

The Central Texas Amateur Radio Club
meets the first Tuesday of each month at 7:00 PM at the
Bell County Communications Center, 798 West Avenue O, in Belton



The Prez Says...

Priscilla Beauregard, KE5UES



It doesn't seem like another year has passed but December is here. I would like to say I have enjoyed writing the president's message each month and will miss doing so. There are some things I enjoyed as President for the last two years and some things I did not. But I am glad I had the chance to work with some great officers and board members. I thank you all for your support and I wish the best for the officers, board members and club members alike for the coming year.

A note on that subject, at our November 5th General Membership Meeting, elections were held for club officers to carry the club through the coming year. Elected into office were: Gerald Richmond-N5ZXJ, President; Robert Shoemaker-KE5WVC, Vice President; Kenneth Watkins-KE5ISN, Treasurer; Rick Murray-K6WXA, Secretary and Walter Mezynski-KE5DPS, as a Board Member.

The Club wishes to welcome our newest member **Bob Gleason, KF5WSQ** from Harker Heights. If you hear him on the radio say hello.

Some upcoming dates you might want to remember:

- December 2nd - Temple Christmas Parade
- December 3rd - CTARC Christmas Dinner
- December 7th - Skywarn Recognition Day
- December 21st - First Day of Winter

Please remember the Club's December meeting will be a dinner get-together at the Golden Corral located at 1420 East Central Texas Expressway in Killeen, at 7:00 PM, on the 3rd of December. The restaurant is on the West side of Highway 190 between Trimmier Road and W.S.Young.

- 73 de KE5UES





The Central Texas Amateur Radio Club

Holiday Dinner at Golden Corral

...This no-host dinner get-together to be held in lieu of our regular December meeting...

Tuesday, December 3rd at 7:00 PM

Golden Corral

1420 East Central Expressway in Killeen

...nearest cross-streets are U.S. Highway 190 and Trimmier Road...

Dinner menu can be found at:

<http://www.goldencorral.com/menu>



Golden Corral: (254) 501-4710



The Central Texas Amateur Radio Net
meets every Thursday at 8:00 PM
on the N5ZXJ repeater,
on 145.310(-) PL 123.0
Join Us!

December NCS & Back-Up NCS Schedule

December 5 th :	December 12 th :
Net Control: W5VEX	KE5ISN
Back-Up: KE5ISN	AD5SK

December 19 th :	December 26 th :
Net Control: AD5SK	K6WXA
Back-Up: K6WXA	W5VEX



Temple Christmas Parade

The Temple Christmas Parade is on Monday, December 2nd at 6:30 P.M. Volunteers are needed to assist with support communications. Initial meet will be at the Bell County Health Building, 201 North 8th St., in Temple at 3:30 PM.



Staging time will start at 4:00 P.M. We will be operating 2 meter simplex. Necessary equipment will be an HT, safety vest, flashlight and proper clothing for the weather conditions. Other items that might be handy include a clipboard, writing instrument, snacks and something to drink. At least 10 to 12 volunteers are needed for this event. If you can assist in this event please contact **Myron Mesecke-N5TFK**, at meseckem@vvm.com.



Christmas on the Radio



Hanging stockings, tinsel, hanging ornaments, family, friends, and listening to favorite Christmas carols and songs all make for great memories. In the 1920's, 30's, 40's, and 50's families gathered around the radio to listen to the long-awaited Christmas editions of their favorite shows, making for great memories.

Most old time radio shows produced some sort of show for the Christmas, even shows that you think wouldn't lend themselves to a Christmas show like *Dragnet*, *Suspense* or *The Whistler* as well as other perennial favorites.

Here are 500 Christmas holiday-themed old time radio shows ranging from the ridiculous to the sublime and everything in-between. Included in the collection are musicals, news of the day as well as Christmas with the troops during WW2 over-seas.

