VOL. 4, NO. 9. MARCH, 1951

THE VHF NEWS

DEVOTED SOLELY TO AMATEUR RADIO

EDITED AND PUBLISHED BY: BILL MCNATT, W 9 N F K, FRANKLIN PARK, ILLINOIS

* AURORA AND TROPOSPHERIC OPENINGS IN FEBRUARY AROUSE ACTIVITY UPSURGE ON 2!
* "AN R.F. IMPEDANCE COMPARATOR" BY R.V. DANNER, W9BYG/3. ARTICLE ON PAGE 12.
* "THE U H F WORLD" DISCUSSES LIMITATIONS OF PEAK ANTENNA POWER ON 420 MC.
* "THE STATION OF THE MONTH" PRESENTS W9DXX, ALICE R. BOURKE. SEE PAGE 4.

TWO METERS, LAST MONTH . . .

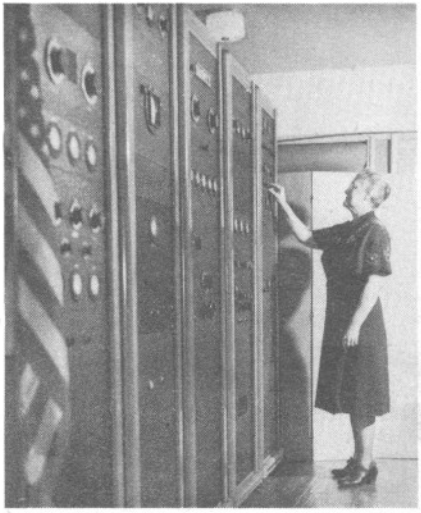
The Aurora opening on February 5th, reported briefly in the February issue, was observed by stations in Canada, Minnesota, Michigan, Pennsylvania, Ohio and Virginia, according to reports elsewhere in this issue.

Several good tropospheric openings occurred during the month, particularly on February 15, when W9AFT and W9EQC worked VE3AIU, Goderich, Ont. On the same night, W9FAN, Sheboygan, Wisc., worked into the Chicago area, and WØBJL, St. Louis, Mo., pushed a good signal into northern Illinois. Good conditions were also observed on February 22 and 23.

Early in March, the band opened up very well to the south, W5VY and W5QNL, San Antonio, Texas, were working into St. Louis and into Illinois as far north as the Peoria area. W9SUV, Arcola, and W9EHX, McLean, Ill., worked quite a few W5s. According to sketchy reports received, W9SUV worked 3 stations in Little Rock, Ark., and one in Texarkana, Texas!

Hod, W9ALU, says, "I called very lustily to W5VY and W5QNL, whose signals were in and out from time to time in Metamora, but up to S6 on peaks. EHX, McLean, had a field day! Funny how only 35 miles makes a difference! Too bad, how WØ... talks too long to elusive DX!"

W9UIA, Ralph Barnett, brings our attention to some more firsts on Two. (See "The VHF News", December, 1950) The W5ERD, W5QNL to W9UIA contact on June 25, 1950, was the first Texas-Indiana on 2; the W9UIA-W5ML contact on the same date was the first Indiana-Louisiana on 2, Ralph believes. FB! Any others for the record?



ALICE BOURKE, W9DXX, ADJUSTS "THE STATION OF THE MONTH". See Page 4.

W9UIA reports 11 states, 7 call areas and 540 miles DX on 2 with 10 w. input to a 522, and a 20-element array, 25 feet high. Nice going!

W2NXC believes in keeping ham radio "in the family". Accordingly, he married W2NLY's sister, recently! As an added note, NXC wrote: "..Will be inactive for a while!" Hi!

"Grid", W1GJO, is active on 6 and 2 in Westminster, Mass., with 400 watts to p.p. 826s. He says he'll be beaming to the west, this summer.

Ted Fabian, W3RUE, summarizes activity in Pittsburgh very briefly: "Things very dead here on 2 meters!"

BADGER MILK RUN

By: Vic Tresidder, W9TQ

Sorry, gents, our DX outpost, W9FPE, Willard, has moved to Chicago, of all places! Hi! Hope others will keep the Willard area alive. Anxious to hear Ed on from the new QTH. (He's on with a 522, in Chicago.- Editor) Good luck!

LJV, finally airborne, made two flights on February 18 and again on the 25th, and tested with several stations. If he could get a certain piece of wire from a certain somebody, he might do better; present antenna is too short. (Certain wire sent! - Ed.) Prop wash does bother signal at times but Bob wants no more holes. While in contact with Chicago stations, he observed that signals dropped out when he hit 2400'; at 2000), they were in, on this particular flight. Weather and snow-skis prevented DX flying. On the 18th, LJV worked KQM TQ BTI GZR/M NZ HJB HDZ AFT. On the 25th, NZ HJB NW IMQ FAN TQ BTI KQM HDB PM GIL AFT GDM ALU JBH and NQZ. Perhaps Bob will write an article on his installation, for us. (FB! - Ed.)

Not much done on the TQ teletype, but am working on it.

No decision on Emergency Corps Net frequency change from 146Mc., as yet. GZR LJV BTQ YFT YYY WTL UJM AFT and BTI are active on drills.

On February 23, IMQ and TQ heard the voice from Libertyville, W9JBH. Guess he didn't have the receiver on. EHX, at 1240 was also a welcome surprise; our beam was on Chicago. 2/24: JBH and PM going at it at 1108, but we had to pull out for the salt mines.

New schedule with Alice, W9DXX, may pay off on Mondays thru Fridays at 1130. Open for others, too, so what is your pleasure?

Band openings observed from 15th to 25th by AFT; we noted daytime conditions improved. On the 15th, AFT worked VE3AIU.

Near and around town. LJT, new; was at Wood, Wisc., VA Hospital. Wood is surrounded by Milwaukee, West Allis and Wauwatosa. Should be on from home before long. GIL is old hand on 125 and 60; tried MO first; new FM and likely to be regular. YYY beam up and operating, altho not rotatable, yet. BTI finishing fixtures on pole 80' up; then comes the beam. AFT raised his beam 10 feet; says LIU and HHE are expected on, soon. UJM delayed by slippery roof. FAN put up antenna for TV, only, so can use 2-meter beam for more operating. DDG on, evenings. HDZ having converter troubles and absorbing TV. AVF must be accustomed to the salt mines, now.

Heard or worked at TQ: W9FAN LJV DDG HDZ AFT NZ KQM IMQ BTI LJT HDB UJM DXX JBH EHX NW GIL and ZH?; not ZHB or ZHL; HDB, pls ck ur log, 2/17, 1106. Tnx!

