NVARC
Nashoba Valley
Amateur Radio Club

SIGNAL

A club since 1992
Since 1993

de N1NC January 2022 Volume 31 Number 1

In this Issue

NVARC Monthly Meetings

NVARC general meetings are scheduled for the third Thursday of the month at 2430 UTC (7:30pm, Eastern Time). Meetings are held at the Pepperell Community center.

This Month's Meeting

The January NVARC meeting will consist of our annual "Member's Short Subjects" Night, which will be filmed live, AND live-streamed via Zoom.

Next Month's Meeting

Les, N1SV, will speak at the February NVARC meeting on 6- and 2-meter Meteor Scatter.

The President's Corner

***de* Bruce, K1BG**

This month, NVARC will return to offering in-person Technician level licensing classes.

Classes will be held on Mondays and Wednesdays for four weeks beginning on January 31st at the Pepperell Community Center.

More information can be found elsewhere in this edition of the Signal.

Why are classes so important?

Have YOU benefited from Amateur Radio as I have? I'd like to see a new generation of hams enjoy those benefits as we have.

It's important to bring new people into amateur radio, not just for the health of NVARC, but for the health of the Amateur Radio Service overall.

Promoting Amateur Radio, the public service that we do, and the fun that we have, is important on a local level.

New blood, with fresh ideas and new energy, is important to having a vibrant club. Vibrant clubs have a number of things in common, one of which is a focus on bringing new people into Amateur Radio (and their clubs). Running classes is a great way to do this.

Soooo, I'm asking for YOUR help with these classes.

The format chosen for the classes is very simple and easy to understand.

To help out, please plan on attending one (or several!) sessions and lend your support by answering questions, sharing your experiences, and mentoring the students. You will be glad you did.

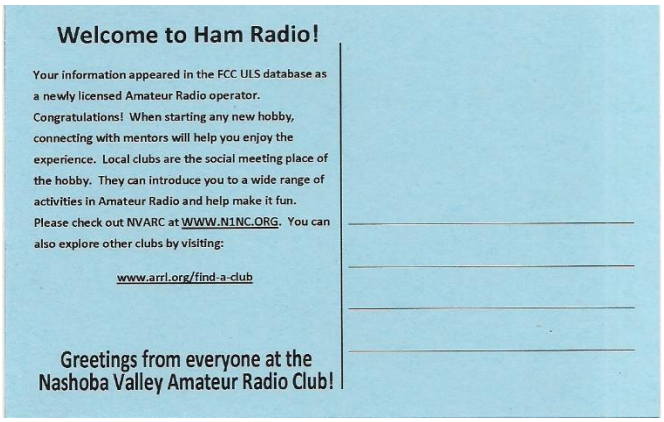
Please let me know that you'd like to help, and I'll fill you in further.

The Billerica ARC started a program to attract new hams to their club meetings, and it has been quite successful for them.

They do this by sending what looks like a QSL card to the new ham extolling the virtues of their club and Amateur Radio in general.

NVARC has borrowed this idea: our first cards went out this month. We'll see how the program goes.

Here's the layout of our "Welcome" card:



I'm looking for a volunteer to take over this program. I estimate one-to-two cards per month, which isn't a major time commitment! Let me know if you are interested.

Fred Kemmerer, AB1OC, is now our new ARRL director for New England. CONGRATULATOINS FRED!

Fred held his first "cabinet meeting" on January 8th. These cabinet meetings have traditionally been held just before ARRL board meetings to get input from the membership on a local level.

It was a great first meeting, with feedback from the last board meeting, reports from section managers, and an open mic session from those in attendance.

Finally, this month's NVARC meeting program is "Member's Short Subjects" Night.

This is your opportunity to talk about anything you would like, in around 15 minutes (OK, if you are long winded like I am, sometimes they go a little longer, but try to keep it to around 15 minutes!).

This meeting will be "simulcast", meaning we will have both a live-in-person meeting and a Zoom meeting. So, feel free to present either in person or via Zoom.

February 10 – 13 is the annual HamCation® in Orlando Florida, which this year is also the ARRL National Convention.

A number of club members have attended this in the past, and may do so this year.

February 12 – 18th is the School Club Roundup, and they are always looking for US to have a chat with. February 19th and 20th is the ARRL DX CW contest, one of my favorites.

See you at the February meeting and/or the tech classes.