You can fill your home this season with streaming audio of old time radio Christmas shows or download your favorite radio episodes by visiting: <http://archive.org/details/500OTRChristmasShows>



Skywarn Recognition Day



This event takes place on all authorized amateur frequencies and modes from 1800 Dec. 6th to 1800 CST, Dec. 7th.

More information can be found by visiting:

<http://www.wrh.noaa.gov/mtr/hamradio>

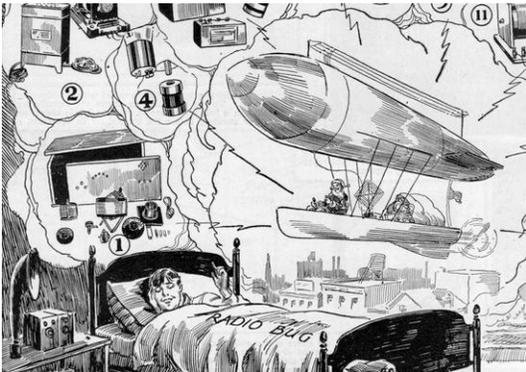


ARRL 10-Meter Contest

Contest period runs from 0001Z, December 14th to 2359Z, December 15th. With the objective for Amateurs world-wide to engage in QSO's with as many stations as possible on the 10 meter band.

For more information, please visit:

<http://www.arrl.org/10-meter>



The **December 1922** issue of 'Science and Invention' magazine included a list of the best radio parts to buy your little "radio bug" as well as this illustration of a boy dreaming of the radio parts Santa will bring him in his flying machine. That large aerial sitting behind Santa lets us know that he's definitely hip to the latest technology of the Roaring Twenties.

MODERN MECHANIX YESTERDAY'S *Tomorrow* TODAY

Radio Set is Mother of Chicks



Not to a radio expert but to a housewife, Mrs. Johannes Ronn, of Kansas City, Mo., goes the honor of putting to useful service the heat emanating from tubes in a radio set. What she did in effect was to make the set do duty as an incubator. She placed the eggs in a pasteboard box and put the box in the radio. After the proper lapse of time four little brown chicks opened their eyes to the world. The chicks will have the unprecedented honor of calling a radio set their mother. - *December 1932*

Radio Cooking – Latest Stunt



Radio cooking is the latest stunt developed by broadcast engineers. If a hot lunch is wanted by the operators in a transmitting station, all they have to do is place their food between the electrodes of the transmitter. In a few moments it will be done to a turn.

- *December 1933*



FCC: Turn Off the Lights or Else!

Skeeter Nash, N5ASH

The FCC has issued a violation notice to a Texas business because it's new over-head fluorescent lighting is interfering with an AT&T cellular telephone site. The FCC's Houston Office used direction finding techniques to locate the source of an unknown transmission on 705 MHz to the 'Perfect Cuts Salon' in San Antonio. The agent confirmed that the interfering signal was coming from the salon's interior fluorescent lighting.

The owner stated that representatives of AT&T had conducted "on and off" testing of the lighting in the salon and confirmed that the interior fluorescent fixtures were the source of interference to their cell site located next door. The owner further stated that he had unsuccessfully asked General Electric, the manufacturer of the fluorescent lighting, to replace the lighting.

The FCC informed the owner that they were in violation of Section 15.5(b) of its rules by operating incidental radiators and causing harmful interference. It has directed the owner to cease operation of the incidental radiators immediately. Or in simpler terms, it basically told him to turn off the lights until the interference can be resolved.

The owner of the salon was given the customary amount of time to respond or face further enforcement actions.

"If we succeed, the Country is ours. It is immense in extent, and fertile in its soil, and will amply reward all our toil. If we fail, death in the cause of liberty and humanity is not cause for shuddering. Our rifles are by our side, and choice guns they are, we know what awaits us, and are prepared to meet it."

- Daniel William Cloud - Alamo Defender, Tennessee Volunteers, December 26, 1835

Santa Net on 3916 KHz

Giving good boys and girls a chance to talk to Santa Claus via the magic of ham radio, the '3916 Santa Nets' will be held on 15 different evenings starting Friday, November 29th through Christmas Eve, December 24th. The Santa Nets are open to all licensed amateur radio operators who wish to invite kids to their shack to talk to Santa.

