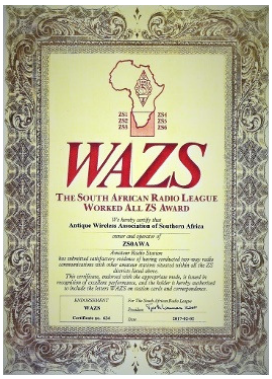
Antique Wireless Association of Southern Africa

201 April 2023



Inside this issue:

AWA Committee:

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* Vice President—Jacques ZS6JPS
* Technical Advisor—Rad ZS6RAD
* Secretary/PRO—Andy ZS6ADY
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* Historian—Oliver ZS6OG
* Member—Wally ZS6WLY

Visit our website:

www.awasa.org.za

Reflections:

In one of our Saturday morning discussions on the net, Renato asked what were our thoughts and have we ever used WWV to any extent. This being the 100yr anniversary.

A lot of people described how that had used it on the odd occasion, some to a greater extent and a few of how they had used it to ascertain time and frequency accuracy.

I wonder how many on the readership would answer the same ?

To me, I never knew much of it. I knew about it in hearing from others, but it was of no great importance to me, no not being a keen homebrew enthusiast or too worried about the accuracy of my frequency.

I would tend to say being a CW op for the majority of my ham career, one would simply find a cw station, zero beat on their frequency and have a chat with them. Or, I would find a clear frequency, check the power out and SWR and then start to call CQ.

Could I say that most CW op's would tend to do the same ?

After all, when QSL'ing, most times it was just the band that was written on the card and sometimes, if you were pedantic enough, you would write in the frequency, which never had any extra zero's.

I also wonder, with the accuracy of our modern rigs, sometimes which are quoted to .0000 to show that you are .0025 off of the other stations frequency, how many of our new amateurs have even heard of WWV ?

I have been asked by a few of our new intakes, what is this WWV on the band selector of some of the older radios.

I must also admit, that most times when I tried to tune in WWV, the signal was so weak, that I would just leave it and say, "It's an American thing". My apologies to some of our US readers.

Then of course on some of the Japanese radio's, there was a JJV, which I believe was the Japanese equivalent of WWV.

I have include a write up on WWV in this issue taken from their QRZ.com page as a special events station which ran for a very short period.

Unfortunately, I think we all heard of this occasion a bit late and the most of the activities had already taken place.

If interested, there is a lot more information available on Wikipedia and on their website, so do yourself a favour and check it out. Then try tuning in to the station and see if you can hear them.

It may just be of interest to many of you.

After reading the history of WWV and the ongoing work they are putting in, we wish them another hundred years of activity and setting the standard.

Long may their signals be heard across the globe.

Best 73

DE Andy ZS6ADY

Wikipedia

Solar Flares:

Prediction

Current methods of flare prediction are problematic, and there is no certain indication that an active region on the Sun will produce a flare. However, many properties of sunspots and active regions correlate with flaring. For example, magnetically complex regions (based on line-of-sight magnetic field) called delta spots produce the largest flares. A simple scheme of sunspot classification due to McIntosh, or related to fractal complexity is commonly used as a starting point for flare prediction.