-*de* Bruce, K1BG

Transatlantic Test 100th Anniversary History is Made Again
***de* Phil, W1PJE**

Part 1

Introduction

In December 2021, amateur radio reached a large milestone: 100 years since the dawn of transatlantic shortwave communication, all done by hams. The importance of the December 1921 Transatlantic Test between the US and UK (actually the 2nd; the first in February 1921 failed) cannot be overstated.

Amateur success during this series of experiments near 160 meter wavelength flung the door wide for reliable shortwave communications on "200 meters and down" (to borrow a phrase from the title of the perennial Clinton Desoto book), defying the commercial wisdom about the useless nature of those bands for long haul contacts and communication.

Overnight, it rendered effectively obsolete the large commercial high-power longer wave broadcast stations near e.g. 500 kHz carrying heavy traffic, using a shortwave station with construction cost at least 1000 times smaller. And this was even a couple years BEFORE Kennelly (US) and Heaviside (UK)'s concept of an ionospheric refracting layer for long distance HF skip communi-

cation was conclusively verified by Sir Edward Appleton in 1924!

The pioneers who made this possible were at the top of the radio game, and handily put to rest any initial assumption that the work was of lesser quality due to its volunteer status.

"ARRL's Successful Overseas Listener" Paul Godley (a NJ resident) was arguably the best US amateur and one of the top in the world at that time.

He was sent to Europe as an "adjunct" to the British listening team, but ended up being the key to success.

Godley had the best equipment possible for both transmission and reception, and was a receiver designer himself. His nine-tube receiver employed the latest Armstrong superheterodyne technology, which he modified for the frequencies used. Major Edwin Armstrong himself participated in the US side of the tests at the powerful 1BCG station in Greenwich, CT, along with other pivotal people in the Radio Club of America (RCA) - Milton Cronkhite (also owner of the land), George Burghard, Ernest Amy, and others. Godley was also helped greatly by a chance encounter with Dr. Harold Beverage - employed by a different RCA: Radio Corporation of America - on the ship passage from New York to the UK.

Beverage made a convincing case to use his eponymous, far superior, and newly developed traveling wave antenna for reception, rather than the meager vertical antenna that Godley was planning to use on 160 meters[1].

Volunteer Work Makes History

Amy and Burghard, two of the US team, later wrote: "…let us add that [1BCG, the CT station] was built and operated as a strictly non-commercial venture. The six of us couldn't resist the challenge to further our knowledge of the mysteries of radio and help blaze a new trail through the then scientific wilderness of long-distance shortwave radio communication"[2].

Subsequent to these tests, which proved the viability of shorter wave paths for transcontinental work, Armstrong and others in the RCA and elsewhere across the amateur spectrum went on to perfect super-regenerative and superheterodyne receiver architectures, and later frequency modulation schemes, forming the bedrock of modern life in the 20th and 21st century.

As a recent RCA publication notes:

> "Other inventors over the next 100 years worked on ever higher frequency equipment, perfected antenna technology, smaller and eventually miniature circuits, and perfected improved techniques for sending both voice and data transmissions. These tests set the table for many later technological developments in radio that are still applied in international government broadcasting and by private domestic stations, air traffic control, utility stations not intended for the general public, amateur radio, time-signal and radio clock stations, … clandestine and numbers stations, unlicensed two way radio activity, pirate radio broadcasting, over-the-horizon radar, and ionospheric heaters used for scientific experimentation."[3].

Some Wild Facts about the Test

Interesting facts about the test abound[4]. The test was supposed to take place in London, and Marconi himself was at the reception for Godley, professing that he too was an amateur in these matters (!).

However, people had created too much QRM in the urban area with homemade "wide as a barn door" spark transmitters constructed, e.g. from door buzzers, so Godley packed up and went to rural Ardrossen, Scotland - southwest of Glasgow on the coast - in miserable December weather, using a marginal 14' x 18' canvas tent for several all-night attempts. I can only imagine the fortitude required[5].

[1] H. Beverage, The Wave Antenna, A New Type of Highly Directive Antenna, Proceedings of the AIEE, February 1923.

[2] The Story of the First Trans-Atlantic Short Wave Message, 1BCG Special Issue: Proceedings of the Radio Club of America, Oct. 1950. https://worldradiohistory.com/Archive-Radio-Club-of-America/Radio-Club-of-America-1950-10.pdf

[3] Radio Club of America, Fall 2021 Proceedings. https://issuu.com/designertp/docs/rca_2021_proceedings_fall_web

[4] For a brief and excellent summary of interesting Transatlantic Test anecdotes from expert historian Clark Burgard, N1BCG, (note the call sign!), see ARRL'S "Eclectic Tech" podcast, episode 48. http://www.arrl.org/files/file/EclecticTech/2021/Episode%2048.mp3

[5] Check out the Google Map for Androssen's location: https://www.google.com/maps/place/Ardrossan,+UK/@55.6773448,-

On one of the first nights, a clearly heard signal was spark station 1AAW, but no one has ever found out exactly who that was, so it "didn't count" and is listed as an "Illegal Station" on the QST cover commemorating the event.