* * *

TWO-METER TOPICS IN TEXAS

By: John N. Naff

Not much activity down here during February; too much cold weather!

W5QME DSB QIO and SM continue to keep the Beaumont area on the band. W5BCF FCD and PJX, and a new station, W5PCW, are active in the Port Arthur area. W5JBW still holds forth at Maplewood, La.

W5QIO does most of the DX work, at least when it's not too cold.

Fortunately, most of the ice storm missed us, so no one lost any beams.

With the arrival of spring, DX conditions should improve. It's getting close to the time when we should have some more of those slam bang openings. The Gulf Coast Emergency Net is still going strong on Two.

W5DSB had a little trouble with a stubborn case of BCI, but finally corrected the trouble in the broadcast receiver.

Interest in Two is rising, and may be we'll have some more stations on.

The gang in our area is looking forward to contacts with Arizona and New Mexico, this year. Quite a few 2-meter stations are active out there.

* * *

THE OLDTIMER ON TWO SAYS: . . .

"Well, this is a little bit more like it.... I mean, the way the old 2-meter band has 'livened up in the past few weeks! Seems good to tune around and hear some stations that haven't been coming in all winter.

"One thing I can't figger out, tho, I can listen, night after night, and only hear an occasional stray signal. But, just let conditions get good, and the gang's all there!!! Can't figger it out; can you?"

STATION OF THE MONTH

By: Jack Woodruff, W9PK

"The VHF News" is privileged to present its first YL station, the first postwar pictures of W9DXX, the first YL 2-meter operator in the Illinois area, Alice R. Bourke, RFD 1, Homewood, Ill. Pictures and write-ups of W9DXX, pre-war, appeared in practically every U.S. radio publication and those of England, France, Poland and Russia . . . pre-war, remember!

Alice's station and activities were written up nicely in "RADIO", December, 1934, and 1935. (Ed. Note: Pardon me for reminiscing, but - even then - we were reporting "From Ones to Nines" in the same magazine.)

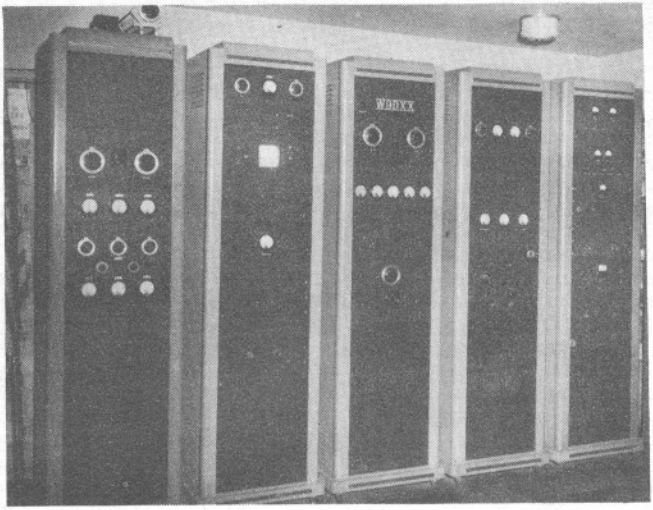
Also, "Short-Wave and Television", July, 1948, devoted space to the activities of W9DXX. Unfortunately, our space permits only a brief sketch of W9DXX's history . . . we can't tell the full story of Alice's days as a reporter for the "Chicago Tribune", when she covered the wild south-side, when the "cops" would talk only to her (police radio did not exist, in those days)...when Alice could walk without escort through crime-ridden, race-prejudiced "Bronzeville" . . . when notorious criminals, when caught, would say, "Tell Mrs. Bourke to see me; I'll talk to her!"

Alice Bourke, as a Police Reporter on the staff of the Chicago Tribune, made some "scoops" that could never be equalled in terms of amateur radio. As Alice says, "Those were the days when news 'scoops' were like a 1200-mile contact on '2', today, as a thrill!"

The "FIRST LADY OF TWO" in the Midwest, Alice Bourke, W9DXX, at the operating console, working "Two"!

Alice was first licensed on April 19, 1930, and received her Class A license on October 10, 1935, in Chicago. In April, 1940, Alice moved to Homewood, Illinois, some distance south of Chicago, to enjoy life with her husband. Fate planned Alice's future differently, however.

THE "LIL OL' SHACK" ! ! !



Regarding the beautiful station in the picture, Alice says, simply, "Charles Corliss, W9CTN, built all of the equipment used at W9DXX."

All pre-war DX was done on c.w., including outstanding participation by W9DXX in the Army Amateur Radio System, where she completed the Army Cryptography course with a grade of 92.5.

Alice's first 'phone "operation" was made during the 1938 ARRL National Convention, when Director Dosland induced Alice to make a talk, broadcast by WENR. She was so scared that her knees shook; something that never happened when she was a Police Reporter! Later, Alice said, "Who'da thunk I'd ever talk into a mike by the hour?" Needless to say, Alice was happy to return to c.w.! She can still take fast c.w., and pound it out, also. However, Alice operates on 'phone, mostly on 2, these days.

W9DXX has logged well over 5500 QSOs during her several years of activity. For a few years, Alice operated W9ENP from her skyscraper location adjacent to the Chicago-loop. Then, she was net control for the well-known Chicagoland Mobile Radio Club, on "10". Also, W9ENP transmitted the educational and informative "Round-Table Net" discussions scheduled by the Midwest VHF Club, on Two Meters.

At present, W9DXX devotes most of her time to Two Meters, although the station facilities provide operation on 'most any band, with wonderful TVI-insulation- 7 acres! The rotary beams include a "W5LHI" for "20", mounted atop a 70-foot steel tower; a 3-element, 10 meter beam atop a 60-foot telephone pole; and, the ever-active 2-meter beam! Wire antennas are used on the lower bands.

The "shack" is in one corner room of the "lil ol' mansion". The floor is green asphalt tile with W9DXX set in red linoleum at the center. The walls of a second room are covered with a collection of DX ameteur photos, accumulated over a period of many years.

The transmitters are: 75 phone, p.p. 100THs, 400w.; 10 and 20 phone-c.w., p.p. 250TLs; 6 and 10 phone, p.p. 813s. A common modulator, class B 150TLs, is used on these rigs. The 6, 10 and 20 rigs are driven by an ART-13. The 2-meter rig is an 829B final, 80w., driven by a 522.

