

*North Fulton
Amateur Radio League
NFARL eNEWS*

January 2024

*Over 43 Years Promoting
Service | Friendship | Education | Fun*

www.nfarl.org



Club Meeting Presentation Updates/ Mike Riley, KN4OAK

Our 2024 Club meetings are off to a great start!

Our January 2024 club meeting presentation “**Amateur Radio in Space**” given by Daryl Young K4RGK, turned out to be both informative and entertaining. Thanks Daryl, for the in depth look at operations, events and equipment involved in this aspect of Amateur Radio!

Our February meeting allows us to participate in a hands on learning experience. Steve Randall KO4VW, will be leading a “hands on” workshop to construct common mode chokes. Up to twenty of these toroid assemblies will be put together. The focal point being the winding of the toroid. You can read about the event details in Steve’s article inside this January edition of NFARL eNEWS.

In addition to the Common Mode Choke workshop, we’ll have a couple of “old/scrap” RF equipment items that can be used as teardown projects. If you aren’t interested in the construction, join us in the teardown and salvage!

Join us on February 20, 2024 for our monthly NFARL Club meeting. We’ll be gathering at our regular meeting location; Preston Ridge Community Center, 3655 Preston Ridge Road Suite 100, Alpharetta, GA 30005. The facility's doors will open at 7:00PM. Our meeting will begin at 7:30PM and should conclude by 9:00PM.

The meeting is a Workshop! So, there will be no Zoom broadcast !!

Join us in person at Preston Ridge Community Center!

February is Coming! What Amateur Radio Activities do you have in Mind?

I've always thought of February being that "special sibling" in the family of months. Just a bit different than the other eleven. Characteristics such as "Not as many days", observation of a particular rodent species shadow on the second day of the month, "Winter Vacations" for some folks, occurrence of Mardi Gras (somewhere between 67% and 83% of the time), lack of occurrence of a full moon in North America (once every 19 years), and so on, all help to characterize February as a "special month" when compared to the remainder of the year.

Several Amateur Radio events only occurring in February include the Vermont, Minnesota, British Columbia, North Carolina, and South Carolina QSO Party events. Others are the ARRL School Club Roundup, Mexico RTTY International Contest, 10-10 Int. Winter Contest, (SSB), ARRL International DX Contest, (CW), and PODXS 070 Club Valentine Sprint. Check out the **WA7BNM Contest Calendar** (<https://contestcalendar.com/index.html>) for details.

If contesting doesn't consume your calendar, perhaps you can add time for performing all those antenna maintenance and improvement tasks you've been contemplating. The foliage usually doesn't start to hamper these types of activity in February. You might also mark the Dalton Amateur Radio Club "Dalton Hamfest" on your calendar. In 2024, the event will be held on February 24th. You can get more information at <https://www.qrz.com/db/W4DRC> before you go.

Finally, one thing you ought to consider doing each February is to plan effectively for your March activities. I bet you can identify things that make March "special" as well.

73,

Mike Riley KN4OAK

Lilburn Elementary School ARISS Contact/ Martha Muir, W4MSA

The ARISS contact with Lilburn Elementary School has been scheduled for Wednesday, February 7, 2024. The target contact time is 14:20:57 UTC (9:20:57 EDT). We recommend viewing the event via the YouTube live stream at:

<http://www.youtube.com/channel/UCuI4sKDBpERtEFs9bFrRMFA/live>

The school event begins at 8:45AM. The YouTube link should begin at that point. Using the live stream opportunity will enable room at the school for parents and family of students. If you choose to be present in person at the event, please wear your NFARL apparel and make a reservation by contacting Ms. Katie Leaycraft at the school via email before February 2, 2024. Send Katie an email at: Katherine.Leaycraft@gcpsk12.org with your name, contact information and number of guests in your party.

For those that are interested in listening to the downlink directly, please tune to 145.800MHz.

In addition, a number of NFARL and GARS members will be participating in a STEM Day event following the contact.

The ARISS contact is being sponsored by both GARS and NFARL.