Under normal procedure, stations were given a 5 digit code to send back to verify the contact.

Codes were sealed in an envelope within a safe at Newington to thwart any cheating on the test. However, 1AAW sent its call sign instead and then vanished.

One wonders: who would go to all the effort required in those early radio days but not follow through, ending up as a "bootleg" station for history? We will likely never know.

The intense non-amateur interest in these results was evident in the commercial world as well.

Word of each night's session was sent back to the US by daily 30 minute MW transmissions in "slow code" using 100% donated time on the incredibly expensive 10+ kW commercial traffic stations maintained by Marconi Company, RCA, and others.

The normal paper tape fed high speed automatic messages were suspended, and so was their revenue generation, so a straight key operator could send the reports. The aggregate cost per minute (or per second!) of this time cannot be overstated.

We are fortunate indeed that much extensive material is available beyond these items on the events and history of the 1921 Test. A good place to start is the Fall 2021 RCA centennial proceedings just quoted, which contains previous articles and links to information including excellent oral histories by the participants themselves written in 1950[3].

9.2917106,6z/data=!4m5!3m4!1s0x4889c58fcb71cbf1:0xb0335f00d7b4a326!8m2!3d55.643889!4d-4.81182

Part 2

The 100th Anniversary: Plans

As Frank Donovan W3LPL recounted in an earlier NVARC presentation this past year, extensive plans were laid to actively celebrate this 100th anniversary milestone. These included:

- A 160-meter transatlantic centenary QSO Party co-sponsored by ARRL and RSGB on December 12, 2021 (0200 - 0800 UTC), operating GB2ZE from Scotland and W1AW from Connecticut;
- Transmission near 1.820 MHz on the night of the anniversary, December 11, using a replica of the original 1921 vintage 1BCG transmitter hardware, and originating from the Vintage Radio and Communications Museum of Connecticut;
- Centennial re-enactment by RCA sponsored station W2RCA at the exact time of the original successful message, 0252 UTC on December 12, 2021, at 1825 kHz and 12 WPM CW. This added a new message after an exact copy transmit of the 1BCG message text successfully received in 1921 by Godley in Scotland.

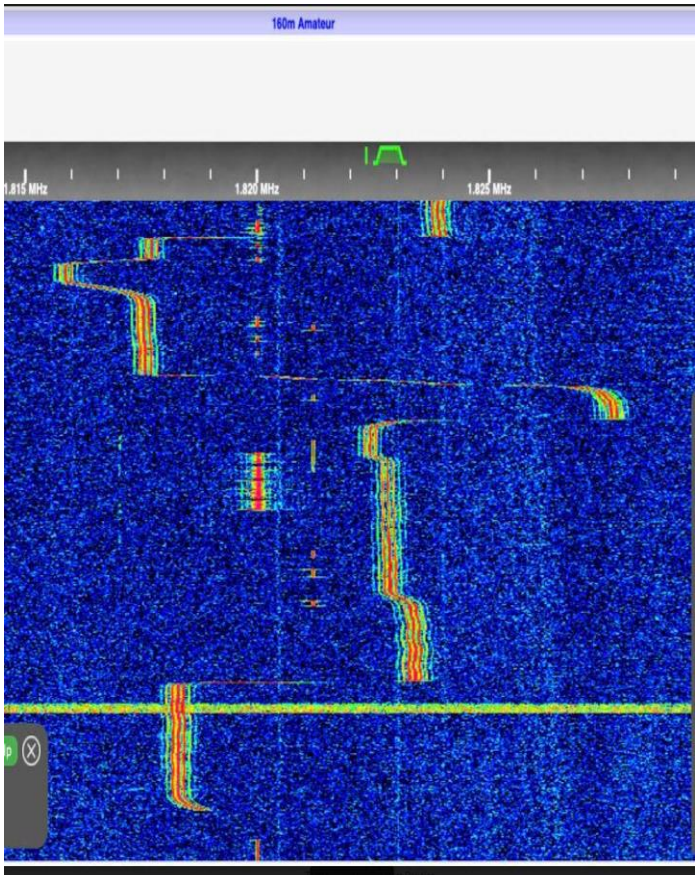
The 100th Anniversary, As Heard at Grid FN42dk

At my QTH, I focused on the 1BCG replica transmission as well as the W2RCA re-enactment as reachable listening goals on my compromise 20/40/80-meter fan dipole, using a KiwiSDR[6] to make audio recordings of what I heard. These proved to be good choices, for the 100th anniversary echoed the original one in technical challenges for the field teams.

