Ottawa Amateur Radio Club

Groundwave

P.O. Box 8873, Ottawa, Ontario, Canada, K1G 3J2

December 2019

As is customary, the December meeting is given over to a Christmas Social including a mini-fleamarket and Fox Hunt information. Don't forget the RAC Winter Contest on December 28.

See you at the meeting.

Ian Jeffrey, VE3IGJ
Editor

Merry Christmas to one and all!

Check out our Web Page: ***www.oarc.net***

Next Meeting 7:30 pm, Wednesday, December 11th in the Colonel By Room at Ottawa City Hall

In This Issue....

Ottawa Amateur Radio Club
Groundwave

December 2019

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Articles may be submitted for use in this publication provided that they portray events or activities that promote Amateur Radio. ***Letters*** *and comments are also welcome. Submissions may be made by mail addressed to the Editor care of the OARC, or by e-mail to "ve3igj@rac.ca". Deadline for submissions occurs three days after the regular monthly meeting of the OARC.*

Please support your local radio organisations. They support you!

Club Information

The Ottawa Amateur Radio Club Inc. is an association of Radio Amateurs devoted to the promotion of interest in Amateur Radio communications in the National Capital Area and to the advancement and achievement of club members.

Regular Meetings of the OARC Inc. are held on the second Wednesday of each month (except July and August) in the Colonel By Room which is on the second floor of Ottawa City Hall, formerly Regional Municipality of Ottawa Carleton Headquarters, on Lisgar Street. Meetings commence at approximately 19:30 local. Further details about each meeting are noted elsewhere in this publication.

Executive Meetings of the OARC Inc. are normally held on the first Wednesday of each month at 19:30 local. Contact the President to confirm the date, time and place of the next meeting.

The CAPITAL CITY FM Net meets every Monday (except some holidays) at 20:00 local on the club repeater VE2CRA (146.940-, 100 Hz) to pass traffic and to make announcements of interest to amateurs in the National Capital Region.

The Rubber Boot Net runs week days at 07:30 local on VE3MPC (147.150+, 100 Hz CTCSS tone) hosted by Mike, VA3TJP. The Rubber Boot net has been running since the early 1980's and is popular for the early risers and the go to work crowd.

The POT-HOLE Net is a SSB/HF net sponsored by the Ottawa Valley Mobile Radio Club and is conducted every Sunday at 10:00 hours on 3.760 MHz**.** All amateurs are welcome to check in.

The POT-LID CW Net is an informal slow-speed **CW** net that meets every Sunday, except during July and August, at 11:00 hours on 3.620 MHz, to promote interest in CW and CW procedures.

The QCWA CHAPTER 70 Net meets every Monday evening at 19:30 local on repeater VE3MPC 147.150+, 100 Hz) You do not have to be a QCWA member to participate.

The Ottawa Valley VHF/UHF SSB Net is sponsored by the West Carleton ARC. Look for it every Tuesday night (except the first Tuesday of the month) around 21:00 local on 144.250, (roll calls after net on 50.150, 432.150, 222.150, and 1296.100.) Horizontal polarization is preferred.

The Phoenix Net meets Tuesday evenings at 20:00 local on VE3MPC (147.150+, 100 Hz CTCSS).

The regular **OVMRC net** meets Thursday evenings at 20:00 local on VE3TWO (147.300+, 100 Hz CTCSS tone) analogue FM.

VE3TEN

Tuning in the beacon so that it makes sense requires you tune to **28.175** on **CW** and read the tone that is there . The spaces between the elements are the higher tone. If that doesn't work, tune to **28.175.28** on **lower sideband** for better results.

The Ottawa Amateur Radio Club bulletin "Groundwave" is published and distributed to club members. Publication dates may vary but it is hoped that the bulletin arrives at its destination before the events listed in it have expired. The bulletin is not published for July and August when meetings do not occur. Every effort is made to provide accurate information in the bulletin, however we are all human and mistakes can be made. The OARC accepts no responsibility for any damages that may result from this. The opinions expressed in this bulletin are those of the author.