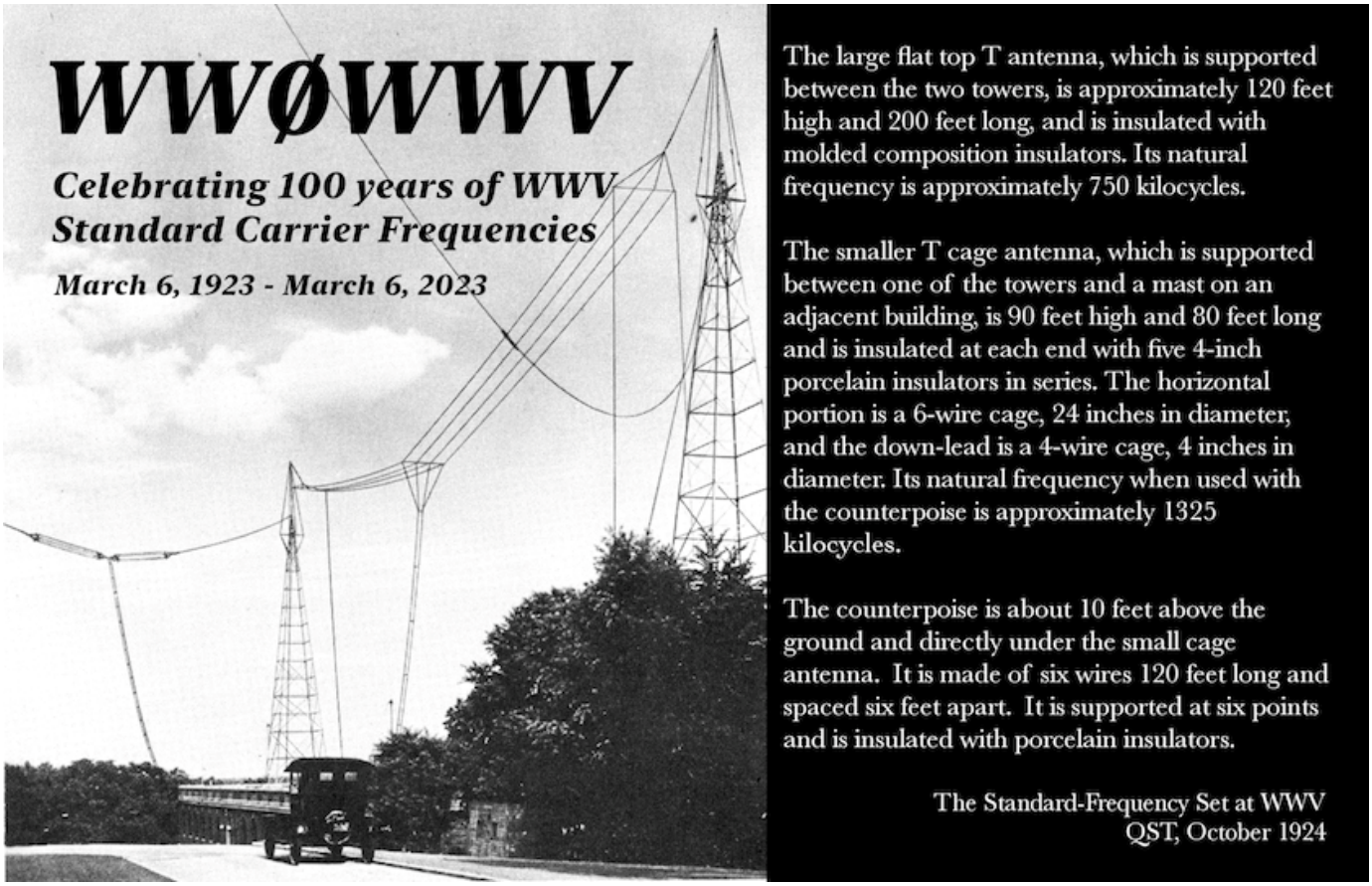
Predictions are usually stated in terms of probabilities for occurrence of flares above M- or X-class within 24 or 48 hours. The U.S. National Oceanic and Atmospheric Administration (NOAA) issues forecasts of this kind. MAG4 was developed at the University of Alabama in Huntsville with support from the Space Radiation Analysis Group at Johnson Space Flight Centre (NASA/SRAG) for forecasting M- and X-class flares, CMEs, fast CME, and Solar Energetic Particle events. A physics-based method that can predict imminent large solar flares was proposed by Institute for Space-Earth Environmental Research (ISEE), Nagoya University.