W2AN/1BCG

I tuned in shortly before the first 1BCG transmission at 2300 UTC and set the frequency to the published 1.820 MHz. I was immediately greeted by an interesting waterfall spectrum that showed the transmitter tuning up, but gyrating all over the place over many kHz as the team struggled to tame the transmitter itself. Note as well how 'wide' the signal was in a local/narrowband sense. Not quite comparable with today's pure and phase-locked oscillators, but certainly better than spark!

[6] See http://kiwiSDR.com/



Finally, the transmission started and successfully ran to completion. Later, I used the audio recording playback to decode the message:

> … W2AN/1BCG W2AN/1BCG W2AN/1BCG V V V W2AN/1BCG SENDS GREETINGS VIA THE ANTIQUE WIRELESS ASSN AND THE VINTAGE RADIO COMMUNICATIONS MUSEUM OF CT TO LISTENERS NNNN …

This transmission was followed by a number of appreciative “dit dit” echoes from what sounded like dozens of listening 160 meter stations.

I note as well that earlier in the day, 1BCG was visited by Bruce Godley Littlefield, a direct descendant of Paul Godley, who brought Godley’s original 1921 logbook open to the exact page where the 1BCG message was copied in Scotland. Certainly historic!

My recording of the audio note was full of “character”: lots of 'whooping'.

Pete N6QW sent me a message that guessed there was a huge amount of ripple on the DC (reminding him of 1957 era transmitters with 55 volt variations!) causing a lot of transmitter ripple/hum to happen, as was typical of the era.

Ward N0AX also pointed out that the "chowpy chow-pit" sound (his description) of 1BCG could have come from poor voltage regulation in the power supply, but more likely from changing capacitance in the tubes as current varied, changing loading on the oscillator circuit.

This is similar to the Miller effect in solid state junctions, multiplying the effective capacitance of a transistor's base-emitter or gate-source junction as the device began to conduct current, thus changing the oscillator tuning. (Those who have played with 1920s era self-excited Hartley designs know that this sensitivity can be so extreme that rapping on the tabletop or having the antenna move in the breeze can also cause severe chirping.)

My recording was highlighted on the SolderSmoke blog hosted by Bill, N2CQR, and Pete, N6QW, and can be listened to there[7].

It turns out I was fortuitous in picking the first transmission attempt, for troubles abounded after that point and eventually the oscillator RF choke failed.

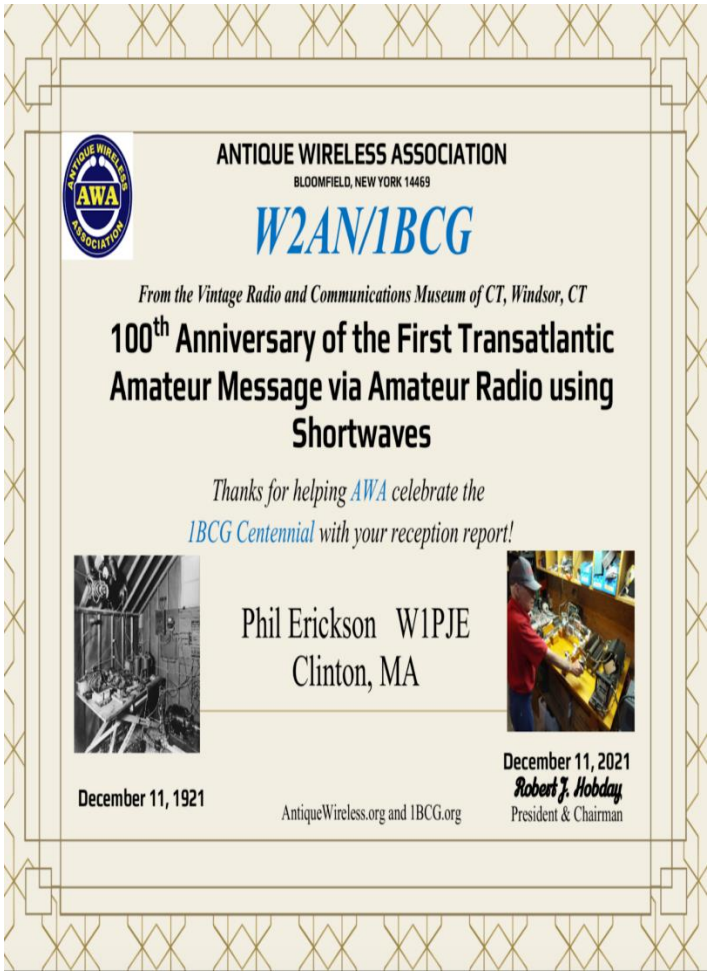
All these problems dashed their hopes of transmitting every 15 minutes[8].