Voice (VHF) 146.940/146.340 100Hz CTCSS required
(UHF) 443.300/448.300 100Hz CTCSS required

VE3TVA Amateur Fast Scan Television Repeater
Currently off the air and looking for a new home.

IRLP Node 2040 146.940/146.340 (VE2CRA/VE3RC)
(Code 411 for info) (Code 204 for activity)
(Code 88 for time)
For further information please contact the Repeater Chair.

Note: The IRLP link is not connected to ECHOLINK. Please do not try to connect using the alpha keys on your keypad. It just confuses the operator.

Note: The IRLP link is disabled during the Monday night Capital City FM Net from 20:00 to about 21:45 .

Ottawa Amateur Radio Club
Groundwave

December 2019

November Minutes

November 13, 2019

19:35 Meeting started by President Dave VE3BOW

Guests
VE3OWV Nick Shephard (Diefenbunker ARC)
VE3UU Brian Jeffrey (Diefenbunker ARC)
Natasha (friend of Jeffrey VA3PEW)

OARC Volunteer Award Presentation (Greg VE3YTZ, Ed VE3WGO)
Greg and Ed expressed their appreciation to Anna and Mary as Volunteers of the Year. Anna and Mary have been volunteering at the front entrance of the Carp Hamfest for many years, assisting Janice VA3PAX, despite not being members of the club.

RAC Winter Contest (Dave VE3TLY)
December 28, 2019
OARC again has permission to use the radio facilities at the Diefenbunker. Once again, the OARC team will be using the VA3RAC call. Dave and his team is currently working on arranging and erecting antennas at the Diefenbunker site. Dave is looking for volunteers to help both setting up on Friday and during operation on Saturday. If volunteers inform Dave prior to the event, he will put their name on a list which avoids them having to pay the museum entrance fee. A sign-up sheet was circulated to indicate interest in assisting.

Canadian Ski Marathon (Neil VE3PUE)
February 7-9, 2020
Neil has assisted CSM with testing radio coverage across the route which again this year will be from Mont Tremblant to Montebello to Lachute. CSM is contracting with ExelRadio based in Gatineau. They have two digital repeaters with what Neil reports to be fantastic coverage across the route. More info on ham radio participation in the CSM can be found on Neil's website: hambone.ca/csm

2019 Field Day Results (Greg VE3YTZ)
Greg summarized the OARC Field Day results from last June. We came in second in Canada as a 2A station with 4646 points. Greg noted that the top three 2A stations were in eastern Ontario: VE3ORF with 4916 points, VE3RC (OARC) with 4646 points, and VE3JW (OVMRC) with 4032 points. Greg displayed our history over the past dozen years or so. 2019 was second by points since 2002.
For next year's Field Day effort, the club has bought bandpass filters that will hopefully reduce QRM from nearby transmitters. The bandpass filters are based on a design by W3NQN. Diane VA3DB and Bryan VE3ZRK are currently installing the filters into metal boxes and will then verify their specifications and test them for suitability for Field Day.

ARRL CW Award (Mike VE3FFK)
Mike has received a Code Proficiency Certificate for 35wpm from ARRL. Mike has been working on these awards at 5wpm increments for many years.

Membership (Roger)
+ Warned non-renewed members that they would be cut off from our Groundwave newsletter in the near future if they don't renew their memberships.
+ Roger also has PowerPole splitter kits (designed by Wayne VE3CZO) for sale.