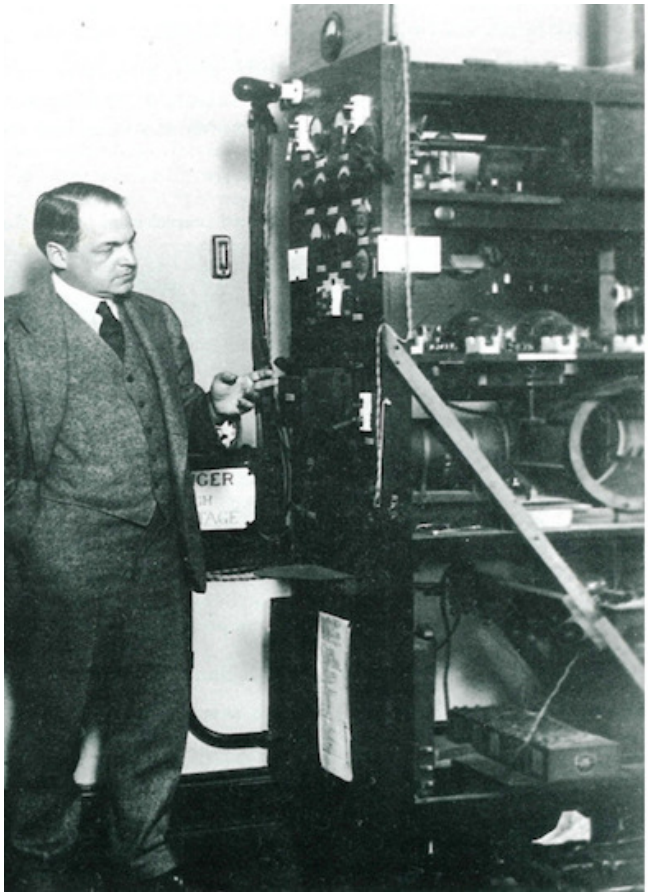
WWoWWV Special Event Station - March 6 to 12, 2023 . . .

The WWV Amateur Radio Club, in Fort Collins, Colorado, will be putting our club call, WWoWWV, on the air between March 6 and 12, 2023. We will be commemorating the 100th anniversary of standard frequency broadcasts from station WWV, which began in March, 1923.

WWV Amateur Radio Club members across the US will be operating on 80-10 meters, including the WARC bands, using CW, SSB and digital modes. QSLs requests may be submitted to our mailing address shown above. A donation to cover costs and/or a SASE is much appreciated! OQRS and LoTW won't be updated until all logs are collected - we hope by March 19.

We look forward to seeing your call in the WWoWWV log!





The transmitting set is a 1-kilowatt continuous wave set of the "master-oscillator power amplifier" type especially designed to operate over a wide range of frequencies and to permit rapid change from one frequency to another.

On the upper shelf is mounted the master-oscillator, modulator, and speech amplifier tubes and their associated tuning and other apparatus. On the bottom of this shelf on the left side of the frame is mounted the variable condenser that is used in coupling the master-oscillator to the grids of the amplifier tubes. The next shelf carries the amplifier tubes with their separate plate fuses and grid choke coils. Under these tubes on the next shelf are mounted the antenna tuning condensers and one of the antenna inductors.

WWV Amateur Radio Club - PO Box 273226, Fort Collins, Colorado 80527 - https://wwvarc.org

Dr. John Dellinger, chief of the Radio Section, Electricity Division, National Bureau of Standards, inspects the 1-kilowatt transmitter used in 1923 for standard frequency broadcasts.

Tune in: The WWV Frequency Celebration

The WWV ARC, along with the National Institute of Science and Technology (NIST), HamSCI.org, and the Fort Collins Museum of Discovery (FCMoD), will celebrate another centennial milestone in radio history we're calling ***Tune in: The WWV Frequency Celebration***

March 6, 2023 marks the 100th anniversary of the first scheduled frequency broadcasts from WWV, a civil and scientific service that continues to this day and that helped reign in the chaos that was developing with the emergence of the Radio Era back in 1923.

On Thursday evening, March 2, 2023, NIST and HamSCI will give talks on the history and current amateur radio science initiatives focused on WWV and the WWV frequency standards at the FCMoD.

Friday, March 3, 2023, NIST will provide tours of WWV and the NIST Boulder labs. First preference will be given to WWV ARC members, but will also open remaining spots to the public within a couple of weeks of tour date.

Saturday, March 4, 2023, from 10am until 3pm will be a public celebration of ***Tune In: The WWV Frequency Celebration*** at the Fort Collins Museum of Discovery. We'll be on the air that Saturday from the museum, demonstrating HF, satellite, meteor scatter, and other amateur radio technologies as well as hosting any other amaetur radio clubs who would like to come and show their clubs/activities off to the public.

Please see: https://wwvarc.org/WWVFrequencyCelebration for more info.

Special Event Station WW0WWV will be on the air from March 6 through March 12 - See the top of this page!