73,

Martha, W4MSA

Common Mode Choke Build / Steve Randall, KO4VW

At our February Club Meeting we will hold a workshop, building a common mode choke. This will be a wideband choke with better than 30 dB choking across the entire Ham HF bands. The boxes and connectors will already be assembled when you arrive at the meeting. This is to facilitate building the toroid during the meeting, as there is a limited amount of time available. We will concentrate on learning how to wind the toroid core and install it in the preassembled box. I printed all the boxes on my 3D printer. The box is fabricated from ASA (acrylonitrile styrene acrylate) high temperature plastic. Each box may have some minor flaws but nothing that will affect operation or construction. All the hardware is stainless steel. The cores we will be using are FT240-31. We will be using silver plated stranded copper wire with 600 volt thin PTFE insulation. The SO-239s are from Max-Gain Systems, Inc. Max-Gain Systems is located in Marietta and they sell these very high quality items at a reasonable price. Figure 1 below shows an example of a finished choke assembly.

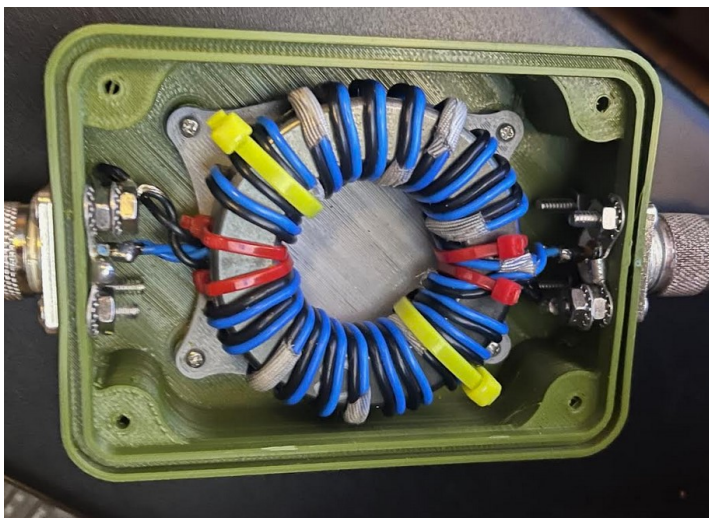


Figure 1: Common Mode Choke example

What will this Common Mode Choke do for me? That depends. It might help you a lot or you might not notice much difference, depending on your situation. This choke can be used at the feedpoint to help prevent the feed line from becoming part of the antenna, and to reduce common mode currents produced by your antenna when transmitting, and help keep your feedline from actually radiating noise. It's also an excellent choke for receive applications, filtering out all kinds of strange noises that are picked up not by your antenna but the coax itself. I have mine located between my radio and my amp. The power handling of this choke will depend on how much common mode you have. This is not a transformer, so the core doesn't heat up just because power is going through it. The only thing that heats the core are the common mode currents we want to get rid of. I've tested mine after the amp with legal limit power and in my system and observed no major heating.

How do you get one of these? The original plan was to build 10 at the meeting. Ten were spoken for before it was even announced so I doubled it to 20, which will be a challenge but with enough help will be ok. As of today, 18 of the 20 are spoken for, with only 2 available. The cost is \$30 in cash at the meeting. You can't buy the parts and build one yourself for that price.

73,

Steve KO4VW

Coaxial-Line Baluns, Ununs and Transformers (Look Ma, No Ferrites!)

In the *Around the Shack* column of December, 2019, I wrote about keeping a station notebook. Last month I wrote about the human interface and “ease of use.” My station notebook is a 3-ring binder. The contents are on paper. It's valuable to flip through the notebook pages in a way I can't do looking at a directory of files.

I was paging through my station notebook recently when I came across a magazine article I'd clipped and saved 43 years ago! It's a two-part article published in *Ham Radio* magazine in February and March, 1980. It's an important article – I have referred back to it many times.



Perhaps a word about *Ham Radio* magazine is in order. If you have not encountered it, it was a technically-oriented magazine begun and edited by Jim Fisk W1HR (sk) from 1968 to 1990. Sadly, Jim died at age 46, in April, 1980, shortly after the article I'm describing this month was published. Others continued the magazine after Jim's untimely death. *Ham Radio* ceased publication and was bought by CQ magazine in 1990. [Note: I received word this month (December, 2023) that CQ is no longer being published – at least for the foreseeable future]. Figure 1 shows the front page of Ham Radio magazine from February, 1980.

Figure 1. The front page of *Ham Radio* magazine, February, 1980. *Ham Radio* was a great resource and is sorely missed.