The operating console contains Collins 75A1 and RCA AR-88 receivers, a VHF-152 converter, the ART-13 exciter, a 75-meter v.f.o., and direction indicators for the 2, 10 and 20-meter beams. The VHF-152-AR88 combination is the 2-meter receiver.

Post-war DX is close to 100 countries, but Alice is more proud of her 12 states worked on 2-meters! We're out of space! Ask Alice for the rest; the Rosenwald Museum display of W9DXX.

ERIE NEWSLETTER FROM W3QKI

After losing last summer's antenna in November, I finally got another one up, at long last, and it seems to be doing a fairly good job, so far. It's an 8-element Yagi, 90 ft. high. There are 3 reflectors, above, below and behind the dipole, and 4 directors strung out on a 12-foot boom!

Although I've never been a Yagi fan, I must admit that it is a worthwhile array. One of its chief advantages is that it is light enough to be raised up higher and easier than a large array. Going from 60' to 90' made a difference of 1 to 2 S units on my signals, even though the 60 ft. level put my antenna in the clear of surrounding objects. For some time I've wondered which is better, a large antenna at a medium height, or a small one at a greater height. No doubt about it, height means a great deal.

I've been running schedules with W2 NLY, So. Plainfield, N.J., since January 29 with promising results. We try contacts on Monday, Wednesday and Friday nights at 10PMEST. So far, he has heard something of my signal, every time; I haven't done quite as well because, probably, of power difference or receivers, but I have heard him about half the time. The path is 310 miles over the Appalachian mountains. The power at W3QKI is about 450 watts m.c.s., on 144.5Mc.

Also, am running schedules with W4 AO, following his 11PM schedule with W8BFQ. This schedule is tentative, every night, and definite only on Tuesday nights because W4AO is quite busy. Have also been eaves-dropping on W8BFQ's nightly schedule at 8:30 with W4JDN, Kentucky, and manage to hear his carrier quite often, but not good enough yet for a contact. Conditions haven't seemed very good, this year, but we should make it, soon.

February 5 brought the first Aurora opening observed here, with signals heard from W9LF EHX MAL W8DUL W4AO W3LNA VE3LU and AIB. Others heard, but not identified.

Most of the gang seem to look forward, a great deal, to the sweepstakes affairs sponsored 3 times a year by the League. They don't seem to come often enough. What can be done to stir up more? (Clubs; locals.-Ed.)

AURORA IN MINNESOTA, FEBRUARY 5.
By: Bob Witschen, WØSV

This is to report the results of a real Aurora opening, which started at about 8PM, February 5th.

Mac, WØHXY, worked W9EHX on c.w. He also heard W9LF AWA and ZHB. When on phone, it was impossible to get sense out of their modulation because of the Aurora garbling. Antennas had to be pointed to the north in order to get any signals at all.

After Mac worked W9EHX, he got me on the air, but I had considerable trouble from power line noise from the north. The best I could do through the noise was W9ZHB and EHX. Believe I also got the call letters of W9LF, but the power line noise was stiff competition for the buzz of the signals. Also, because the b.f.o. was out of order, I had to copy the c.w. without it. AWA may have been calling, but I didn't hear him.

Mac got his tip from hearing Aurora on 10. He did not believe it could happen on 2! (What, after all the authenticated reports in "QST", "CQ" and "The VHF News"? - Ed.) Our previous experience in what was predicted to be Aurora resulted in getting the phones with the beam directly toward the station. (Best way to catch it is to monitor 10; when 10 is all torn up, 2-meters may be affected; CRPL predictions may be off 2-4 days - Ed.)

Our first Aurora bestirred me to overhaul the old SX-17, and now the b.f.o. works! Also, replaced the selectivity switch with a rotary type instead of the toggle, and the i.f. works better than ever before.

This report verifies our participation in the Aurora opening. Hope the boys will QSL; we understand they're kinda bashful in this respect, hi!

Otherwise, our activity has been at a very low ebb -- that sub-zero weather resulted in a cold-wave in the basement shack!

* * *

CENTRAL RADIO PROPAGATION LABORATORY RADIO PROPAGATION FORECAST, March 6.

"The most likely periods for the beginning of disturbed radio propagation conditions during the next 25 days are (Greenwich dates): March 21-23, March 26-27. The average length of a disturbance is two to three days."

THE U H F WORLD

By: Arnold M. Bucksbaum, WØWGZ

Investigations made over a period of several years have brought forth a number of ways of generating power on the 420 Mc. band. These include the use of oscillators, frequency multipliers and amplifiers. Tubes used include the 832A, 829B, 9903, 4X150A, 8012, 8025 and several lesser-known types. In general, the amateur is learning how to generate progressively larger amounts of power at 420Mc.

The present FCC regulation on peak antenna power on 420 may soon become a ceiling for the advancing u.h.f. man, because it states, "Peak antenna power must not exceed 50 watts". Interp- this means an average power of 25 w., unmodulated, or 6.25 watts average carrier under 100% amplitude-modulated conditions. This is shown below.

a. Unmodulated condition

$$P\ (peak) = \frac{E^2\ peak}{R}$$

$$P\ (avge) = \frac{E^2\ peak}{2R}$$

b. 100% Amplitude-Modulated condition

$$P\ (peak) = \frac{(2E\ peak)^2}{R}$$

$$P\ (avge) = \frac{(2E\ peak)^2}{2R}$$

The ratio of peak amplitude-modulated power to average unmodulated carrier power is 8. If you desire to 100% amplitude-modulate your transmitter on 420 Mc., the average unmodulated carrier power, at the antenna, may be only 6.25 watts. In terms of u.h.f., this sounds like an exceedingly small amount of power. Because of transmission line losses at 420Mc., there is little danger of very many rigs exceeding the peak power limit at the antenna, at the present state of the amateur art.

To ensure that the FCC regulations are not violated, and yet have the highest possible average power in the antenna, it appears that c.w. should be preferred to a.m. phone operation, at least when hunting DX. (Ed. Note: If the fellows could agree on some basic standards of f.m. deviation, limiters and discriminator recovery characteristics, f.m. phone could be used. However, the average ham's attitude towards f.m. is negative because most of his experience with it has been with a mongrel combination of f.m. transmitters and a.m. receivers detuned for slope-selectivity detection. That is a poor "f.m." system!) Although the difference between 6.25 watts and 25 watts is only 6 db, this difference may be what is required at the other fellow's station in order for him to have a readable signal. More efficient transmission lines and directive antennas are necessary in order to make the most effective use of the maximum permissible power. Until transmission lines are improved, order to obtain higher output so that transmission line losses may be overcome and put peak power to the antenna.