Each evening, the '3916 Santa Net' will start at 8:30 PM CST on 3.916 MHz. Pre-net check-ins will be taken on the air starting at 8:15 PM. The following is their net schedule:

Friday, November 29
Saturday, November 30
Tuesday, December 3
Thursday, December 5
Saturday, December 7
Monday, December 9
Wednesday, December 11
Friday, December 13
Tuesday, December 17
Thursday, December 19
Friday, December 20
Saturday, December 21
Sunday, December 22
Monday, December 23
Tuesday, December 24

Amateurs asked to leave 7095 KHz Clear

Ramon Anquilan, DU1UGZ

In the wake of Super Typhoon *Haiyan* which struck the Philippines, amateurs are being asked to leave 7095 KHz clear for on-going emergency and relief communications. The typhoon raced along a string of islands from east to west, leaving thousands dead, knocking out power and communications and forcing some 750,000 people to flee their homes.



The U.S.S. Wisconsin (BB-64) will be on the air as **N4WIS** December 7th from 10AM EST to 4:30PM EST and on December 8th Noon EST to 4:30PM EST on 40m on or around 7.264 MHz and on 20m on or around 14.264 MHz. QSL Direct.

DK9FN will be operational as **H4ØFN** from Temotu December 21st through January 10th. QSL via his home call.

EA4GBA will be operational from Mozambique through December 27th signing **C91GBA**. QSL via his home call.

NL8F, N7RO & KW7XX will be active from Kiritimati Island 3-11 December as **T32RC**. QSL via N7RO.

JA1NLX, will be on the air as **P29VNX** from Lissenung Island, Papua New Guinea, December 1-6. QSL via his home call.

JA1FUF and JF1CCH will be active through the 4th of December as **T3ØNK** and **T3ØTS** on 40-6m. QSL each via their respective home calls.

DH3WO will be active from Lesotho 22-24 December **7P8WO**. QSL via his home call.

A group of Indian hams will be operating from Agatti and Kavaratti Island in the Lakshadweep Islands, through 10 December as **VU7AG** and **VU7KA**. QSL via W4VKU.

DJ2HD will be active from Lesotho 22-24 December as **7P8DJ**. QSL via his home call.

DL7VOA will be active as **6V7D** from Senegal through December 7th. QSL via his home call.

SM6LRR will be active from Vietnam through 14 December as **XV2LRR** on 40-10m CW. QSL via LoTW only.

PP5BZ will be active from Santana de Fora Island 6-9 December as **ZW5W**. QSL via his home call.

8P9IU, 8P9TA and 8P9BJ will be on the air from Barbados from December 9th to the 16th. Their main activity will be the ARRL 10 meter Contest on the 14th and 15th of December using the call **8P8T**. QSL via KI1U.

SM6GOR will be active from Mauritius through December 15th as **3B8JB**. QSL via SM6JBC.

A ten-member team will be active from the Laccadive Islands through the 10th of December as **VU7AG**. QSL via W4VKU.

A new 60 meter beacon is on the air from South Africa on 5.250 MHz with the callsign of **ZS6KTS**. Should you hear the beacon, email reception reports to: beacon@zs6kts.co.za.

DL3DXX will be active from Namibia December 24, - January 8, 2014 signing **stroke V5**. QSL via DJ2HD.

CO6RD is active as **COØSS** from Sancti Spiritus, Cuba until the end of the year. QSL via EA5GL.

G3WIP is operational as **VKØGB** from Casey Base Station, Antarctica, until sometime in February 2014. QSL via his home call.

UA3DJY will be active from Mahe Island from the middle of December till the middle of January as **S79ACR**. QSL via his home call.

F6ICX is active through December 15th on Saint Marie Island as **5R8IC**. QSL via his home call.