(Continued on page 4)

Dates to Remember

2019

Sep. 7	OARC Hamfest
Sep. 14	Radio in the Park
Sep. 30	Membership Renewals Due
Nov. 1	Joe Norton Award Subm. Due
Nov 21-23	Tall Pines Rally
Dec. 28	RAC Winter Contest

2020

Feb. 8-9	Canada Ski Marathon
Apr. 8	Homebrew Night
May 15-17	Dayton Hamvention
Jun. 10	OARC AGM and Elections
Jun. 27-28	Field Day
Jul. 1	RAC Canada Day Contest

Ottawa Amateur Radio Club
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mk's Word

Here's the story of this year's tune up of the antennas we put up for the Diefenbunker (well, actually for the Winter Contest). We went to Walter Baker Park, where the "Radio in the Park" has been held in recent years. After a bit of to and fro, the antenna, a series of inverted vee dipoles with a common feed point went up. They all measured way high in frequency. For example, the nominal 7.1MHz of the 40m dipole was around 8.8 MHz. Obviously the weather was too good to test antennas that day. TLY later figured out that the problem was due to the length being based on insulated wire, while the actual stuff was uninsulated. Another set of wires was cut and fielded. By the way, have you ever tried to measure an 80m dipole in a 10m house? This time the decision was made to try the antenna closer to home, at Hampton Park. The weather was more like traditional antenna weather, with snow on the ground and in the sky. Since the wire was deliberately made long this time, only a final round of trimming was needed - until in a brilliant bit of brain fade, I cut the wrong wire and ended up with a need to splice a few metres of wire back into the 40m dipole. Sigh. Done. Next stop the Bunker. Once again we were back to real antenna weather, with really cold rain, freezing rain and snow. It's gotta work now, and it did. For a while. While it checked out great at the base of the mast, we later found it wasn't so happy when checked at the shack. It turns out this time it was an iffy jumper cable at the point where the coax goes underground near the antenna. I wasn't there for that repair, but I'm guessing it was fun to fix too. So now it works, and WSPR is getting reports from VKs ZLs and DP0GVN picked us up from Antarctica at -20 dB. A mere 14,000 km. I guess we can stop fixing it. I'm really looking forward to the Canada Winter contest. If you aren't coming out to operate, see if you can manage a contact or two with us, especially on 2m and 6m, phone and/or CW. Those are easy contacts, and mean a lot to our final score, to say nothing of the fun factor.

73, CU there,

mk VE3FFK

(Continued from page 3)

Youth on the Air Week in Ohio (Glenn VE3XRA)
Youth 15-25 years old to work together with radio and have a good time. Based on similar activities in Britain and Europe. Glenn is suggesting to encourage young people to attend. RAC is prepared to assist financially.

OVMRC meeting (Norm)
Next wednesday: Featuring Richard Ferch VE3KI: all you wanted to know about FT4 and FT8.

Diefenbunker Cheque Presentation (Greg VE3YTZ)
Greg introduced Nick VE3OVW and Brian VE3UU from the Diefenbunker ARC. Greg summarized discussions between OARC and DARC for the past few years regarding assisting DARC with the cost of a new tower. Nick: The tower project has been proposed for many years. Diefenbunker management was a bit leery about digging holes in the ground, or even using an existing location where a 200 foot tower used to be located. The Diefenbunker Radio Group reformed as a ham radio club to take advantage of RAC insurance. Time and changes in management members has resulted in a more permissive environment. The hole has been dug. The base section of the Trylon Tower is in place and concrete poured. The OARC contribution is $2200. The estimated total cost will be about $5000. The cost of the concrete pour was more than anticipated as the engineering firm insisted on a larger hole than originally planned. MacFarlane Electronics will be directing installation of the rest of the tower. OARC will have priority usage of the tower for radio competitions. DARC encourages OARC members to become registered Diefenbunker museum volunteers so as to use the museum radio gear during regular hours.
A tri-band HF antenna will be mounted on the new tower. There will be many opportunities for volunteers to help out. For example, there is lots of cable work to be done. Nick commented that they are looking for rotator cable.

(Continued on page 5)

(Continued from page 4)
Greg summarized by stating that OARC has been happy to support the Diefenbunker in a cooperative manner that benefits both radio clubs.
Dave VE3BOW: Presented the cheque to Nick and Brian.