At a recent affair in Cedar Rapids, Iowa, the telephone company demonstrated a very interesting method of making microwave demonstrations. The technique is one which you can duplicate with your surplus microwave cavities. All the transmitting equipment (klystron, in their gear) and a crystal detector was mounted inside of a small box. A small horn antenna was mounted on the outside of the box. The unit was powered from 115 v.a.c. The receiver box also had a small horn antenna, and a pilot bulb was lighted when the received microwave signal was sufficiently strong.

By activating your microwave gear in a similar manner, you would not only learn more about microwave power generation and detection, you would also have a fine demonstration unit for your amateur friends who have only a cursory interest in microwaves.

A lot of experimental fun can be had by placing various types of lenses in the path, or by deflecting the signal through longer paths by use of metallic reflectors. This would not be DX in the usual sense of the word, but it would be educational from the aspect of influence on microwave propagation by various "foreign" bodies.

Let's build our activity on 220 and 420Mc., this spring and summer, and get more stations on those bands. It is a lot of fun. Please report u.h.f. to A. M. Bucksbaum, 1608 1st Ave., N.E., Cedar Rapids, Iowa.

WØMNQ REPORTS FROM KANSAS CITY, MO.

I haven't had time to do anything with propagation analysis for some time because the winter weather has been keeping me very busy on the job. However, conditions for February 21, 22 and 23 should have shown better than normal v.h.f. contact conditions in the middle-west.

The first part of February was uneventful in the area, no aurora effect was observed, here, although local activity held up quite well. But, no known contacts were made outside of the Kansas City area. Two new stations active in the K.C. area during the month were WØs LQV and ZGK, formerly on 10 meters, who now have a signal on 2, directly, rather than an un-suppressed harmonic. There are rumors that several other low-frequency boys are ready to come on Two. Paola, Kans., is now represented on 2 by WØUBI and OTN, both using 522s.

On Sunday morning, February 11, WØ HOZ, Allen, was scanning the band for some activity and, just before hooking a local, he heard a CQ from WØUCP. This, to the regular 2-meter gang, would have meant "Fire with both barrels! - DX!" But, since Allen didn't recognize the call, he assumed it was a local 10-meter harmonic, and thought nothing more of it. That evening, he casually mentioned it to the local gang, and thereby found out he had been hearing Des Moines, Iowa! Now, he beams north for an Iowa contact, every time he comes on! However, nothing has been heard of Rocky, WØUCP, or any other Des Moines station, since!

On February 22, WØDSR, Greenleaf, and WØJFE, Abilene, Kans., worked the K.C. gang, and we know there was also a station on in Salina, Kans., but we couldn't identify it. On February 23, the first 3-state roundtable QSO occurred since last year, with WØDSR, WØEMS, Adair, Ia., WØINI, Pleasant Hill, Mo., and the Kansas City gang participating. Frank, WØEMS, passed the news along that, at about 2330CST, February 21, he heard a WØDD? working WØELL, Denver, Colo. WØEMS' beam was pointed almost south at the time, so he thought it was Roscoe, WØDDX, in contact. But, it wasn't Roscoe, and inquiry of the area has failed to identify the station. Frank says that he heard two transmissions, and that he would have been able to identify the station, definitely, had it not been for the fact that the operator seemed to slurr over his own call.

Now, we wonder if Frank could have been hearing WØDD, Frank Matejka, at Estes Park, Colorado, working WØELL in Denver??!! How about it, Ed and Frank, whom were you working at that time? Kinda looks like we all missed the boat, the long-awaited Colorado contact!!

WØDRW, of the local gang, now has 2 distractions in addition to TV to keep him off the air. He now has a rig on 40(!) and also has become a grandfather! (Phooey on the first; FB on the second! - Ed.) In spite of all this, tho', Grandpa Frank is still one of the most regular stations on the band.

WØDVV has been delayed on the construction of his crystal-controlled converter. Ned took time out to assemble a vacuum-tube voltmeter kit, but he is now back to work on the 2-meter job. We plan to have Ned as the speaker for the March meeting of the local radio club. His subject will be "The Importance of R.F. Stages in the Receiver", or something similar.

New beams for the coming "season" are another project for the gang; especially important is this effort, inasmuch as we've had so few warm days, recently. WØDDX is ahead of all of us because he had the fortitude to erect a 32-element array right in the middle of the winter! However, most of the gang haven't the facilities for erecting a large array, so our majority probably will continue to use parasitic beams.

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SUBSCRIPTIONS . . . Thanks, again, to several of you fellows who keep "The VHF News" in mind and send in new subscriptions, each month. That really helps. It helps, too, to ask your friends if they've renewed. Or, ask that new man on 2 if he's subscribed. We've got to keep the subscriptions coming to replace those who, for various reasons, lose interest in v.h.f. and the "News". Also, we could stand to have even one more advertiser, hi! As W5MKP says, ".... it's human procrastination!"

"CANADIAN CAPERS"

By: Norm Rickards, VE3BOW

The biggest bit of news, here, is that Clayt, VE3LU, Brantford, is now running 250 watts to a pair of 826s driven by an ARC-5. The antenna system is a 5 over 5, 70 ft. high.

The band has been open about three or four times during the last 3 weeks of February. The first opening came on the 5th when Aurora arrived. On February 15, the band was open to the west. VE3AIU, Goderich, AVE and EI, in Forest, were heard and worked. Also, W8DUL, Michigan, was heard. VE 3AIU worked W9AFT, Milwaukee, and W9 EQC, Aurora, Illinois!

Another opening came on the 18th, to the east, this time. The Rochester and Syracuse, N.Y., gang came through very well. The band remained open all week and gave fairly good coverage in all directions. An east-west opening came along on the 25th. VE3AIU worked into Buffalo, but nothing was heard east of there.

W3WBM, Erie, came through very strong on the night of the 26th, with a bit of QSB. He also worked the Toronto gang. W3WBM and VE3BOW have held schedules at 9PM on Monday, Wednesday and Friday for the past 6 weeks.

On only two nights were conditions unfavorable to work Frank. The path is only 75 miles, but it's tough!

There is now a Six Meter Emergency Net operating in Toronto on Tuesday nights at 9PM, with approximately 12 stations tying in with Oshawa, Newcastle and Hamilton. Newcastle is approximately 90 miles east of Hamilton. In the 3-city area, there are approximately 45 stations on Six, the great majority being in Toronto.