A nearly complete archive of Ham Radio issues is available here:

https://www.worldradiohistory.com/Ham_Radio.htm

The eulogies for Jim Fisk are in the June, 1980 issue of Ham Radio:

<https://www.worldradiohistory.com/Archive-DX/Ham%20Radio/80s/Ham-Radio-198006.pdf>

Ham Radio was an important publication. How important? It has its own Wikipedia entry. Technically-minded hams are, today, writing articles about technical gems that appeared in its pages over 40 years ago. Ham Radio was and is a treasure-trove of technical information.

I encourage you to randomly select one or two issues from the archive and enjoy flipping the pages. For me, the ads from the 1960s through the late 1980s elicit fond memories. If you weren't around then, the ads will still be interesting; we have come a long way. The articles were superb. The writing was crisp. The contents remain applicable.

Continued on next page—

This month's *Around the Shack* summarizes the article *A new Class of Coaxial-line transformers* by George Badger, W6TC (sk). It was published in two parts in *Ham Radio* magazine, February and March, 1980.

Part 1 can be found here:

<https://www.worldradiohistory.com/Archive-DX/Ham%20Radio/80s/Ham-Radio-198002.pdf>

Part 2 can be found here:

<https://www.worldradiohistory.com/Archive-DX/Ham%20Radio/80s/Ham-Radio-198003.pdf>

The author, George Badger, was a prolific contributor to amateur radio as well as commercial communications companies. Like L.B. Cebik, who I wrote about a few months back, George received an obituary in QST. These are rare – reserved for those who have made significant contributions to the hobby.

Let's get to the article. Part one describes the pros and cons of ferrite-based RF devices. These include baluns, ununs and matching transformers. Matching transformers receive extensive treatment including theory, practical design considerations and measured data.

Antenna matching has been an important subject since the dawn of radio. Its importance has grown over time, driven by the advent of solid-state finals and EFHW (end-fed half-wave) antennas.

Part two gives instructions for making HF and VHF baluns, ununs and transformers, using only coax. The devices are easy to make and perform better than ferrite-based devices. Extensive test data is included. You can head straight to part two if you want to skip the theory and begin making devices. Figure 2 shows a typical high-power high-performance balun made using only coax and a piece of hookup wire.

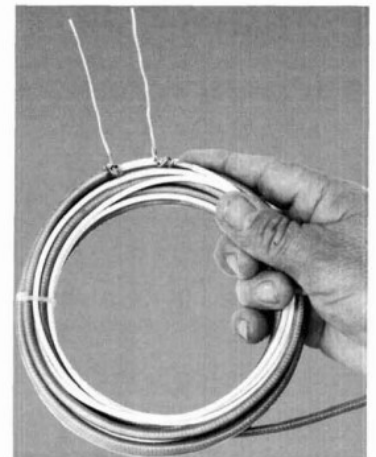


Figure 2

What follows is a summary of the article's key points.

Ferrite cores have their pros and cons. Here are some:

Ferrite Core Baluns, Ununs and Transformers – Pros

- They can be wide-band. One device can cover 1.8 to 30 MHz.
- They can be wound to provide large impedance transformations that are hard to get any other way. EFHW antennas are now available using 49:1 and even 81:1 ferrite-based transformers.
- They are compact for low power applications.
- Performance is good, including low loss, up until certain boundary conditions are exceeded.

Ferrite Core Baluns, Ununs and Transformers – Cons

- Ferrites saturate. When they do they become highly non-linear. Radio and amplifier designers go to great lengths to achieve linearity – only to have that nice clean signal distorted by a balun operating near saturation.
- Ferrite-based devices are sensitive to winding details. They are prone to arcing and break-

down.

- Ferrites are easily destroyed. They are susceptible to excess power, SWR, duty cycle, arcing and voltage breakdown. The damage is permanent. Care to climb the tower to replace one?
- Ferrites can be expensive, particularly those for use at high power.
- Availability can be an issue if home-brewing. You probably don't have the core(s) you need in your junk box.
- Ferrites are heavy. Ferrite baluns add unwelcome weight at the feedpoint of dipoles.
- Ferrites sometimes need to be characterized and that's always a problem. UFOs (unidentified ferrite objects) are commonplace (see below).
- Baluns sold to the amateur community rarely, if ever, come with proper specifications.