PU5IKE will be operational on 10 meters as **ZW5AAA** from Remedios Island between December 7th and 8th. QSL via his home call.

F5TLN is operational **stroke OD5** in Lebanon, mainly on 15 meters, until April. QSL via his home call.



2013 Atlantic Hurricane Season Ends

What happened to the hurricane season? The predictions back in the spring were quite ominous, with them calling for an above-average number of hurricanes. The forecasting team from Colorado State University predicted a total of 18 named storms, and nine of those would develop into hurricanes, while the National Oceanic and Atmospheric Administration said there would be seven to 11 hurricanes and four of those hurricanes would be of Category 3 intensity or higher.

“It’s the biggest seasonal forecast bust we’ve ever had”, said Colorado State meteorologist Phil Klotzbach, part of the team of forecasters that first started issuing seasonal hurricane predictions in the early 1980s.

What transpired during the season, were a total of 13 named storm systems. Of those, only a total of 2 reached hurricane strength and both of those only reached the intensity of Category 1 hurricanes.

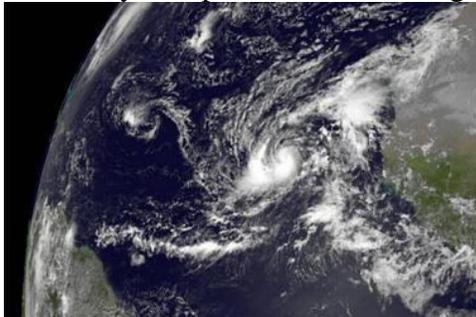
The first storm of the season was Tropical Storm *Andrea*. It formed from the remnants of Hurricane Barbara – an Eastern Pacific category 1 hurricane, which passed through southern Mexico May 30th. Its’ disorganized remnants then entered the Gulf of Mexico and re-organized into what became Tropical Storm *Andrea*.

This system then went on to pass over northern Florida and the eastern coast of the U.S. and then dissipated over the Atlantic.



Tropical Storm Andrea – June 6, 2013

The first of the only two hurricanes of the season was Hurricane *Humberto*, which formed on September 11th. It was just three hours short of being the latest in the season that the first hurricane had developed. After having brushed the Cape Verde Islands as a tropical storm and thereafter peaking as a Category 1 hurricane with 85 mph winds, it eventually dissipated on the evening of September 19th.



Hurricane Humberto – September 11, 2013

So what happened? The top reasons include an increased amount of dry, dusty air from the Sahara Desert as well as “sinking” air over the Atlantic, both of which worked to suppress hurricane activity. Wind shear - a difference in wind speed and direction at various levels of the atmosphere - also worked to tear apart storms before they could strengthen.

There were plenty of positive factors for above-average activity, what was not anticipated was all the sinking motion and resulting dryness - factors that occasionally disrupt what would otherwise be an active season - but which are impossible to predict.

Winter Forecast Outlook

The Farmers' Almanac is using a very strong four-letter word to describe this winter, which is **C-O-L-D** as well as words like “piercing cold,” “bitterly cold,” “biting cold” and “The Days of Shivery” to describe the upcoming winter.

They are forecasting a winter that will experience below average temperatures for about two-thirds of the nation. Only a few areas will enjoy many days where temperatures will average above normal and significant snowfalls are forecast for every part of the country.

In contrast, *AccuWeather.com* forecasts the winter in our region as having well above-normal temperatures with monthly average temperatures as much as 4-6 degrees above normal. With the warmth will come a severe weather threat for the central and western Gulf Coast with heavy rains.



Officially from NOAA, their winter forecast for our region is calling for a greater than 40% chance of above normal temperatures along with a greater than 45% chance of dry conditions over Texas and surrounding states.

The one portion of all the winter forecasts that does have a high probability of being correct, is the forecast of dry conditions over Texas and surrounding states. Extreme droughts tend to be self-reinforcing, by creating high pressure zones around them that tend to deflect rain-bearing low pressures systems, so we can expect that the fairly predictable drying La Niña influence will dominate Texas' weather this winter.