OARC Appreciation Plaque to be presented to Barry McLarnon VE3JF (Greg VE3TZ)
Greg described how a plaque for Barry has been sitting in his garage since 1997! The plaque was intended to convey the club's appreciation for the work Barry did in conjunction with the Packet Working Group in the late 80's and 90's. Unfortunately, Barry was unable to make it to the meeting, so the presentation will have to be another day.
Greg described the work of the Packet Working Group of the OARC and their development of several packet TNCs, then displayed some photos he had found of the Packet Working Group showing Robert VE3IDG, Norm VE3LC, Dave VE3KMV, Doug VE3OCU, Marcus VE3MDL, and Ying VA3YH.

December Meeting
Wednesday, December 11.
A reminder that our December meeting is our annual Christmas Party and Social. Also featured is a mini-fleamarket and information on fox hunting. Please bring your spouses and friends!

Show & Tell
+ Arthur VA3BIT: Showed off a single-lever paddle that Mike VE3FFK made and gave
to him. Arthur has already used it to check into the Pot Lid Net for his second time the previous Sunday. Arthur commented that Mike's single-lever paddle seems to have already improved his sending. Arthur passed Mike's single-lever paddle around the room.
+ Glenn VE3XRA: Described a photo of the waterfall from his new IC-7300. A discussion ensued regarding broadband QRM interference.
Norm VE3LC: Suggested Bell's Fibe service (VDSL) is causing broadband interference at the interface between the fibre and copper loop in the home, but probably not what Glenn was describing on 20m.

Feature Presentation
Arthur VA3BIT, Dave VE3TLY and Norm VE3LC described how they have mounted and used ham radios on their bicycles and how they have applied their set-ups to CN Cycle for CHEO and other events. Arthur finished off with a description of how he has installed a Kenwood TM-D710 into his motorcycle. The presentation will be available on OARC's website.

Meeting ended at about 21:39.

Pre-meeting announcements
+ New Ham? Sign up for your free OARC membership!
+ Renew your membership by seeing Roger VA3EGY
+ Nov 22-24: Rally of the Tall Pines in/near Bancroft
+ Dec 11: OARC monthly meeting is a Christmas Social including a mini-fleamarket and Fox Hunt info
+ Dec 28: RAC Winter Contest at the Diefenbunker (during museum open hours during the day; volunteers needed!)
+ Feb 7-9: Canadian Ski Marathon. Details on hambone.ca/csm
+ QTH near Constance Bay? Dave VE3SXY could use help erecting a TV tower and dipole. 613-261-9563

Minutes taken by VA3BIT.

Antenna Effective Aperture

The effective aperture of an antenna is sometimes called its capture area. It is the frontal area from which a receiving antenna extracts energy from passing electromagnetic waves. The effective apertures of most antennas are larger than their physical sizes, which is the fundamental reason that two stacked antennas must be spaced some distance apart to double the amount of energy received. The ratio of the effective aperture to the physical aperture of an antenna is known as its K-factor. Yagi antennas have higher K-factors than most other designs.

The Long Dash

November 5, 1939

It was on this day that Canada's longest running, and shortest radio broadcast began.

It's the official time signal from the National Research Council (NRC) broadcast on the public radio network ever since, with other networks sometime joining in.

The broadcasts last about 30 seconds, although usually much shorter now. Originally with an announcer saying "Now, the National Research Council time signal. The beginning of the long dash following ten seconds of silence indicates exactly one o'clock, Eastern Standard Time, (month) (date) (year)" except the long silence is now gone.

While official time signals had begun as far back as 1923 when astronomers at the Dominion Radio Astrophysical Observatory created a shortwave time signal radio station. Regular daytime transmission began in January. In order to cover Canada in its entirety, the station automatically sent its call sign in Morse code once per hour and pulses were coded to identify the time of day.

The radio call letters CHU were first used for Canadian time transmission on the frequencies 3330 kHz, 7335 (7850 since 2009) kHz and 14670 kHz starting in 1938.