Here is a wonderful QSL card the FCMoD prepared for our first operating event, the WWV 100th Anniversary in October 2019. The museum hosted StarDrive, K0PRB and K0LAO's impressive mobile amateur station and astronomical observatory, and we had several QSOs between the museum and the SES at WWV, including the youngest participant I've ever heard on the air at 2 years old!

Hey, what time is it?
Check with radio station WWV, which broadcasts via shortwave radio the official time announcements (and more critical information) from its antenna array located just north of Fort Collins.

The National Institute of Standards and Technology Radio Station WWV is celebrating the 100-year anniversary of its call letters on October 1, 2019. WWV is not only one of the world's oldest continuously operating radio stations, but also one of the oldest scientific and technical services provided by the United States government.

The callsign **WW0WWV** is for the special event amateur radio station celebrating the WWV Centennial from September 28 through October 2, 2019. This document is a QSL card, typically sent in the mail to confirm a contact between "hams." For more information about amateur (ham) radio, visit: *http://www.arrl.org/what-is-ham-radio* and also *http://ncarc.net*

WWV began broadcasting from
the Fort Collins area in 1966
and continues to do so today.

FORT COLLINS MUSEUM OF DISCOVERY

Please visit our website and learn more about the WWV Amateur Radio Club - https://wwvarc.org

I can forward a .pdf file of accommodation in the area if anyone is interested. (Ed)

You wouldn't know it from the title, "The Bell Bull Session," but this Carl and Jerry technodrama features a very interesting subject - the Shive Wave Machine. The "Bull Session" part of the title is self-explanatory; it's the "Bell" part that is a reference to Bell Telephone Laboratories, and specifically to a gentleman named Dr. John N. Shive, who was Director of Education and Training there. Being avid amateur radio operators and electronics experimenters, Carl and Jerry were very familiar with the concept of traveling waves and impedance matching. The Shive Wave Machine is an ingenious device that provides a visual physical representation of a traveling wave and how an impedance mismatch generates a standing wave within the metal tube transmission medium. A video of Dr. Shive explaining his invention is embedded at the end of the article.

A comprehensive list of all the *Carl & Jerry* episodes posted on RF Cafe is at the bottom of the page.

Carl & Jerry: The Bell Bull Session

By John T. Frye W9EGV

It was a Sunday evening in early December, and half a dozen young men were standing in the hall outside the locked door of Carl and Jerry's room on the third floor of the H-3 Building at Parvoo University.

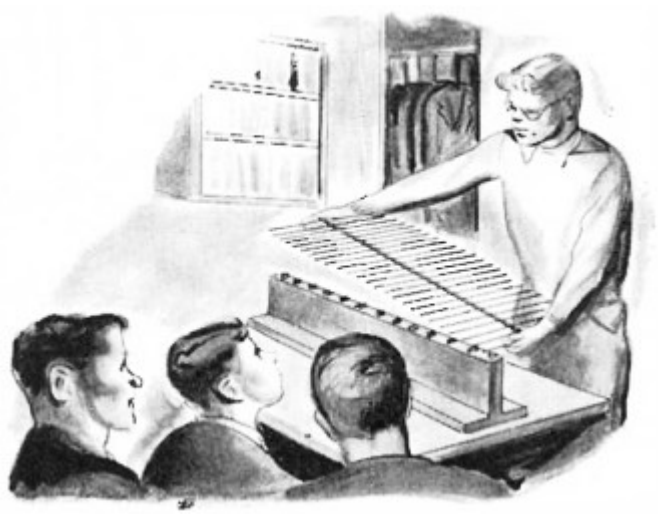
"Knuckle the door again," one of them suggested. "In those notes Carl and Jerry said to be here at 7:00 sharp for a 'Bell Bull Session,' whatever that is. It's after seven now."

At this moment Carl stepped into the hall through the stairway doors. Jerry, puffing a little from the climb, was right behind him.

"Sorry we're late. fellows," Carl apologized as he unlocked the door and waved the visitors inside. "Jerry and I were at the library, and time sort of got away from us."

"Okay, but what's all this about?" a chubby redhead named Jack asked as he took possession of the single upholstered chair in the room.

"Yeah, what's a 'Bell Bull Session' ?" a lanky boy from Texas drawled from where he sat on the floor. "Most of the bull sessions I've sat in on get around to women sooner or later, but down Texas way we feel it's a little



caddish to name names. Who's this Bell co-ed? Do we know her?"