Making an accurate winter forecast is very difficult, as there is much that we don't know. Learn to expect the unexpected and unprecedented from our weather. However, perhaps the most unexpected thing would be a very average winter as far as temperatures.

Either way, for those of us here in Central Texas, the Winter Solstice - bringing the first day of Winter will be on Saturday, December 21st, at 11:11 a.m. CST.



The most snowfall in Austin history was 9.7 inches on November 11th, 1937. That's a pretty healthy snowfall for anywhere in a 24-hour period, but for Central Texas it's darn near apocalyptic. Austin's average yearly snowfall is 0.9".

You know its winter in Texas when you only use the air conditioning during the day.
- *Anonymous*

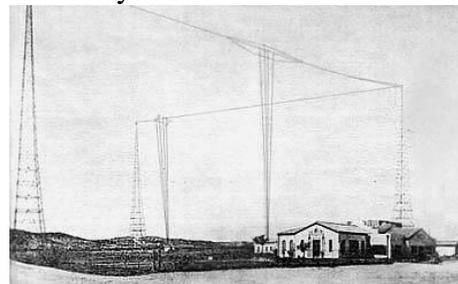
The by-gone era: Tuning-In the ‘Border Blasters’

A quack doctor... A million watts... Goat testicles... Pistoleros and Banditos... Wolfman Jack... *“It’s all accordin’ to how yo’ boogaloo is ya understand.”* Now, this is radio!

Other people turn off today’s syndicated crud, and moan that radio broadcast standards have never been lower. Well, these fine folks apparently don’t know about XERB, and XERF. These call letters were all used by the megawatt border blasters that sold a nation on goat testicles, and forever defined what *real* AM radio would be about.

People just don’t understand about X-stations. People think they’re just normal, scuzzy AM stations, only a little scuzzier and using the last letter in SEX to get noticed. People ask why they hear Spanish on them. Many don’t believe the answer, which is that XE and XF are the Mexican radio prefixes, and that they’re actually in Mexico.

These Mexican radio stations operated at powers 3-5 times higher than U.S. stations were allowed. They were located on the borders of Mexico and Texas or California, but were leased to Americans. They were in reality “outlaw” U.S. stations mostly catering to an English speaking audience. At night, XERF owned the world. From its high-gain antenna, it blasted its signal way north, right through Canada, all the way over the Pole, and into Russia with a clear signal. If the ionosphere was just right the “Outlaw X” - XERF across the border from Del Rio, would blast into New York City as clear as if it was a local station.



Station XERF, Ciudad Acuña, Mexico

Border station power generally ranged from 50,000 to 500,000 watts. The electricity coming off the transmitters was so powerful that birds flying too close would drop dead. The extreme energy would cause nearby parked cars headlights to glow. Sometimes listeners claimed to hear broadcasts without a radio, receiving the powerful signal on dental work, bedsprings, and barbed wire. American network programs were often lost in the ether when a Mexican border station was broadcasting near an American station’s frequency.



Bob Smith before being bitten by the ‘Wolf’

In 1964, a young platter-spinner from Brooklyn named Bob Smith metamorphosed into XERF’s late-night saint of radio naughtiness, ***Wolfman Jack***. From his border lair the Wolfman tantalized American listeners with rock-and-roll, and rhythm-and-blues. The gravel voiced Wolfman Jack took to the air--- “Howling at a quarter-million watts... down here with the donkeys.”

Wolfman Jack held court over his young audience from XERF-AM, where its 250,000 watt signal --- five times more powerful than any U.S. radio station --- blanketed most of North America. Without the benefit of traditional advertising, it was word of mouth that spread

the news about the provocative Wolfman and his nonconformist style -- the kind of style that horrified parents -- making it all the more appealing to a growing legion of young followers.