But on this date in 1939 the daily signal was begun on the CBC public broadcaster AM radio network across the country. It now continues its 80 years of uninterrupted broadcasts on CBC radio.

For decades the Dominion Observatory time signal was an important as most people used wind up watches and clocks, and for appointments, train and other schedules, it was important to readjust them to ensure accuracy. This was even more important as Canada had already entered the Second World War, and massive amounts of personnel and materiel were being shipped around the country and internationally.

Initially the scientists at the Dominion Observatory in Ottawa would take astronomical measurements and combine that with a state of the (at the time) pendulum clock and together accuracy was within one second. Since the 1950's a cesium atomic clock has been used, and the service transferred to the National Research Council.

Eventually as electronics began to enter the radio system, the ten seconds of silence had to be done away with as the equipment interpreted the silence as a technical problem and react with backups.

Even though people have digital timepieces, smart devices and other automatically adjusted cell phones, the time signal is such a part of Canadian culture that it's unlikely it would be done away with as "redundant" in the foreseeable future.

Additional information-sources

Government of Canada: Time signal history

CBC: Nov 1/19: Happy 80th to CBC's longest running segment

PostMedia (Ottawa Citizen); T. Spears: May 4/16: Time under attack at the NRC?

WIKI: National Research Council time signal-

From:

https://www.rcinet.ca/en/2019/11/05/canada-history-nov-5-1939-the-national-time-signal-begins/

Artificial intelligence is no match for natural stupidity.

The Silicon Dioxide Solution

How physicist Jean Hoerni built the bridge from the transistor to the integrated circuit

By Michael Riordan

Not plastic bags, nor metal screws, nor cigarette butts. No, the commonest human artifact today is the transistor—invented 60 *[72 now. Ed.]* years ago this month by Bell Labs physicists John Bardeen and Walter Brattain. Millions of these subminiature switches populate computers, cellphones, toys, domestic appliances, and anything else that carries a microchip. Exactly how many transistors are around is hard to know, but several years ago Gordon Moore, a founder of Intel Corp. and author of the famed Moore's Law, made an educated guess: more than 10^{18}—that's one quintillion—transistors are produced annually. "We make more transistors per year than the number of printed characters in all the newspapers, magazines, books, photocopies, and computer printouts," Moore told me recently. "And we sell these transistors for less than the cost of a character in the Sunday New York Times."

Behind the explosive growth that transistor production has seen since 1960 is a major technological achievement. Today, chipmakers essentially print transistors on silicon wafers. It's a manufacturing method rooted in the mechanical printing process originated by Johannes Gutenberg more than 500 years ago—though far more complex, of course. Moore himself played a lead role in developing transistor-fabrication technology during the 1960s when he was research director at Fairchild Semiconductor Corp., in Palo Alto, Calif. But much of the credit for that revolutionary advance belongs to a lesser-known semiconductor pioneer and Fairchild cofounder. The unsung hero of this pivotal chapter in the history of electronics—the invention of the planar transistor—is Jean Hoerni.

A Swiss-born theoretical physicist, Hoerni, along with seven other determined, like-minded rebels—Moore, Robert Noyce, Jay Last, Sheldon Roberts, Eugene Kleiner, Julius Blank, and Victor Grinich ("The Fairchild Eight") —founded Fairchild in 1957. They all contributed, directly or indirectly, to the new technology, but none so much as Hoerni. Fifty years ago, sitting alone in his office, he elaborated a radically new kind of transistor: a more compact, flatter device whose sensitive parts were protected beneath a thin layer of silicon dioxide. Hoerni's brilliant idea, more than any other single factor, allowed the fledgling firm to begin printing transistors on silicon. Planar transistors would prove to be much more reliable and perform far better than other designs, in effect rendering the competition's offerings obsolete.