A word about UFOs. When I changed QTH last year I reduced my cache of junk-box parts. Out went several pounds of UFOs. Ferrites come in a variety of shapes, sizes and mixes and they are never marked. It's possible, in theory, to wind a few turns of wire around a ferrite core and with test equipment, math and catalogs identify what you have. In my experience this seldom works.

The ARRL's prolific writer Ward Silver, N0AX, and I chatted once about co-authoring a QST article: "How to Identify UFOs." The title was catchy! After some experimenting we abandoned the idea. We could not devise a way the average ham could accomplish the task.

If you use ferrites a lot you will either store them carefully with labels or throw a lot of them away over time. Surplus houses sometimes sell ferrite cores – unmarked of course. At best, those tend to be a waste of money given the UFO effect. Worse is when you convince yourself your UFO will work for your project, to find out later it doesn't.

Here is my summary of the article's two parts:

Part 1. Ham Radio, February, 1980 (7 pages)

- A discussion of the disadvantages of using ferrite as a core material and the advantages of using only coax for the task.
- A discussion of how baluns work.
- Design concepts for coreless baluns and transformers.
- A discussion (with confirming measurements) of how to add a compensating wire to existing ferrite baluns to improve performance.

Part 2. Ham Radio, March, 1980 (11 pages)

Properties of coreless balun transformers:

- They are inexpensive – it's just coax and hook-up wire.
- They are linear including at high power and SWR.
- They use readily available materials: coax, wire and connectors if desired.

Continued on next page—

- They are lightweight and compact.
- They introduce very little SWR and negligible loss.
- They are inherently balanced.
 - Their power handling capability is only limited by the coax used to make them. They are virtually indestructible in amateur service.
 - Unlike ferrite baluns, there are no closely spaced or tightly twisted wires that can arc or break down.

Part two includes detailed instructions for building the following baluns, ununs and transformers:

Input/Output			
Impedance			Bandwidth
Ohms	Ratio	Type	MHz
50/12.5	4:1	Balanced/balanced	1.8-30
50/200	1:4	Balanced/balanced	3.5-30
50/200	1:4	Balanced/balanced	1.8-14
50/50	1:1	Unbalanced/balanced	3.5-30
50/50	1:1	Unbalanced/balanced	1.8-14
50/50	1:1	Unbalanced/balanced	21-100
50/12.5	4:1	Unbalanced/balanced	3.5-30
50/200	1:4	Unbalanced/balanced	3.5-30
50/12.5	4:1	Unbalanced/unbalanced	7-30
50/50	1:1	Unbalanced/unbalanced	3.5-30

Additional notes

The article does not mention avoiding the use of foam-dielectric coax. RG-8/X, RG-213 and other foam dielectric coax only began appearing around the time the article was written. Every design described in the article uses coax wound into a tight coil, some with a diameter as small as two inches. Under strain, the center conductor in foam coax will migrate toward the shield and may eventually short. Heating accelerates this process.

The maximum power handling capability of a ferrite-free device is only limited by the coax itself. Many designs use two or more short lengths of coax in parallel - in those cases each piece of coax carries half the power. At 1,500 watts, each of two parallel pieces of "plain-old RG-58/U" will carry 750 watts; RG-58/U can do that. For higher power, Teflon-dielectric coax is a good choice. Light-weight Teflon coax can handle full amateur power with ease. Examples include RG-141/U, RG-142B/U and Belden B3242-100.

Let's wrap this up with a discussion of specifications and margin.

Regarding margin, the margin you need with a ferrite balun you don't need with a coreless balun. *Ferrite-based devices saturate at some mix of applied power, SWR and duty cycle.* Coax-only baluns are impervious to operating conditions until the coax itself fails.

Continued on next page—

Just as high power antenna tuners lack proper specifications (Around the Shack, November, 2023) so do commercially available ferrite baluns, ununs and transformers. The critical specification that usually goes unmentioned is SWR. The higher the SWR, the less power a ferrite-based device can handle.