Frank, W3LPL, reported that the crew later got the transmitter back on the air but ended up way down at 1809 kHz just inside the normal 160-meter band: “I hope the FCC was not listening too hard”.

One successful overseas reception report was received from Ipswich in Suffolk, UK. The 1BCG crew kindly acknowledged my successful reception (one of 55 to date) with a nice certificate.

[7] See https://soldersmoke.blogspot.com/2022/01/1bcg-100th-anniversary-of-trans.html

[8] A detailed account of the 1BCG adventure can be found at http://1bcg.org/1BCG/. “... an exploding glass fuse sounds just like a gun shot and had the crowd ducking..”



W2RCA

I completed the anniversary later that evening by successfully receiving the W2RCA replica transmission and 21st century addition/tag at the time of the original reception, 0235 UTC on December 12th - 2135 local time on December 11th.

The message was sent by RCA president John Facella, K9FJ, using a straight key and a good fist, with modern equipment from Tom Frenaye, K1KI, and operating from what I believe is Tom's home QTH in West Suffield, CT.

Chip Cohen, W1YW, RCA vice president, was also present and assisting near the operating console.

The use of modern equipment avoided the earlier 1BCG woes, and W2RCA successfully transmitted the 1921 message while adding a new one of their own. Again, employing the recording technique from the earlier 1BCG try and rewinding a lot, I was able to get most of the text copied right. It read:

NR 1 DE 1BCG W12 NEW YORK DATE 11/12 21

TO PAUL GODLEY ARDROSSAN SCOTLAND

HEARTY CONGRATULATIONS

BURGHARD INMAN GRINAN ARMSTRONG AMY CRONKHITE

BT BT

BEST WISHES TO ALL FROM THE RADIO CLUB OF AMERICA

FOR THE NEXT 100 YEARS OF WIRELESS PROGRESS

AR

73 73 DE W2RCA W2RCA W2RCA

QRT CL

Across the 'pond', this centenary message was successfully copied by Scottish amateur club GB2ZE in Ardrossan, stationed in a parking lot about 100 yards away from Godley's original site right on the ocean.

However, reception was reported to be very difficult - and it was nearly 0300 local time with precipitation going on!

In a modern twist, just before the event, I obtained the link to a live Zoom feed hosted by W3LPL and Tim Duffy, K3LR. I was able to view not only the W2RCA site during the transmission, but also the cold, wet, yet exhilarated Scottish crew at the seaside in the dead of night.

Later on, W3LPL reported that GB2ZE was able to have more reliable success working many hams stateside using much better equipped home stations from various Scottish DXers.

In fact, 160 meters stayed open for transcontinental QSOs for most of the evening - not always a sure thing.

Perhaps the Radio Gods were having their own proper celebration after messing with 1BCG earlier!

Conclusion

In the end, I had great fun and was very glad to serve as one of the "stateside listeners" (mirroring Godley's "overseas listener") to this historic and appropriately energetic celebration of a true milestone in the radio art. I hope that NVARC readers enjoyed coming along for the ride.

de Phil, W1PJE

NVARC YouTube Channel Content Needed!

If anyone has old (or new) Ham Radio related videos or electronic projects, and would like to have them edited and put on our YouTube channel, please contact Jim, N8VIM.

The History of Entry-Level Licensing Part 4

de Bruce, K1BG

Last month, I ended with the creation of the Novice license in July of 1951.

When getting a license in the early 1950's, one typically purchased a copy of the "Radio Amateur's License Manual", published by the ARRL. The FCC provided (and published) the questions contained in the license manual, and the league answered those FCC questions[9]. This is what was in the old license manuals – a series of questions and answers.

The first license manual with a section for the Novice license had 28 total questions and answers!

The multiple-choice novice exam consisted of 20 questions based on these 28.

It was considered (and still is) a VERY easy test, similar to that given prior to 1917.