The planar process also made it easy to interconnect neighboring transistors on a wafer, paving the way to another Fairchild achievement: the first commercial integrated circuits. As other companies realized the great advantages of planar technology and began adopting it on their own production lines, Hoerni's elegant idea helped to establish Silicon Valley as the microelectronics epicenter of the world.

See full article at

https://spectrum.ieee.org/tech-history/silicon-revolution/the-silicon-dioxide-solution?utm_source=techalert&utm_medium=email&utm_campaign=techalert-09-26-19&mkt_tok=eyJpIjoiTUdWaVltUXlaVEl5TlRNdyIsInQiOiJVZjhPUzdhTGRtWlFadEVZanFqZVo1ampSUHlzeDdSZDNkcXpnQW0wK1A0ekhkQXlFeHZHdnNUb1ptWTNGTDZSZUQ2QmJCQklXMmV3S3Y1MVk0Q0pkVzVpbUR5SXgxNVB0blN6UUZzTHRBYlZGMElzMzd5TzB2YWpFZWdJdFU1dSJ9

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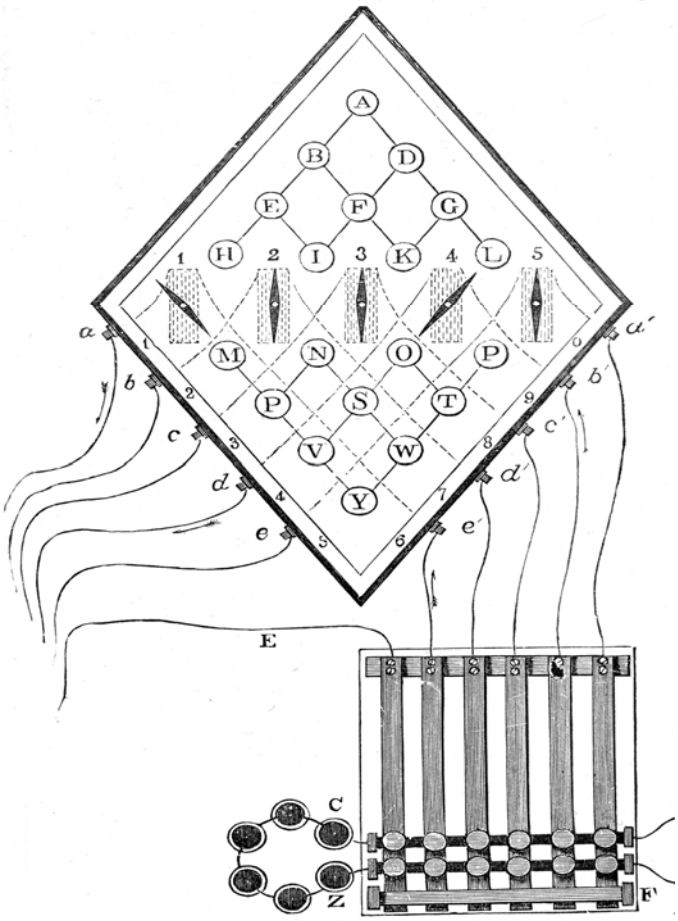
Morse Code's Vanquished Competitor: The Dial Telegraph

Over the years, I've played with interactive telegraph exhibits in science centers and museums. I can tap out the common ••• – – – ••• of the emergency distress signal, and I know the letters H (••••) and E (•), but beyond that, Morse code's patterns of dots and dashes run together in my brain. Stories of telegraph operators who could decipher hundreds of characters a minute still amaze me.

Recently, though, I learned about the needle telegraph. On both the sending and receiving end, the needle or needles would simply point to the desired letter. Finally, a user-friendly telegraph system, provided the user knew how to read.

The first needle telegraph was patented by William Cooke and Charles Wheatstone in Britain in 1837. The design used a set of magnetic needles arranged in a row, with letters of the alphabet arranged above and below them in a diamond grid pattern. Each needle could point left, right, or neutral; to indicate a letter, two needles would point so as to outline a path to that letter. The sending operator controlled the direction of the needles by pressing buttons that closed the circuits for the desired letter combination.