"Oh, yes, you know her," Jerry answered with a grin; "but let me explain. All of you are friends of Carl or myself or both; and all of you share our deep interest in electronics. We think we've found something that will be as intriguing to you as it is to us, and we want to share it with you. The 'something' was developed by Bell Telephone Laboratories. That, plus the fact that we thought a little mystery might help lure you up here tonight, is the reason we called this a Bell Bull Session."

"Boys, it looks like we've been had!" Tex drawled with a good-natured grin.

"I'm hoping you won't think so when you leave," Jerry answered, and then dived right into his theme. "You see, the behaviour of radio waves has always been hard for me to keep straight in my mind; yet one must understand this subject thoroughly in order to have a clear knowledge of such things as resonance, impedance-matching, standing wave ratio, and antenna theory. I was talking to my high school science teacher back home about it recently, and he suggested that I build a wave machine as described by Dr. John N. Shive, Director of Education and Training of the Bell Labs, in his little book called Similarities in Wave Behaviour. This booklet tells how to build the machine and describes several experiments that can be performed with it. Well, Carl built one, and that's what we want to show you tonight."

Carl had placed a long board on one of the study desks. Fastened in a row to the top of the board were about a dozen narrow isosceles triangles of heavy sheet metal with their planes at right angles to the length of the board. A narrow portion of the bottom of each triangle had been bent over to form a foot for fastening the triangle to the board. The top of each triangle had been clipped off and a shallow U-shaped notch had been filed in the top of the resulting trapezoid. All of these notches were perfectly in line and at the same height.

Carl stepped to the clothes closet and carefully lifted out a flimsy, jiggling arrangement of closely-spaced slender metal rods fastened at their centres to a still smaller central metal spine. Grasping the spine by its ends and holding the array taut, Carl carefully lowered the spine into the notches of the sheet-metal bearings.

"This thing is rather simple to build," Carl explained. "The spine is a three-foot length of 0.042-inch steel drill rod. There are 70 18-inch lengths of 0.042-inch steel drill rod fastened to the spine a half-inch apart. They are soldered to the backbone exactly at their centres, parallel with each other, and at right angles to the backbone. But if you want to build one of these machines yourself, I strongly recommend that you order a copy of The Student's Edition of Similarities in Wave Behaviour, by Dr. John N. Shive, from the Williams & Wilkins Company, Science Series, 428 E. Preston St., Baltimore 2, Maryland. You can't get the booklet anywhere else, and it only costs 35¢ postpaid. It shows you how to make special jigs for holding the rods in position while you're soldering them, how to conduct many interesting experiments with the machine, and how to understand the significance of these experiments."

"This last is very important in the opinion of Dr. Shive," Jerry smoothly scooped up the conversational ball. "He says science is more than just knowledge; it's a method. You can gather facts in the aimless way that your car radiator collects bugs and butterflies in summer; but a scientist carefully selects his specimens and studies them carefully, looking for similarities and differences, searching for clues that will make what is new and puzzling fit into the knowledge he already has. The scientist is forever trying to reduce observed phenomena to a least common denominator.

"To him, therefore, a wave is a traveling disturbance of a medium from its normal condition. So, in view of that definition, mechanical waves, sound waves, light waves, and radio waves are seen to behave alike. In each case the passage of the wave disturbs the conducting medium which returns to rest after the wave has passed. By studying mechanical waves in this machine, therefore, we can understand the behaviour of other waves whose actions cannot be readily seen."

of He reached over and pumped the end of the first cross arm the machine up and down once. A smooth undulation ran slowly up and down the array of steel rods until it gradually died away.

"That wave you see moving the rods is actually a twisting and untwisting of the steel spine," Jerry explained. "The rods soldered to the spine reveal the movement of this torsion wave along the spine by the up-and-down motion of their ends as the twist-untwist I applied at one end of the spine travels along its length. The wave I started with a pulse is a damped waved. It is damped by three kinds of friction: air resistance to the up-and-down motion of the cross arms, rolling friction of the central backbone in the bearing notches, and hysteresis friction in the backbone itself. This damping gradually absorbs the energy of the wave, and it dies

out."