When the Novice was first introduced, you had to visit an FCC office to take the Novice exam, but this changed in 1954 when the exam could be administered by a General or higher class licensee by mail[10].

Between 1951 and 1968, the questions (and answers) grew from 28 to 34 questions. An extra question was added now and then, but for the most part the questions were very easy. The questions would also change slightly – for instance – when novices were given 40-meter privileges, the question on frequency privileges was modified to reflect this change.

In the mid 60's, numerous "incentive licensing" proposals were made by the ARRL and others. The purpose of these were to "improve standards" within the amateur ranks. The FCC combined these proposals into their own Incentive Licensing proposal, which would result in major changes to amateur radio.

The FCC proposed changes to the Novice license at the same time – Increasing the license term from one to two years, and eliminating 2 meter phone privileges[11].

It was felt at the FCC that too many Novices were upgrading from Novice to Technician class license because their code proficiency had not increased to the 13 word-per-minute requirement of the General class license. Perhaps one year was not enough time for this?

The Technician class was not considered a "stepping stone" because the only difference between Technician and General class was (at the time) a difference in the code speed requirement (Technician was 5 words-per-minute, just like the Novice).

The FCC also felt that giving Novices 2 meter phone privileges distracted them from the goal of becoming code proficient. Thus, the changes in the rules.

However, along with the rule changes, the number of questions the FCC provided from 34 to 50![12][4], [13].

While the Novice exam based on the 34 questions in the license manual was working extraordinarily well, it was deemed that adding questions was appropriate given the extra year that the Novice was valid. [In my opinion, this was the very beginning of the demise of the Novice license.]

As a side note, I was one of the first Novices with a two year license. I took the exam based on the 50 questions. My very first contact was on two

[9] https://worldradiohistory.com/Archive-DX/QST/50s/QST-1951-06.pdf, pages 42-46, 114.

[10] https://worldradiohistory.com/Archive-DX/QST/50s/QST-1954-05.pdf, page 50 – 51.

[11] https://worldradiohistory.com/Archive-DX/QST/60s/QST-1965-05.pdf, page 47.

[12] https://worldradiohistory.com/Archive-DX/QST/60s/QST-1966-09.pdf, pages 75 – 77.

[13] https://worldradiohistory.com/Archive-DX/QST/60s/QST-1967-07.pdf, page 73.

meter AM the first week I was licensed. I lost those privileges about a week later, and never made another phone contact as a novice.

In 1972, the FCC decided to allow Novices the use of VFOs (Variable Frequency Oscillators).

Up until then, a transmitter's frequency was required to by crystal controlled (i.e., fixed to the frequency of the crystal being used). I can find no specific reason for doing this.

Also in 1972, the novice 40 meter sub-band was moved from 7150 – 7200 kHz to 7100 – 7150. This was to accommodate an expansion of the phone band down to 7150 kHz. Crystals, however, were considered affordable, and the move was not considered to be a hardship for novices. This is an area where I want to do more research.

In 1973, the list of questions provided by the FCC was completely re-written for novices. No reason was given for it, but my suspicion is that allowing VFO operation would call for ratcheting up the standards!

The league was so concerned by this that the "It Seems To Us…" June 1973 QST editorial is dedicated to just this. "It would appear that the Novice requirements have been upgraded… a notch." "The status of the Novice exam is of particular concern". The belief was that the Novice written exam is now at a "more complicated level"[14].

In the next installment, the bombshell proposals in FCC docket 20282, dramatic changes to the Novice license, and the beginning of declining numbers of youth coming into amateur radio.