The picture, below, shows the gang in attendance at the Southern Ontario VHF meeting held at Oakville on January 18th. (Unfortunately, the grouping is too complicated to list all of the fellows, but in the 1st row, 3rd from left, is VE3ANY; 4th, VE3 BOW; behind him is VE3BWG; on his left is, we think, VE3DIR. Last, in the first row, is VE3ANT. VE3EAH, AIB are 'way back, at the left.-Ed.)

VE3BOW made the Rag Chewers Club, on two meters, hi!

(You couldn't speak to him, without bowing, for almost a week after he became a member of RCC! His head is normal-size, now!-Kathy, XYL.)

The Canadian gang will be looking to the west for the Illinois-plus DX, now that spring's here!

TWO METERS ON PUGET SOUND

By: Hugh Compton, W7MKW

W7DF and LBP are on 2 in Everett, and put good signals into Olympia over a 90-mile path. W7JBK-portable atop Swauk Mountain, east of Seattle, made over a score of contacts with a 522 on a recent Sunday afternoon, showing that routine band occupancy isn't too bad.

W7KKR, Dick, former 2-meter mainstay in Yakima and now attending the U. of W. in Seattle, is mobile from Queen Anne Hill, now and then. Homer, W7 EUI, keeps Kirkland active on two.

Activity in Tacoma has slumped a bit, but is on the upswing in Olympia.

W7HED and HPJ acquired 522s during the month. Rex, W7HNS, is back in Olympia after a whirl at being a W6, and agrees that 2 is a bit different here than in the land of inversions! Rube, W7EGV, has revamped the front-ends of quite a few local 522s and says that his latest version, using 6J6s is the hottest he's had, yet.

W7CMX lost his 16-element beam twice in a month because of the heavy blows!

W7KNV and NEY are on, almost every night. Roy, NGZ, has a 522 and is toying with the idea of seeing whether it works. Most of the Olympia gang have 8100 kc. rocks, and gang-up on 145.8Mc. The local club has been re-organized and over half the members are active on Two.

Ralph, W7WDZ, gets on the band from Port Orchard, regularly.

Norm, FQR, Seattle, and Leo, CVI, at Renton, are in the active column. Ed, AQJ, is on 2 at Vancouver, and would be a nice catch for any of the Puget Sound boys.

Judging by the f.b. article by WØMNQ in "The VHF News" for January, 1951, the DX outlook in this region is not so good. There are about 25 stations active on 2 in the Puget Sound area.

(Ed. Note: Believe your position on the coast is better for propagation than you might think. Wait 'til the weather warms up, arrange schedules for tests. We'll ask Jim to check into your weather as soon as he isn't as loaded with work, as he is now.)

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MOVING? If so, please send us your new address in advance; the post-office doesn't forward the "News".

BATON ROUGE REPORT

By: J.R. Fincher, W5MKP

On February 11, we celebrated the 2nd Anniversary of the first 2-meter contact between New Orleans and Baton Rouge, and 2 years of nightly schedules. Participating were W5EM OQW and MXJ, New Orleans, and W5MKP and GIX, Baton Rouge.

New in Nola, on 2, W5HCM, JYN; new in Baton Rouge, on 2, is W5IIA; W5HEZ will be back on 6, soon.

Nightly schedules are also kept with W5QIO, Beaumont, Texas, and W5JEW, Maplewood, La.; others, also, when conditions are good enough.

One opening occurred in early February. Stations in Corpus Christi, using 522s, were Q5 here, but they couldn't read us. Other openings occur from time to time, and we work into Houston; sometimes farther.

Nothing has been heard from the north since the contact in October with W9 SUV; he was barely readable, and the only northern station heard, here. W5MXJ, New Orleans, was hearing several Illinois stations. (We know! We missed him! - Ed.)

W5JTI is very busy with the 148.14 Mc. C.A.P. Net.

W4HHK doesn't even turn his beam in this direction!

Have heard and read a great deal about Pensacola stations getting on 2 with 1st class equipment. But, they don't answer letters or telegrams, so if a contact is ever made, it will be purely random in occurrence, and the chances for that are slight.

W5JTI's 148.14 Mc. C.A.P. net did yeoman service in Mississippi's recent emergency!

After listening to the North and calling CQ several times nightly all winter, I think Aurora is purely a Yankee proposition! (Correct! From all available records, Aurora just doesn't show up that far south.-Ed.)

* * *

SELL OR SWAP . . .

1 DCL Relay Rack, Allied Radio Catalog #98-880. Purchased in 1944 at a cost of $41.20; same thing today, almost $60. Brand new, original case. Would accept new table model record player with good variable speed changer, or other trade; or, $35 cash. H.C.Newman, 36 W. Sheridan, Ely, Minn.

W8WRN REPORTS FROM COLUMBUS, OHIO..
Local activity on 2 has been very good as a result of civil defense work. Six is as sick as ever, altho I haven't been on, either.

Most active on 2 are W8UZ CPA PDW ABO GKN EYE LQK BAX and WRN, operating mostly on 146.34; ask W9NSF! He broke in on the net, recently, hi! About half the stations use both vertical and horizontal antennas.

DX-wise, the band has been fairly good. On February 25, the Indianapolis gang came in S8-9 from 8:30 to 9:30; then some QSB occurred. W9ASM EWO GDW GSY and NSF were worked.

Many new stations are on in western Ohio: W8SNY and THJ are on about 145.2 in Piqua; W8FMW and GAB, East Sparta, run 250 watts to p.p. 35TGs. WRN still uses the same pile of junk.

The local club received the call W8 TO for the Red Cross headquarters station, 30 E. Town St., Columbus. John Brant, W8WAB, is trustee. WAB and WRN QSO'd with inside dipoles and had 3 contacts using 522. The receiver was a crystal controlled converter into an HQ129X. MEN and Don Flint are working on the i.f. and noise limiter end of the job; WRN is working on a tunable converter. Dave Cleckner, of Antenna Labs is building the mobile and headquarters antennas. The 2 and 10 meter antennas will be about 125 ft. high, atop a building next to the Red Cross. We should get out, well.

W8UZ and QQ have been working on the transmitter, 6J6-6J6-2E26, with about 7 to 8 watts input. Our surplus generators put out only 100 ma., so the power is limited. Super-regens have been ruled out. (FB! - Ed.) The club is striving to put 30 units on the air. CD seems to have awakened them.

The Dayton Club is building some rigs similar to Tiltons, using 4 6J6s; also, 12AT7-12AU7 superregens; understand that W8LJ has a good design. Springfield and Piqua are also building additional equipment.

In Columbus, W8ABO has an ARC5, using clamper-tube modulation, ready for mobile. He's tried it out with battery power, from the shack, and it worked very well.