DXEngineering makes high-quality, high-power (5 KW) baluns. It is one of the few companies that addresses SWR. From DXEngineering's literature: "The SO-239 connector limits power handling to 5 KW or less at low SWR and reduced power at elevated SWR." A thorough treatment of balun capability (or lack thereof) over diverse operating conditions is beyond the scope of this article. My advice is the same as with antenna tuners; 1) read what specifications there are carefully, 2) read the reviews, 3) buy all the margin you can afford because you will likely need it, and 4) consider building one yourself without using ferrite!

Done reading? Here's your homework assignment: *Print out* the *Ham Radio* article (you know, on paper) and place it your station notebook. Use the article to make (not buy!) your next balun, unun or matching transformer using only coax – no ferrites. You will save money and enjoy the satisfaction that comes from a DIY project that works. You will also avoid a trip up the tower to replace a store-bought ferrite balun the next time you send 1,500 watts up the coax on the wrong band!

73,
Hal N4GG

Congratulations New & Upgraded Hams! / Wes Lamboley, W3WL

Thank you Slope's BBQ for letting us use your facility! We held the January 2024 VE Test session at Slope's BBQ on Saturday, January 13, 2024.

Five candidates successfully completed and passed their exams. We're glad they had the opportunity to take the exams and would like to take the opportunity to congratulate them. Please greet and congratulate these folks the next time you see them.

<u>Candidate Name</u>	<u>Call (if applicable)</u>	<u>Test</u>
Ryan Ensor		Technician
Thomas Nesmith		Technician
Brady Van Oss	KQ4JSU	General
Brian Van Oss		Technician
Nicholas Lamey		Technician

Each successful candidate, who is not already a club member, receives an offer to join NFARL at no cost for one year as part of our testing program.

In order for the VE license testing to occur we need a supporting panel of Volunteer Examiners to be available and willing to participate in the program. Our thanks goes to the thirteen VE member panel associated with NFARL.

If you're interested in becoming a VE, please contact Ian, NV4C Contact Ian at nv4c.ian@gmail.com or 404-626-1566. You may also visit <http://www.arrl.org/become-an-arrl-ve> and check out the requirements for becoming a VE.

Extra Extra! / From the Extra Class Question Pool

New info for Technicians and Generals and a refresher for Extra Class Licensees!



E6C01

What is the function of hysteresis in a comparator?

- A. To prevent input noise from causing unstable output signals
- B. To allow the comparator to be used with AC input signals
- C. To cause the output to change states continually
- D. To increase the sensitivity

See answer on the last page!

The new Amateur Extra-class license examination question pool, effective from July 1, 2020, through June 30, 2024, has been released and is available at the National Conference of Volunteer Coordinators (NCVEC) [website](#). Note the new Technician class license examination question pool is effective July 1, 2022.


Ian NV4C and his team hold license test sessions on the second Saturday of each month. For more information including upcoming test dates, [click here](#).

Contest Corner

These are some contests and events besides the "routine K1USN, CWops, and other organizational events" scheduled to occur the near future

Contest Name	Time & Date
+ Vermont QSO Party	0000Z, Feb 3 to 2400Z, Feb 4
+ 10-10 Int. Winter Contest, SSB	0001Z, Feb 3 to 2359Z, Feb 4
+ Mexico RTTY International Contest	1200Z, Feb 3 to 2359Z, Feb 4
+ European Union DX Contest	1200Z, Feb 3 to 1200Z, Feb 4
+ Minnesota QSO Party	1400Z-2400Z, Feb 3
+ British Columbia QSO Party	1600Z, Feb 3 to 0359Z, Feb 4 and 1600Z-2359Z, Feb 4
+ North American Sprint, CW	0000Z-0359Z, Feb 4
+ 4 States QRP Group Second Sunday Sprint	0100Z-0300Z, Feb 12
+ ARRL School Club Roundup	1300Z, Feb 12 to 2359Z, Feb 16
+ PODXS 070 Club Valentine Sprint	0000Z-2359Z, Feb 14
+ NAQCC CW Sprint	0130Z-0330Z, Feb 14
+ South Carolina QSO Party	1500Z, Feb 24 to 0159Z, Feb 25
+ North American QSO Party, RTTY	1800Z, Feb 24 to 0559Z, Feb 25
+ NA Collegiate Championship, RTTY	1800Z, Feb 24 to 0559Z, Feb 25
+ North Carolina QSO Party	1500Z, Feb 25 to 0100Z, Feb 26
+ ARRL Inter. DX Contest, SSB	0000Z, Mar 2 to 2400Z, Mar 3
+ Novice Rig Roundup	0000Z, Mar 2 to 2359Z, Mar 10