For millions, Wolfman Jack was the world's most famous disc jockey for the rock 'n roll generation of the '60s and '70s. By the 1970s, the Wolfman was heard on 2,200 radio stations in over 40 countries worldwide.

These "bandit", "outlaw", or "border blasters" as they were called, transmitted programs by all sorts of wild characters, usually pitching something.

Wolfman Jack sold, sold, and sold. Some of the products he pitched: Record packages- from Ernie's Record Shop in Nashville and Stan's Record Shop in Shreveport. 40 songs for \$4.95. He would sell 600 record packages a day. Dog food- "The Wolfman eat it all the time!" Weight loss pills, Weight gain pills. 100 Baby chicks for \$3.95 COD. "You can walk them around with little leashes. Give them names. And when they grow up ya can eat 'em."



Bob Smith – aka – 'Wolfman Jack'

Flores pills- which were supposed to have the same effect as Viagra. "It'll put some zing in your ling!" They really were just sugar-coated pills with aspirin inside. Roach clips- he never said what they were really for (smoking marijuana) but talked about how you could clip the roaches tiny little legs to them and throw them out the window. Wolfman Jack/Bob Smith earned 50% commission on everything he sold and soon, XERF was making \$150,000 profit a month.



Station XERB in Tijuana, Mexico

In 1967, he started all over again at XERB. The transmitter was in Tijuana, but the studio was in Los Angeles. The history of notorious 'border blaster' XERB is the stuff that legends are made of... Born in a sleepy seaside village in the 1930's, XERB grew to be one of the famous radio stations in the world, with a blow torch signal that sent the voice of the Wolfman to all corners of the

globe. The signal from XERB – "The Mighty 1090" – could hold its own with such Los Angeles giants as KFI and KNX, and certainly had no trouble whatever shooting up the Central Valley. The shows on XERB were recorded in Los Angeles, and then the tapes were driven down to Mexico to be played at the transmitter. He was rocking along, when jealousy kicked in over the money he was making, and the Mexican government took the radio station away from him.

It was primitive and unpolished, sometimes tasteless and at other times downright illegal, but nobody could accuse border radio of suffering from the tightly formatted homogeneity that plagues so much of today's broadcasting.

Those days are gone now, Spanish has replaced English as the language of choice on most of the border radio stations; gone also are the super-powered border blasters, just across the line that separate Mexico from the U.S. and its more restrictive broadcasting laws. Gone also is the howling funk of rock's original wildman of the airwaves, Wolfman Jack, who passed away on July 1st, 1995 of a heart attack. He was 56.

You can listen-in again to some of the Wolfman's radio broadcasts by visiting: http://mp3skull.com/mp3/wolfman_jack.html and at: <http://www.xerbradio.com>.

I want to thank Bud Garretson-AD5SK, for his inspiration behind this article. –Ed.

A Ham's Night Before Christmas

Yet another corruption of Clement Clarke Moore's classic Christmas tale
By Gary Pearce, KN4AQ

'Twas the night before Christmas,
and all through two-meters,
not a signal was keying up any repeaters.
The antennas reached up from the tower quite high,
to catch the weak signals that bounced from the sky.



The children, Technicians, took their HT's to bed,
and dreamed of the day they'd be Extras, instead.
Mom put on her headphones, I plugged in the key,
and we tuned 40 meters for that rare ZK3.

When the meter was pegged by a signal with power;
It smoked a small diode, and, I swear, shook the tower.
Mom yanked off her phones, and with all she could muster
Logged a spot of the signal on the DX PacketCluster.



While I ran to the window and peered up at the sky,
to see what could generate RF that high.
It was way in the distance,
but the moon made it gleam -
A flying sleigh, with an eight element beam.

Then lo, it was Santa, the Santa of Hams,
on a mission this Christmas to clean up the bands.
He circled the tower, then stopped in his track,
and he slid down the coax right into the shack.



While Mom and I hid behind stacks of *CQ*,
this Santa of hamming knew just what to do.
He cleared off the shack desk of paper and parts,
and filled out my late QSLs, for a start.