New frequencies for CD nets: 146.8 for fixed, and 147.11 for mobile, if we can get enough crystals.

THE VHF NEWS

"Audi alteram partem"
(Hear the other party; hear both sides.)

EDITED AND PUBLISHED BY:
BILL MC NATT, W9NFK
FRANKLIN PARK, ILL.

Subscription Rates: In U.S.A., Possessions and Canada, $2.00 per year. Elsewhere, $3.00. Single copies of current Volume, 35¢ each. Please do not send stamps.

All editorial contributions will be appreciated, and should be mailed on or before the 25th day of the month for publication in the next issue.

CORNER REFLECTIONS . . .

The current rush of many organized nets for spots in the recently-assigned v.h.f. civil defense bands may ultimately result in tremendous confusion and interference when all the services in one area try to operate simultaneously, especially in areas like New York City and Chicago.

In recognition of this problem, the Civil Defense authorities in some metropolitan areas are considering the establishment of Frequency Allocation Committees for the use of the frequencies assigned by the FCC.

This plan is already under way in Chicago. The Chicago Civil Defense Corps Communications Committee will probably have some information available within a few weeks. Under the Chicago plan, communications must be provided to 6 different defense subgroups in addition to auxiliary support by amateurs to the fire and police departments. Consequently, it is evident that some orderly distribution of frequencies must be made, or else the usefulness of amateur operation will be destroyed by arguments over frequencies as well as QRM!

Accordingly, if you or your net is planning to move into the civil defense bands, it might save much time and confusion if you would check with your civil defense communications committee to see what the frequency assignment plan is. If there is none, there may be need for one, now.

AN R. F. IMPEDANCE COMPARATOR

By: Roland V. Danner, W9BYG/3

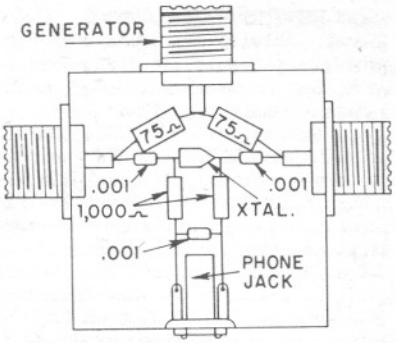
The R.F. Impedance Comparator is a simple Wheatstone bridge circuit with an easily-replacable reference impedance. It will give an excellent null over a frequency range about 500 Kc. to 500 Mc. It will measure any balanced or unbalanced circuit of any impedance normally encountered in connection with transmission lines. A continuously variable reference resistor can be used, but only at the sacrifice of optimum balance at high frequencies. The circuit will compare reactances quite accurately.

Because of its size and electrical design, the Comparator can be inserted at an antenna for measurement. It cannot, however, be left in the circuit when the transmitter and receiver are in normal use. The ease with which the reference resistor can be changed, together with the advantages of flexibility and small size, make the Comparator very useful in determining impedances quite accurately.

In order to use the unit, only a few accessories are required: a variable-frequency oscillator, for the frequency of interest; a 0-1 ma. meter, and a reference resistor or resistors.

An amplitude-modulated signal generator can also be used in conjunction with an audio amplifier and audio voltmeter.

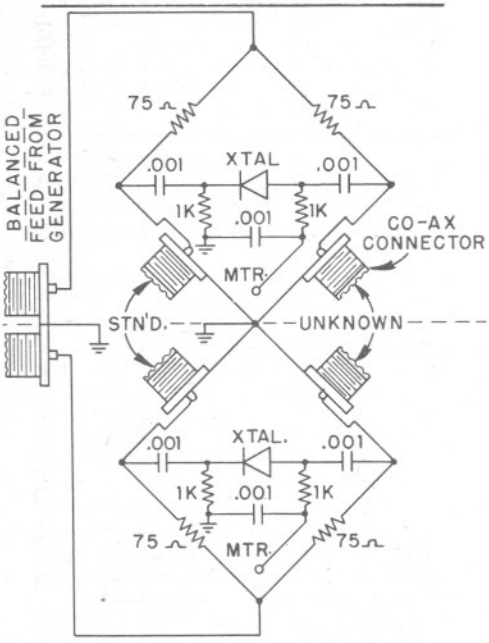
The circuit and layout of parts are shown in figures 1 and 2. Symmetry of parts location is of the utmost importance. The more symmetrical the construction is about the generator terminals, the higher will be the frequency at which a good null will be obtainable. Note carefully the arrangement of parts in the author's unit, shown in the picture. This is a double unit, per figure 1, and is used for checking balanced circuits. The two circuits are constructed in a stacked arrangement so that the spacing between the coaxial connectors is 3/4", that of GR double plug



LAYOUT OF SINGLE SECTION

75Ω RESISTORS MUST BE MATCHED ALLEN-BRADLEY 1w TYPE. .001 uf. CERAMIC CONDENSORS WERE APPROXIMATELY SIZE SHOWN. 1000Ω RESISTORS WERE 1/2w ALLEN BRADLEY. XTAL - IN63 - IN34 OR SIMILAR. UNKNOWN MAY BE PLACED IN EITHER UNMARKED CONNECTOR, WITH REFERENCE RESISTOR IN THE OTHER.

Fig. 2



SCHEMATIC FOR DUAL COMPARATOR

USE CIRCUIT ABOVE DASHED LINE FOR UNBALANCED MEASUREMENTS.

Fig. 1

connectors. Various accessories are illustrated in the picture of the unit. The use of similar or nearly identical connectors in the unknown and in the standare arms of the bridge introduces practically identical reactances which, because they are out of phase, produce little or no effect upon the operation of the Comparator.

The dimensions for the box are shown in figure 3, at the right. Note that this is a "two-holer", for the balanced-circuit type; one row of holes is omitted for the unbalanced type. Note also that the coaxial receptacles require that their meeting-edges be cut off accurately to the center of the mounting holes for proper spacing.

The reference resistors consist of 1-watt Allen-Bradley resistors of the desired values, selected with an accurate ohmmeter. A bridge permits greater accuracy of selection, however. Coaxial connectors, JAN Type PL-259, are used as housings for the resistors. Soldered connections should be as short as possible; but, avoid unnecessary heating of the unit, which may change the resistance value. It is always good practice to measure the resistance of the assembled unit.

Reference resistors to be used for measurements on balanced-circuits are mounted on GR type double plug connectors, as illustrated in the picture.

The calibration curves, shown in figures 4 and 5, were obtained by use of an assortment of both types of reference resistor assemblies. Carbon potentiometers can be compared to these reference resistors in order to determine their suitability for use at the higher frequencies. Lead lengths should be short and as equal as possible.

