat and call him a bit slower speed as he transmits.



AJ8B: What is your favorite contest?
HA3NU: I love contesting, I participate usually in 30-40 contest per year but I think the best one is the WAEDC contest where you have to receive QTC's which makes the contest difficult and unique.

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Interview with HA3NU (cont.)

AJ8B: Any QSLing hints?
HA3NU: Unfortunately the QSL traffic dropped and sometimes is not easy to get rare cards. I always follow the QSL information of the DXpeditions on QRZ.com or on their webpage. Lot's of them use Online QSL Request that makes things easier.

AJ8B: What coaching/advice would you give new amateurs?
HA3NU: Try to work in the bands as much as possible, this is the base of our hobby and the key for developing your skills. Don't forget to learn the morse code. If you are persistent enough and reach a certain level, morse code will sounds in your ears like music. This is a fantastic mode and a heritage of our HAM ancestors.

AJ8B: If I were to stop by for a visit, what local place would you want us to visit?
HA3NU: Our capital Budapest is beautiful and offers many cultural and entertainment possibilities.

AJ8B: What local food would you want me to try?
HA3NU: Hungary has famous cuisine, there are some special foods that are well known around the globe eg. goulash, stuffed cabbage, stews, fish soup.

AJ8B: Thanks for taking the time to answer my questions. Is there anything you would like to share with us?
HA3NU: I like WRTC events I participated in 2000 as competitor then regularly as referee. Contest operations abroad: Z38N, ED9M, ED9Z, CR3DX. Beside contesting I like DX hunting, mostly on CW and SSB. I'm owner of DXCC HR, 5BWAZ (200 zones), RDA HR and many other awards.

Since 1971 I've been member of our local radio club HA3KNA and since 2000 I've been the leader of it.

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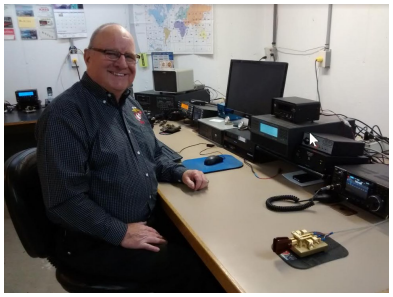

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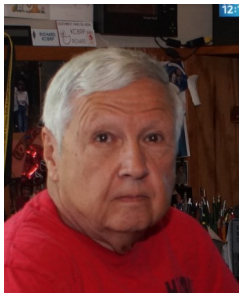

SWODXA Station
TrusteeW8EX

—

KC8RP—Richard Pestinger
rpestinger@gmail.com

SouthWest Ohio DX Association (SWODXA)
Club Fact Sheet

Who We Are: *SWODXA* is comprised of active DX'ers and contesters with a deep passion for all aspects of Amateur Radio. We welcome everyone who is interested in joining our club to please contact us. *SWODXA* members are active in all facets of DX and Contesting. We also travel to, and fund various DXpeditions all over the world. *SWODXA* sponsors the annual DX Dinner held on the Friday evening of Hamvention weekend in Dayton, Ohio. In addition, *SWODXA* members moderate the Hamvention DX Forum and host the *W8DXCC DX Convention*. *SWODXA* is proud sponsor of the prestigious *DXPedition of the Year Award*.

DX Donation Policy: The policy supports major DXPeditions that meet our requirements for financial sponsorship. Details are available on the website at: https://www.swodxa.org/dxgrant-application/ and elsewhere in this newsletter

Club History: The Southwest Ohio DX Association (SWODXA) is one of the country's premier amateur radio clubs. Though loosely formed in mid-1977, the club had its first formal organizational meeting in August of 1981 where Frank Schwob, W8OK (sk), was elected our first President. While organized primarily as a DX club, SWODXA members are active in all aspects of our hobby.

Requirements for Membership: We welcome all hams who have an interest in DXing. It doesn't matter whether you're a newcomer, or an old-timer to DXing; everyone is welcome! Visit http://swodxa.org/member.htm

Meetings: The club meets on the second Thursday of each month at Hunter Pizzeria in Franklin, OH, and virtually via ZOOM. Members gather early in the private room for dinner and then a short business agenda at 6:30 PM, followed by a program. If you enjoy a night out on the town with friends, you'll enjoy this get together. Meeting attendance is NOT a requirement for membership.

Club Officers: Four presiding officers and the past president (or past VP) make up the Board of Directors The current roster of officers are: Pat President Tom Inglin, NR8Z, President Bill Salyers, AJ8B; Vice President Kevin Jones, W8KJ; Secretary Mindi Jones, KC8CKW, and Treasurer Mike Suhar, W8RKO.

Website: We maintain websites at www.swodxa.org and www.swodxaevents.org managed by Bill, AJ8B. These sites provide information about a variety of subjects related to the club and DXing.

SouthWest Ohio DX Association (SWODXA) DX Donation Policy

The mission of SWODXA is to support DXing and major DXpeditions by providing funding. A funding request from the organizers of a planned DXPedition should be directed to the DX committee by filling out an online funding request. (https://www.swodxa.org/dx-grant-application/)

The DX Grant committee will determine how well the DXPedition plans meet key considerations (see below). If the DX Grant committee recommends supporting the DXPedition in question, a recommended funding amount is determined based on the criteria below. The chairman of the committee will make a recommendation at the general meeting on the donation.

Factors Affecting a DXPedition Funding Request Approval

DXPedition destination	Website with logos of club sponsors
Ranking on the Clublog Most Wanted Survey	QSLs with logos of club sponsors
Online logs and pilot stations	Logistics and transportation costs
Number of operators and their credentials	Number of stations on the air
LoTW log submissions	Bands, modes and duration of operation

H40GC	H44GC	ZL9HR	XX9D	HK0NA	FT4TA
KH1/KH7Z	EP2A	FT5ZM	C21GC	VK9WA	NH8S
K4M	CY9C	VK9MA	PT0S	FT4JA	YJ0X
6O6O	VP6D	TO4E	XR0ZR	VP8STI	VP8SGI
W1AW/KH8	K1N	3D2C	VK0EK	S21ZBB	E30FB
ST0RY	TI9/3Z9DX	VK9MT	K5P	9U4M	TX3X
VU7AB	3Y0Z	3C0L	TX7EU	CE0Z	3C1L
TI9A	3D2CR	3B7A	K9W	VU7RI	6O7O
C21WW	CE0Z	T30GC	T30L	D68CCC	W8KKF/WP5
K5D	3Y0J	T33A	3Y0J	CY9C	