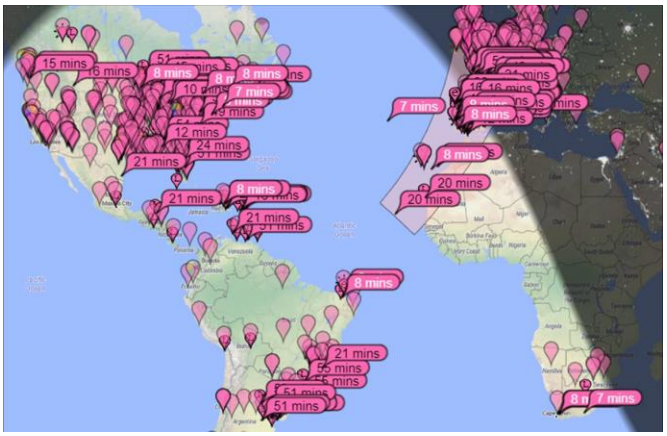
de Bruce, K1BG

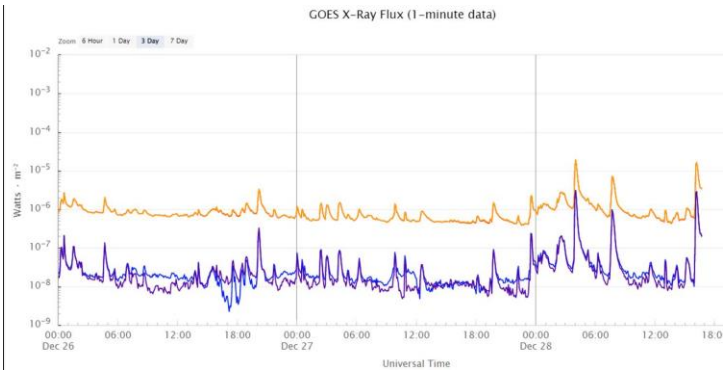
10 Meters id HOT!!
de Joe, KYOW

I am finding it interesting that so far this Winter (Dec 2021) that there has been very little 6M Es, yet 10M has been open almost every day. For one thing, we here in New England have not had any major storms nor any deep jet stream dips riding up our way, so the usual pattern of Es on the Eastern side of strong Winter jet streams has not been there.

But, maybe somewhat like geomagnetic storms also disrupt the Winter Es happenings, we have been seeing more active sun spot groups creating C and M class flares, with the M class flares causing short R1 blackouts. The more active sun seems to be boosting conditions nicely on 10M for world-wide communications that travels with the sun on daylight paths.

Attached are two charts: PSK Reporter 10M for the morning of Dec 28 2021 and the last few days of XRAY flux. On 10M I am running around 90W into an OCF dipole not too high up using FT8, so nothing fancy.





Good 10M DXing to all.

de Joe, K1YOW

[14] https://worldradiohistory.com/Archive-DX/QST/60s/QST-1973-06.pdf, page 9.

Have **YOU** paid your NVARC Dues? See:
http://n1nc.org/Members/Roster
for your renewal month.

Treasurer's Report

Income for December was $15 in membership renewals. Expenses were $58.43 for video editing software and $69.81 for the QSL sort refreshments, leaving a net expense of $113.24 for the month.

Current balances:

General fund	$2,454.65
Community fund	$6,628.25

As of 6 January we have 37 members who are current with their dues and 37 renewals outstanding.

Renewal months are in the member list on www.n1nc.org in the Member's area; check yours at https://www.n1nc.org/Members/Roster.

Thank you to those of you who mail your renewals or use PayPal without a reminder.

To pay membership dues via PayPal see the instructions at http://n1nc.org/Members/dues.

If you are joining ARRL or renewing your membership please consider letting Ralph send in the paperwork for you. The Club will buy the stamp and will get a commission from ARRL. As a Special Service Club, the ARRL expects a majority of Club members to also be ARRL members. Contact Ralph for further information if you need it.

de Ralph, KD1SM

Board Meeting January 6, 2022

Board Meeting started at 7:30pm

Attendees:

Bruce, K1BG,	Jim, N8VIM,
John, K1JEB,	Ralph, KD1SM,
Jim, AB1WQ,	George, KB1HFT

Current balances are: General Fund $2,454.65 and Community Fund $6,628.25. Expenses were $58.43 for video editing software and $69.81 for the QSL Card Sort refreshments. There are 37 renewals outstanding.

USPS PO Box now costs $188/yr.

Publicity report from George is: 3 Signal reports left over at Electronics Plus and 10 new reports dropped off. 3 copies were remaining at HRO and 15 new copies were dropped off.

New Ham QSL cards will go out this week.

January is short subjects night. Each person has 15 minutes to cover a subject.

Jim, N8VIM, would like an assistant to help manage the camera placement for hybrid meetings while he focuses on managing the Zoom call.

AA1VX Downsizing Donation: no new progress made.

Bruce had the Monday night repeater meeting members try out Paul's, WB1EWS, repeater in Fitchburg, however the repeater had shut down. Paul will be checking out the repeater and try to get it back up.

The License Classes:
Several methods are being used to push notices for this class and as a result several people have signed up already.

The class announcement will be posted on the Club Web Page. The Community center is all set up.

Bruce has requested for volunteers to help with this class.

A proposal was introduced to offer free one year membership for those that complete the License Class. There was general support for this proposal among the Board who were present and a rec-

ommendation that Bruce take this to a general meeting for resolution.

Saturday breakfast had 2 people attend last Saturday (New Year's Day).