As a result of laboratory measurements, it was determined that the accuracy of this comparator was such that a change of resistance of 2 ohms plus or minus, from 52 ohms, was indicated on

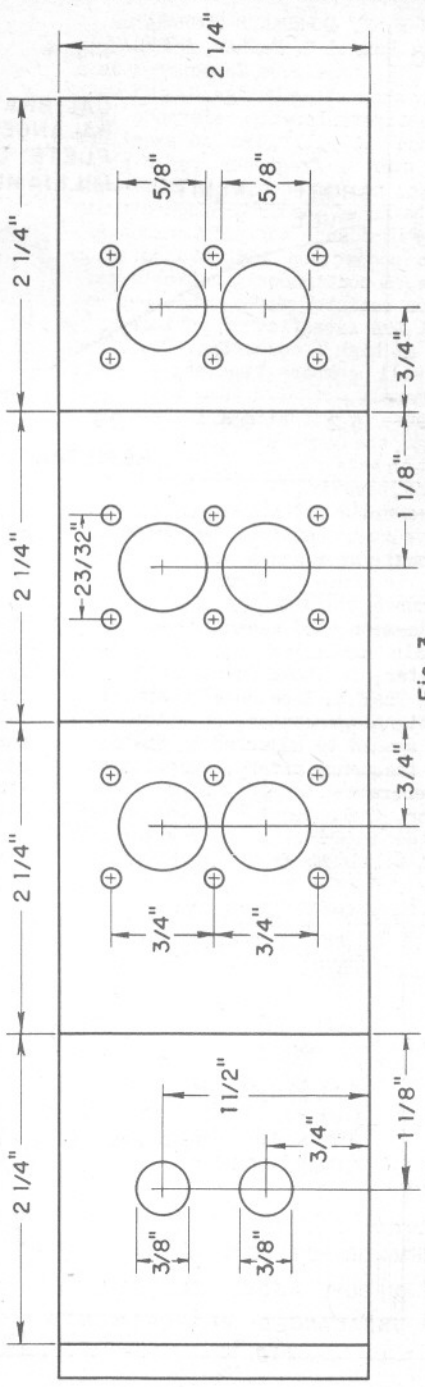


Fig. 3

MATERIAL - 1/32" SHEET BRASS, FOLD TO FORM CUBICAL BOX, MAKE COVERS TO FIT

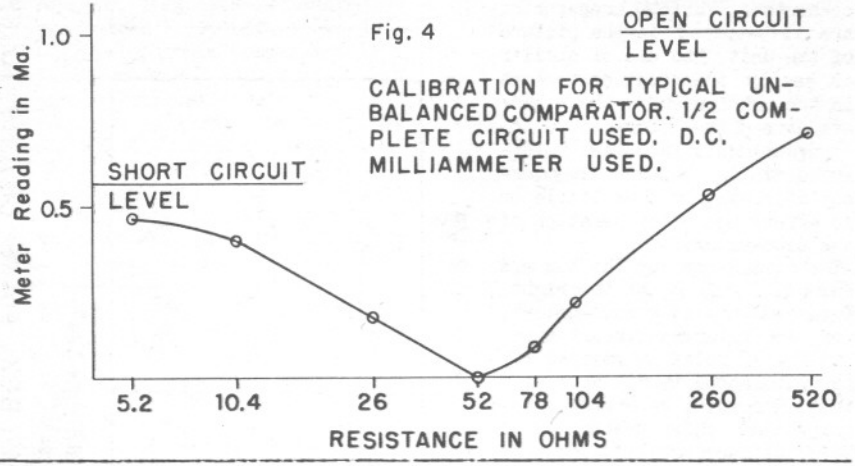


Fig. 4

CALIBRATION FOR TYPICAL UNBALANCED COMPARATOR. 1/2 COMPLETE CIRCUIT USED. D.C. MILLIAMMETER USED.

the meter as 2 db. A typical calibration curve, obtained by using an r.f. oscillator and a d.c. milliammeter, is shown in figure 4. A typical curve, obtained by using an amplitude-modulated signal generator, an audio amplifier and an audio-voltmeter, is shown in figure 5.

Using The R.F. Impedance Comparator

The signal generator, or source of r.f., should be adjusted to the desired frequency after connection to the "generator" terminal of the comparator. The output level should be adjusted for full scale reading of an 0-1 milliammeter when a reference resistor of the desired value is inserted into the "standard" connector. The "unknown" terminals are not connected to anything during this initial adjustment. The unknown impedance should now be inserted, check the frequency of the generator to see that it is reasonably close, and then adjust the unknown by appropriate impedance matching methods. If the "unknown" is a matching section, properly terminated, adjust the shorting bar on the stub; conversely, if it is desired to determine at what frequency the matching section is resonant, tune the generator for a null reading of the mill-