"You talk about the 'energy of the wave,' Jack interrupted. "Can you use that coat-hanger marimba to prove waves transport energy ?"

Jerry did not answer, but both he and Carl wore smug smiles as the latter took a small stand out of a drawer. This stand had a little toothed and dogged wheel at its top. The axle to which the toothed wheel was fastened had a string wrapped around it with a weight suspended on the end.

Carl clipped a little piece of stiff wire to the cross arm at the far end of the machine. Then he carefully adjusted the bent end of this wire so that each upward movement of the cross arm pushed the toothed wheel around a notch and enabled the dog to catch it; each downward movement let the end of the wire slip down and engage another tooth. The result was that when the end of the cross arm at the near end of the machine was moved up and down and the waves so produced traveled to the other end, the up-and-down movement of the last rod caused the toothed wheel to revolve, raising the weight.

"Guess that answers the question," Jerry said. "Obviously waves do carry energy. Just as energy contained in the mechanical waves raised that weight, so sound waves vibrate our ear drums, the energy of water waves stirred up by Hurricane Carla late last summer battered down dock installations along the Texas coast, and energy carried by light waves from the sun changed the orbit of Echo sufficiently to upset predictions about how long the satellite would last. But enough of these damped waves, Carl; let's send some c.w."

Carl was already placing a small synchronous motor driving a speed-reducing gear train beneath the end of the wave machine. A little drive rod was connected between the rim of the slowest-moving gear and the end rod of the wave machine. When the motor was turned on, this rod was moved up and down at a constant rate of about two complete up-and-down movements per second. After a few seconds the transients died out and the waving ends of the rods settled into a definite pattern of regularly spaced, smoothly varying intervals of maximum and minimum movement.

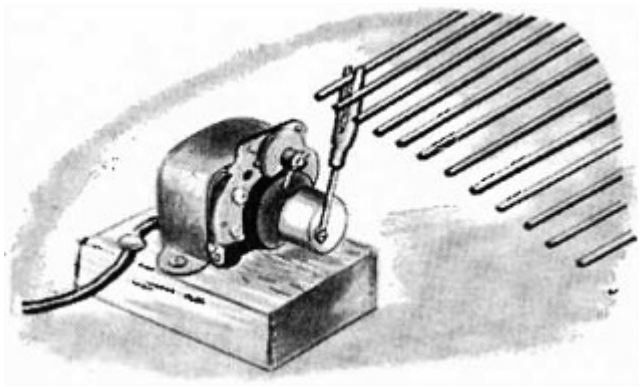
"That's a pretty picture of a standing wave," Carl said admiringly. "The quiet rods represent nodes of the standing wave and the ones moving the most represent loops. While the pattern of the standing wave does stand still, it's actually produced by the interaction of two traveling waves - one going down the machine from our continuous-wave generator, the other coming back after being totally reflected from the unterminated opposite end.

"These two waves combine by adding their energy algebraically," he went on. "When one is trying to raise the end of a rod while the other is trying to push it down, they cancel each other and we have a node. A quarter of a wavelength away - nodes are a half wavelength apart - the two waves work together to produce a maximum movement of the rods. Notice that the first node is a quarter of a wavelength away from the far end of the machine. Now watch what happens when I clamp that end rod firmly so it can't move:"

As he did so, the pattern changed on the machine. Now a node appeared at the clamped rod, and a loop appeared a quarter of a wavelength away. The whole pattern shifted endways to accommodate this change and still retain its regular spacing.

"Hey !" Tex exclaimed, "that's exactly what happens in a coax line when you change from a short-circuited to an open-circuited condition. But if you terminate the coax in a resistor equal to its characteristic impedance, you get rid of the standing waves. It's too bad we can't hook a resistor across the far end of that machine and see what happens."

"But we can!" Jerry declared as he took still another piece of apparatus out of the drawer. It consisted of a stiff wire soldered vertically to the centre of a thin metal disc. This disc was lowered into a can of water, and the rod was clipped to the last rod of the machine.



"This dash pot arrangement represents mechanical resistance," Jerry explained. "By connecting it to the rod at different distances from the spine, we can change the impedance match between it and the machine in the same way changing the length of the gamma rod on a beam antenna alters the impedance the antenna presents to the coax feeder."