Although any number of needles could be used,



Cooke and Wheatstone recommended five. This combination allowed for 20 possible characters. They omitted the letters C, J, Q, U, X, and Z. Early telegraphs were mainly used for transmitting simple signals, rather than discussion-style communication. For example, to indicate whether a one-way tunnel was clear, an operator might send the short message "wait" or "go ahead." So the absence of a few letters wasn't a huge shortcoming.

Operators needed minimal training to use the system, which their employers appreciated. But the system was otherwise costly to operate because it required a wire for each needle plus an additional return wire that completed the circuit. Maintaining multiple wires proved expensive, and many British railroads adopted a version that used just one needle and two wires. A single-needle system, however, required that operators learn a code to send and receive signals. Gone was the ease of simply reading letters.

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Cooke and Wheatstone must have realized there was room for improvement, because in 1840 they came out with a dial (or ABC) telegraph, whose face displayed all the letters of the alphabet. The operator selected the desired letter by pressing the appropriate button and turning the handle; the needle on the receiver's dial would swing around to point to that letter. However, a dispute between the two inventors kept this version of the telegraph from being commercialized. Only after the 1840 patent had expired did Wheatstone return to the dial telegraph, eventually patenting several improvements.

Meanwhile, the French had been using an optical telegraph system that Claude Chappe developed during the French Revolution. It relied on semaphore signals transmitted along a line of towers. By 1839, Alphonse Foy was in charge of over 1,000 optical-telegraph operators, but he saw the need to investigate the growing development of electric telegraphs. He sent Louis-François Breguet to England to study Cooke and Wheatstone's needle telegraph. The first result was the Foy-Breguet telegraph, which used two needles that mimicked semaphore signals.

Breguet was manager of his family's watchmaking company, Breguet & Fils, and not long after, he developed a dial telegraph that had both the appearance and the working mechanism of a clock [receiver shown at top]. When activated by an electric current from the sender, a spring connected by gears rotated the needle around the dial; an escapement—the toothed-wheel mechanism that in a clock moves the hands forward—kept the needle in place in the absence of a signal.

Breguet divided the face into 26 slots, with an inner ring of numbers and an outer ring of letters. The starting position was at the top, noted by a cross, leaving room for 25 letters. At the end of each word, the needle would return to the starting position. Some versions omitted the letter W; others omitted the letter J.

After French railroads adopted the Breguet telegraph and made it standard equipment, it became known as the French railway telegraph; it remained in use until the end of the century. Breguet's system was also exported to Japan, connecting Tokyo and Yokohama as well as Osaka and Kobe. A new face for the telegraph incorporated Japanese katakana characters.

Of course, even Breguet's dial telegraph was limited in the range of characters it could transmit. Operators of the needle and dial telegraphs had to somehow deal with missing letters—perhaps they just made their best guess based on context, or perhaps companies devised their own codes for specific letters or symbols. Louis-François Breguet couldn't properly transmit the cedilla in his own name, but maybe he accepted it as a limitation of the technology.

As it happens, as early as the 1840s, Friedrich Clemens Gerke, the telegraph inspector for the Hamburg-Cuxhaven line in Germany, was noting similar shortcomings with Morse code. The code, developed by Samuel Morse and Alfred Vail in the United States, was fine for the unaccented English alphabet. To accommodate European languages, Gerke added accented letters; he also significantly revised the patterns of dots and dashes for letters and numbers, making the entire code more efficient to transmit. His version, which became known as Continental Morse Code, spread throughout Europe.