Attendance is generally steady at 10 people give or take.

The CW Help Group has been meeting and Jim and Bob from NVARC have been attending.

New Business:
Who will be attending the NE Region Board meeting was covered.

Bruce wanted to implement a "Visioning" Meeting with Club. He has assigned John, K1JEB, to plan this event. This will help the club at large on what events it wants to focus on. This should be done when as many members can be in attendance.

Discussion concerning the Special Services Club Renewal. It will require someone to fill out the renewal form on the ARRL website. The club secretary will follow up on this.

Thinking Day on The Air is driven by the Girl Scouts to organize the event. We support them with any On-the Air equipment and operation. There has been no request from the Girl Scouts, so there are no plans to participate in 2022.

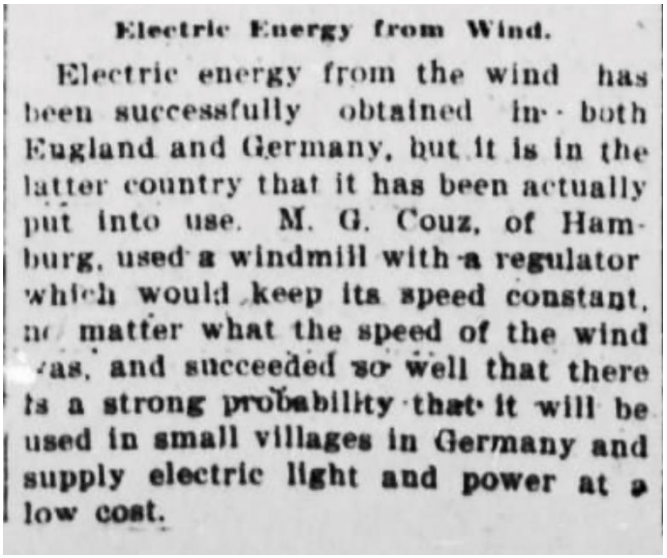
Jim Hein needs assistance in designing and adding Title and End Cards for the Videos that are uploaded to the web. Ralph volunteered to help.

Jim Wilbur mentioned that Mark McLean is interested in a Radio Class.

Meeting ended at 8:52pm

de John, K1JEB

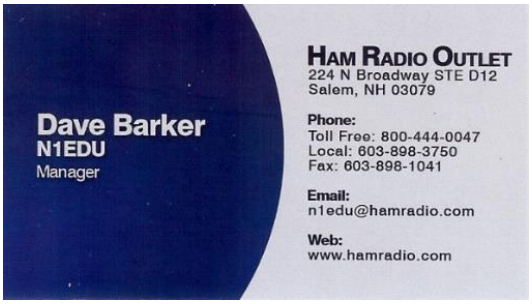
Here's a prescient clipping from The Anadarko Oklahoma Daily Democrat, October 1, 1901:



Electric Energy from Wind.

Electric energy from the wind has been successfully obtained in both England and Germany, but it is in the latter country that it has been actually put into use. M. G. Couz, of Hamburg, used a windmill with a regulator which would keep its speed constant, no matter what the speed of the wind was, and succeeded so well that there is a strong probability that it will be used in small villages in Germany and supply electric light and power at a low cost.

Sponsors



NVARC
Nashoba Valley
Amateur Radio Club
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http://www.n1nc.org/

President: Bruce Blain, K1BG
Vice President: Phil Erickson, W1PJE
Secretary: John Bielefeld, K1JEB
Treasurer: Ralph Swick, KD1SM

Board Members:
Jim Wilber, AB1WQ, 2019-2022
Skip Youngberg, K1NKR, 2020-2023
Jim Hein, N8VIM 2021-2024

Property Master: John Griswold, KK1X
Librarian: Peter Nordberg, N1ZRG
N1NC Trustee: Bruce Blain, K1BG

Join NVARC! Annual membership dues are $15; $20 for a family.

NVARC general meetings are scheduled for the third Thursday of the month at 2330 UTC (7:30pm, Eastern Time). Non-members interested in attending may send an email to meetings@n1nc.org requesting the teleconference details. NVARC thanks Medtronic, Inc for providing the teleconferencing services under their employee volunteer support program for non-profit organizations.

Contact us on the N1MNX repeater.
442.900 (+), 100Hz
147.345 (+), 100 Hz
53.890 (–), 100Hz

This newsletter is published monthly. Submissions, corrections and inquiries should be directed to the newsletter editor: editor@n1nc.org.
Articles and graphics in most PC-compatible formats are OK.

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