NFARL Upcoming Events and Dates

- **Every Sunday — NFARES net** - 8:30 PM - 147.06 MHz (+) PL 100
All licensed hams are welcome, you do not need to be an ARES member!
Check [NFARES.org](https://www.nfares.org) for more information.
 - **Every Monday — Tech Talk** - 8:30 PM - 145.47 MHz (-) PL 100
NFARL's flagship technical based "non check-in" net. The net is always better when using the web based chat room (Discord) but Internet is not required to join the net.
Check [NFARL Nets](#) for more information and "how to". Here's the link to the NFARL server on Discord web app <https://discord.gg/spr2a9D>
 - **Every Wednesday — Hungry Hams Lunch Bunch** - 11:15 AM
Location: Slope's BBQ, 34 East Crossville Road, Roswell, GA 30075 (770) 518-7000
 **SLOPE'S BBQ**
Dining Room is OPEN. Get Take Out if you can't stay!
 - **Every Thursday — YL Net** — 8:00 PM - 9:30 PM - 145.47 MHz (-) PL 100
Check NFARL Nets [website](#) for "how to." This is a great opportunity for YL's to get on the radio with other YL's! OM's (guys) are welcome to listen in to this YL net.
 - **Every Wednesday — CW CHAT** — 8:00 PM on ZOOM.
New meeting link and credentials:
<https://us06web.zoom.us/j/84722087419?wd=VIN2d0xvQVhKcDIUL0R4N1hQMTQ2UT09>
Meeting ID: 847 2208 7419; Passcode: CW-CHAT
- **Second Tuesday — NFARES Meeting - February 13, 2024 *Now meeting in-person!***
Meeting location: The Church of Jesus Christ of Latter-day Saints, 500 Norcross St. Roswell, GA 30075. Enter using the "Family History Center" Door. ***See NFARL website for details & Zoom link.*** NFARES members receive Zoom invitation automatically.
- **Second Saturday – VE Testing - NFARL February 10, 2024 session:** 8:30 - 10:30AM
Slope's BBQ, 34 Crossville Road, Roswell, GA 30075. Seating will be limited to 20 - preregistration is required. [Registration is by email to Ian NV4C](#); monitor registration opening & closing on the website. [Click here for more information.](#)
 - **Fourth Tuesday – NFARL Executive Team Meeting** - MMM DD, 2024, 7:00 PM.
Online meeting only — monitor website and NFARL Groups.io reflector for updates.
- **NFARL Club Meeting— Tuesday, February 20, 2024— 7:00 PM** Preston Ridge Community Center, 3655 Preston Ridge Road Suite 100, Alpharetta, GA 30005. The facility's doors will open at 7:00PM. Our meeting will begin at 7:30PM and should conclude by 9:00PM. Our meeting is a Workshop "Common Choke Build", led by Steve Randall KO4VW
- **Lilburn Elementary School ARISS Contact— Wednesday, February 7, 2024**
School program begins at 8:45AM. We recommend watching YouTube Live Stream at: <https://www.youtube.com/channel/UCuI4sKDBpERtEFs9bFrRMFA/live>
- **Dalton Hamfest— Saturday, February 24, 2024 – 8AM EST-2PM EST**
NW GA Ag Fairgrounds, 500 Legion Drive, Dalton, GA 30721
<https://www.qrz.com/db/W4DRC>

Contact Us

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North Fulton Amateur Radio League

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nfarl.org

eNEWS can be located online at:
<https://nfarl.org/enews-index>

Club Repeaters

Frequency—Description	P.L. Tone	Location
145.470 (-) EchoLink Node 560686 NF4GA-R	100 Hz	Morgan Falls
147.060 (+) Primary ARES Repeater	100 Hz	Roswell Water Tower
* 224.620 (-) Joint Venture with MATPARC	100 Hz	TBD
443.150 (+)	100 Hz	Roswell Water Tower
444.475 (+)	100 Hz	Morgan Falls
* 927.0125 (-)	146.2 Hz	TBD

* Currently off the air

Club Call signs: NF4GA and K4JJ

Extra Extra answer: A (question E6C01)

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