Despite the expanded code's popularity, the International Telegraphic Union took many years to embrace it. In his 2017 book The Chinese Typewriter: A History, Thomas Mullaney describes the slow, conservative evolution of Morse code. In 1865, the ITU settled on a set of standardized symbols that were decidedly Anglocentric. Three years later, it confirmed the standard codes for the 26 letters of the English alphabet, the numerals 0 to 9, plus 16 special characters—mostly punctuation, plus the e-acute, É. In 1875, the ITU elevated É to a standard character and added six more accented letters as special characters: Á, Å, Ä, Ñ, Ö, Ü. It wasn't until 1903 that the ITU accepted these supplemental characters as standard. Languages based on nonalphabetic characters, such as Chinese, were never incorpo-

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rated, although some countries adopted their own telegraphic codes. Thus did the technology of telegraphy connect and also divide the world in new and unexpected ways.

The Breguet telegraph receiver that touched off my inquiries is on display at the Museum of the School of Telecommunication Systems Engineering at the Technical University of Madrid. The museum was started in the 1970s by a small group of professors, who scoured antique shops and flea markets to collect artifacts representing the history of communications. Rather than confining its objects to a dedicated space, the museum maintains exhibit cases in hallways throughout the school, where students, visitors, and others can stumble upon them every day.

I wonder if those who see the Breguet dial telegraph draw connections to modern technology. The set of characters on computer keyboards, for example, vary from place to place and language to language. I remember attending a student conference in Istanbul in 1998 and being unable to access my email. I didn't realize that Turkish keyboards have both a dotless and a dotted i key, and so I kept hitting the wrong one. A few months later I met students in Hamburg who were using American keyboards to do their computer programming. They'd discovered that German keyboards of the era required three keystrokes to make a semicolon, which slowed down their coding.

Such tales are good reminders of the persistence and the fluidity of language, which adapts to new technologies just as new technologies are molded by their users.

By Allison Marsh, associate professor of history at the University of South Carolina and codirector of the university's Ann Johnson Institute for Science, Technology & Society.

An abridged version of this article appears in the September 2018 print issue as "The ABCs of Telegraphy."

Feed-Line Mismatch Mechanical Analogy

If a mechanical wave was induced into one end of an infinite length rope, the wave would propagate down the rope to infinity and would never return. However, imagine what would happen if the far-end of a finite-length rope, for example a 15-meter rope, was attached to a solid object, such as a large tree trunk, and a mechanical wave was induced into the other end by whipping it up and down sinusoidally. Mechanical waves would propagate down the rope just as in the infinite-length case until they reached the tree trunk. If the tree trunk had the same mechanical impedance as the rope, it would move up and down with the rope and no energy would be reflected. However, a large tree trunk is much more difficult to move than rope and therefore has a different mechanical-impedance. The impedance mismatch would cause waves propagating down the rope to reflect back toward the sending end, just as electrical waves reflect back from a transmission-line impedance mismatch.

A police officer called the station on his radio.
"I have an interesting case here. An old lady shot her husband for stepping on the floor she just mopped."
"Have you arrested the woman?"
"Not yet. The floor's still wet."

2019-2020 **OARC Membership Application/Renewal**

Ottawa Amateur Radio Club Inc., Box 8873, Ottawa, ON, K1G 3J2, Canada

◯ Single $25 ($20 after February 1)
◯ Family $30
◯ Junior $15 (under 18 years of age)
◯ New Ham $0 (licensed in current membership year)

◯ Emailed Newsletter $0 ◯ Mailed Newsletter $10

Name _____ Phone _____

Callsign(s) _____ Year Licensed _____

☐ Basic ☐ Honours ☐ Advanced ☐ Morse ☐ RAC Member

Email Address _____

Name _____ Phone _____

Callsign(s) _____ Year Licensed _____

☐ Basic ☐ Honours ☐ Advanced ☐ Morse ☐ RAC Member

Email Address _____

Postal Address _____

Membership year is September 1 through August 31. Paying members who are in good standing by the December General Meeting will be eligible for a free one-time name badge. Members who wish to purchase additional replacement badges may do so through the club for $10 each. Ordered badges will be available in January. All prices are listed in Canadian Dollars (CAD).

First Name on badge _____ Callsign on badge _____

First Name on badge _____ Callsign on badge _____

Notes _____