He ran copper braid, took a steel rod and pounded
it into the earth till the station was grounded.
He tightened loose fittings, re-soldered connections,
cranked down modulation, installed lightning protection.
He neutralized tubes in my linear amp...
(Never worked right before – now it works like a champ).





A new low-pass filter cleaned up the TV.
He corrected the settings in my TNC.
He repaired the computer that wouldn't compute,
and he backed up the hard drive and got it to boot.
Then, he reached really deep in the bag that he brought,
and he pulled out a big box. "A new rig?" I thought!
A new Kenwood? An Icom? A Yaesu, for me?
an Elecraft, TEN-TEC or Flex, could it be!
(If he thought I'd been bad it might be QRP!)

Yes! The Ultimate station! How could I deserve this?
Could it be all those weekends I worked Public Service?
He hooked it all up and in record time, quickly
Worked 100 countries, All down on 160.
I should have been happy. It was *my* call he sent.
But the cards and the postage will cost a month's rent!



He made final adjustments, and left a card by the key:
"To Gary, from Santa Claus. Seventy-Three."
Then he grabbed his HT, looked me straight in the eye;
Punched a code on the pad, and was gone - no good bye.

I ran back to the station, and the pile up was big.
But a card from St. Nick would be worth my new rig.
Oh, too late, for his final came over the air.
It was copied all over. It was heard everywhere...



The Ham's Santa exclaimed what an old ham expects:



"Merry Christmas to All, and to All, Good DX."

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Best Amateur Radio Operators Train to Assist Navy in Event of War

WASHINGTON – Some of the best amateur radio operators in the country will be available for immediate service to the United States in the event of war. Selected men from the ranks of radio amateurs are being enlisted for four years in the Volunteer Communication Reserve of the Navy.

Operators with a commercial license of extra first grade may qualify as chief radiomen in time of war; those with first grade licenses as radiomen first class; those with second grade licenses as radiomen second class; and amateurs second grade as radiomen third class.

One of the noteworthy examples of the development of this branch of the naval reserve is the growth of the units in Florida, Commander J.A. Schofield of the Naval Reserve, says.

In February, 1925, Capt. C.D. Stearns, then commandant of the Seventh Naval District, began organization of the communications reserve in his district. At that time there were one officer and two enlisted men in the district. The personnel now is 84 officers and men and the reserve has acquired 24 radio transmitting and receiving stations, in various Florida cities.

Units of the communication reserve have been established in Orlando, Jacksonville, Ft. Meyers and Tampa, Florida. Each unit reports by radio to the master control station at Orlando on Thursday nights. The Navy Department, through the cooperation of the Department of Commerce, has assigned two Navy call letters to reserve radio stations. They are NRRG at Orlando and NRRQ at Jacksonville.

Men who enroll in the reserve are given an opportunity to become acquainted with expert radiomen in all parts of the United States. Each year a selected number are given shore radio station duty with full pay for two weeks, and in some instances, radiomen have been sent on Summer cruises on board Navy destroyers, where they have been assigned to stand radio watches at sea.

The enlistment age is 18 to 35, but fans of all ages apply, from 16 to 70, Commander Schofield says.

Advertisement from
'Popular Radio'
December, 1927



**Make it a
RADIO
X'mas!
with a
MICHIGAN
FOUR
\$150**

RIGHT now, settle the question of Christmas presents. Buy a Michigan Radio receiving set.

You get more real value and satisfaction from these receivers than any others, regardless of what you pay.

Distance—with greater selectivity and simplicity of operation.

Reliability—with logging and unusual tone qualities.

And each model enclosed in a cabinet designed and made by the world's best furniture craftsmen.

Models in two, three and four tubes. Styles from \$32.50 up.

Send for illustrated folder. Ask your dealer for a demonstration.

Licensed under U. S. Patent, 1,113,199-letters pending 807,285

MICHIGAN RADIO CORPORATION
33 Pearl Street
Grand Rapids, Mich.