He disconnected the motor and sent a single wave down the machine. A small reflected wave came back. He changed the position of the dash pot clip and tried again. The reflected wave was smaller. Finally he found a position for the clip where no reflected wave could be seen. Now when the motor was connected and started, waves could be seen marching down the machine and disappearing at the far end. All their energy was being absorbed by the dash pot. No standing waves were present.

"I'll be doggoned!" Tex exclaimed. "That little old section of picket fence certainly lets me see clearly some things I've tried to picture in my mind for a long time. Can you do anything else with it?"

"Oh, you can perform lots more experiments with a wave machine," Jerry answered. "You can see what happens when you have an abrupt change in impedance in a line, and you can make a mechanical impedance-matching transformer that will cancel this effect. You can study the relation between wave energy and wave amplitude. You can prove to yourself that the speed of waves in an elastic medium is independent of amplitude. But I'm afraid that will have to wait for another evening. I don't like to be a party-pooper, but Carl and I have to spend two or three hours on graphics before we turn out the lights tonight, and I've the feeling we'd better have at it."

The fellows got to their feet and filed out of the room. Jack stopped in the doorway to say, "Thanks a lot, fellows. I must have rocks in my head, but I actually enjoyed your Bell Bull Session. I'm coming back again to ask that quivering Ouija board of yours some more questions about wave behaviour."

Carl and Jerry quickly cleared away the equipment, and then both boys seated themselves at their respective

desks and prepared to study.

"You know I believe the guys really did enjoy our little show," Carl said over his shoulder. "I'm glad but a bit surprised. That was dangerously close to studying."

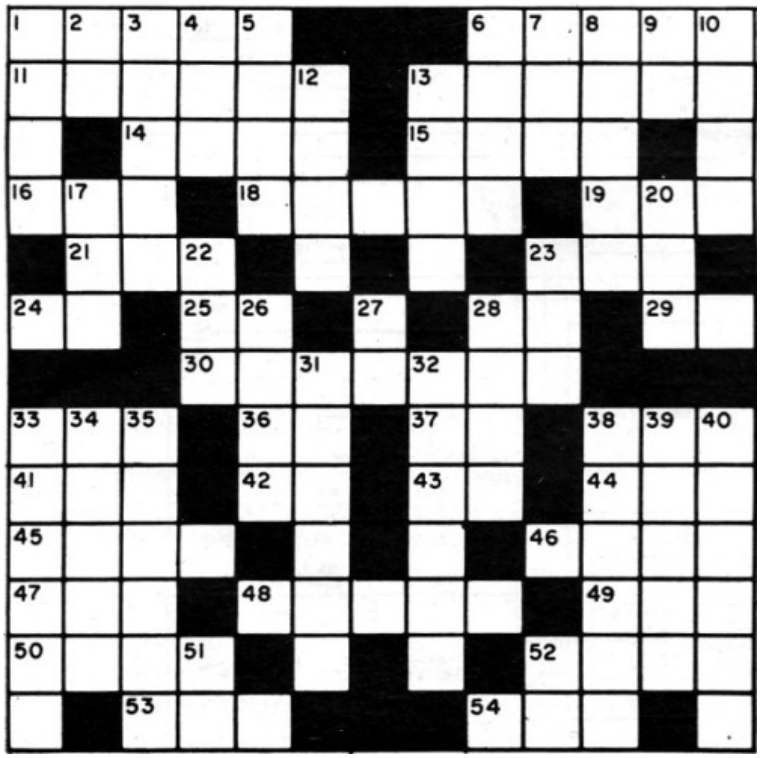
"I think really learning something for sure is pleasurable," Jerry spoke slowly as he opened his book. "It's half-learning that leaves you full of questions and doubts and breaks your back. When you master an idea, when your mind completely wraps itself around the subject and understands it perfectly, all sense of work and effort disappears in a feeling of power and accomplishment.

"Personally, I get a real blast out of knowing that radio and light waves traveling 186,000 miles a second and sound waves traveling a little better than a 1000 feet a second are blood brothers to those waves moving up and down our wave machine. There is something so beautifully simple and right about the whole thing."

"I feel the same way," Carl agreed as he turned on his desk lamp.

Copy and paste this link if you would like to see the video of Dr Shrive.

https://www.youtube.com/watch?v=DovunOxlY1k

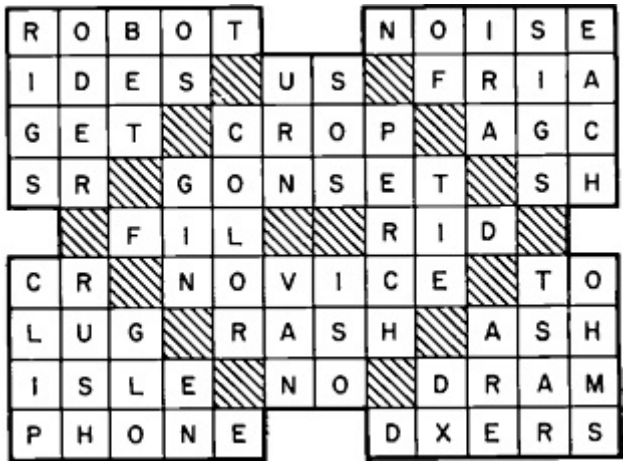


Across

1. Person who usually wins.
6. Do this to raise crystal frequency.
11. Straight-line function.
13. Slotted cover.
14. Placed on.
15. The lowest female voice range.
16. Appendage on airplane.
18. Produced by a loudspeaker.
19. Action taken to check for microphonics.
21. Adjust to correct position.
23. Said when leaving (familiar).
24. Type of current necessary for a squirrel cage motor.
25. Before the second detector (abbr.).
28. Commonly alloyed with copper (chem.).
29. General ham call.
30. Unaffected.
33. Red on the color code.
36. 1/16 ounce (abbr.).
37. Man's nickname.
38. Used in national pastime.
41. Atmosphere.
42. Power formula.
43. Small destroyer (abbr.).
44. Cut-off voltage (abbr.).
45. Beseech.
46. British jail.
47. Writing tool.
48. Best.
49. Waveforms are seen on this (abbr.) .
50. Farthest from center.
52. With no one else.
53. Yields chicken.
54. Large weight.

Down

1. Alligator _____
2. Informal "hello."
3. Part of tube.
4. Homo sapiens.
5. Soft, friendly hits.
6. Expensive element often used for .plating.
7. Worn path.
8. Elephant tusk.
9. Forty-five degrees (abbr.).
10. Reduction in voltage.
12. Exponent of 1/2.
13. Between grooves of phonograph record.
17. Generates signal (abbr.).
20. Government department re-sponsible for control-ling the atom.
22. Component of solder.
23. Ten decibels.
26. Loss of signal strength.
27. Unit of audio strength.
28. Large bundle.
31. Tube which has high plate-grid capacity.
32. Emanating perpendicular to axis.
33. Having intermediate connections.
34. Connected with wires.
35. Third band on a 12K resistor.
38. Transmitter for locating.
39. Small r.f. tube.
40. Indian succeeded by Aztec.
51. Grid voltage (abbr.).
52. Part of superhet (abbr.).



CONTACT US:

P.O. Box 12320
Benoryn
1504

Mobile: 082 448 4368
Email: andyzs6ady@vodamail.co.za

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Visit our Website:
www.awasa.org.za

Antique Wireless Association of Southern Africa

Mission Statement

Our aim is to facilitate, generate and maintain an interest in the location, acquisition, repair and use of yesterdays radio's and associated equipment. To encourage all like minded amateurs to do the same thus ensuring the maintenance and preservation of our amateur heritage.

Membership of this group is free and by association. Join by logging in to our website.

Notices:

Net Times and Frequencies (SAST):
Saturday 07:00 (05:00 UTC) —Western Cape SSB Net— 3.640; Every afternoon from 17:00—7.125
Saturday 08:30 (06:30 UTC)— National SSB Net— 7.125; Sandton repeater 145.700
Echolink—ZS0AWA-L
Relay on 10.125 and 14.135 (Try all and see what suits you)
Saturday 14:00 (12:00 UTC)— CW Net—7025

AWASA Telegram group:

Should you want to get on the AWA Telegram group where a lot of technical discussion takes place, send a message to Andy ZS6ADY asking to be placed on the group. This is a no-Nonsense group, only for AWA business. You must download Telegram App first. …..+27824484368