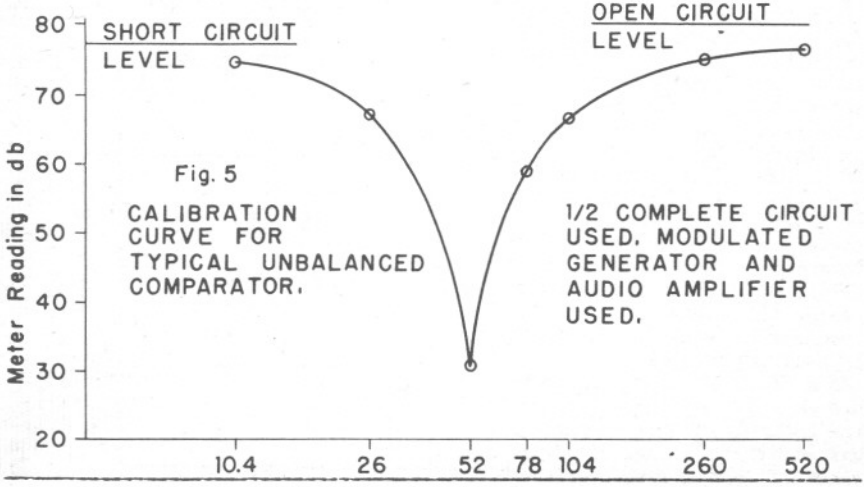
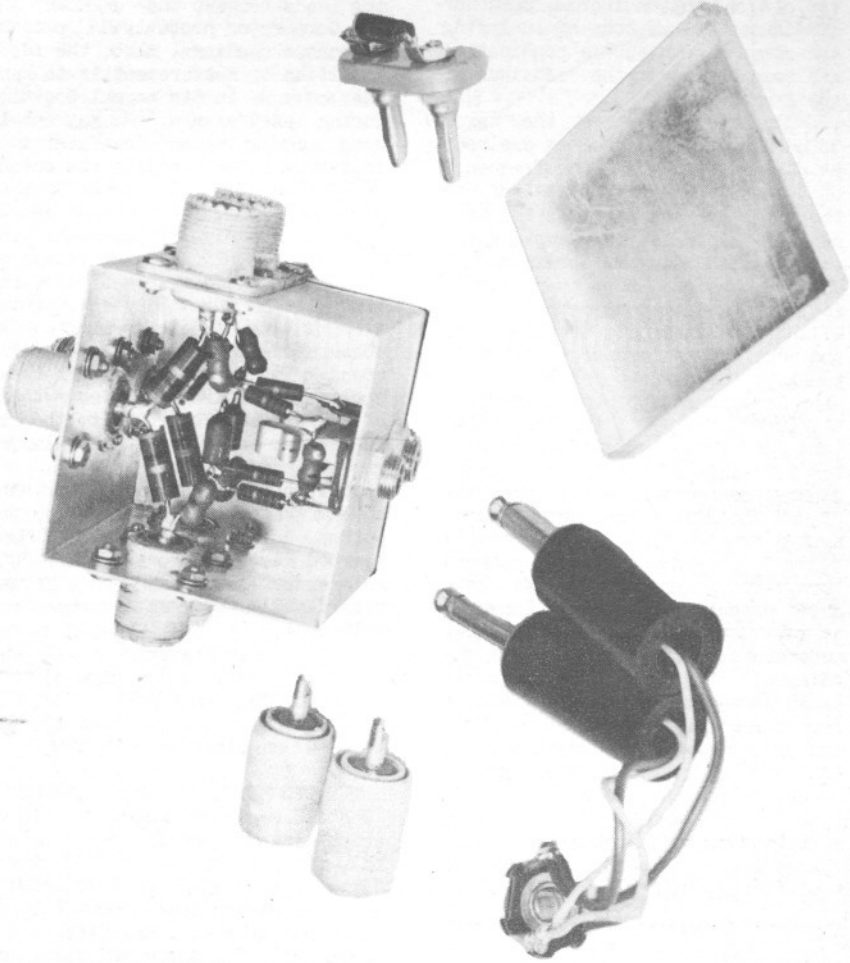


Fig. 5

CALIBRATION CURVE FOR TYPICAL UNBALANCED COMPARATOR.

1/2 COMPLETE CIRCUIT USED. MODULATED GENERATOR AND AUDIO AMPLIFIER USED.



R.F. Impedance Comparator (Cont'd). ammeter and note the frequency. It is important to avoid, if possible, anyuse of transmission line between the "unknown" terminals and the actual "unknown" to be measured; otherwise, you will be measuring the net, effective impedance of the combination of transmission line and "unknown" impedance. The methods of analyzing the components of such a combination are somewhat beyond the technique of the average ham.

If the measurement of the value of an unknown impedance is desired, at a given frequency, the frequency of the generator is maintained and the reference resistor, in the "standard" terminals, is changed until zero meter reading is obtained. The unknown impedance must then be resistive, because zero meter reading will be obtained only at resonance, and when the reference resistor is equal to the unknown resistor.

For measurements of balanced-circuit impedances, the reference resistor is connected between the two center terminals of the two "standard" coaxial connectors on the Comparator, and the unknown impedance is connected between the center terminals of the two "unknown" coaxial connectors. The generator must have balanced output, effectively. Inasmuch as practically all standard signal generators, or oscillators, have unbalanced output terminals, it is usually necessary to make up a simple resistor-matching section, as shown in figure 6. Fed by a balanced source, the outputs of the comparator are in phase, so that they add.

In using the Comparator for antenna measurements, it is recommended that the device be connected directly to the antenna, with r.f. power source and meter cabling being provided so that the operator may make measurements from a point located several wavelengths away from the antenna. This eliminates the complexities offered by a transmission line between the Comparator and the "unknown". It must be emphasized that any connecting leads between the "unknown" and the Comparator probably will produce erroneous readings. Also, the ideal condition of measurement is to have the antenna in its normal position during measurements. This may entail some running up and down stairs or ladders in order to adjust the antenna, but the effort is ordinarily very worthwhile, based on the end result.

If used properly, the Comparator enhances the duplication of values of coils and condensers in filters for transmission lines, as an example. Also, within impedance limits, the Comparator can be used to match coils wound on loading resistors. In these applications, the inductive reactance of the coil must be equal to the resistance in order to obtain balance, at the desired frequency.

Additional information may be obtained from the Bibliography, or from the author, Roland V. Danner, 1122 Ramblewood Rd., Baltimore, Md. The "CQ" reference contains excellent material regarding the use of an instrument of this type.

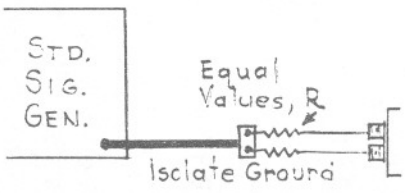


Figure 6.

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Proc. IRE, Jan., 1950, p. 37.
"CQ", Sept., 1950, page 13.
G-R "Experimenter" May, 1950.

* * *

THE TWO METER FM PARTY LINE NET

Station registry is now up to 41, of which 9 are mobile units also operated by fixed stations. 12 stations are "fixed", only; 3 are mobile, only; 3 are temporarily fixed; 9 are both on fixed and mobile; 1 has fixed and a temporarily fixed station, and 1 has three stations, fixed, temp. fixed and mobile! Calls are: W9s HPJ KWU WN EQC MWN CEW WJU JBH ZNX HH CG CYT SXJ ZOX WMR MOE BFY ZVV GLB MDO QIO RAY CPF KLB NFK SAK LLZ QM LLX. Of these, W9s EQC WMR MWN MOE and BFY are in Aurora. In the South Bend - Mishawaka, area: W9ECH W9IGH W9EKK and W9FME. W9ECH and W9IGH are both mobile.

IN AND AROUND CHICAGO . . .

Walt, W9CT, announces that W9NW is the winner in the "Stations Per Month" contest for January, 1951. Station scores were: W9NW, 50 stations; W9 NQZ, 32; KJU, 31; QJO, 30; CT, 27; PEN, 14.

All 2-meter stations within an area of 25-miles from State and Madison Streets, Chicago, are invited to participate in the contest. Awards are made, monthly, and a trophy will be given to the first place winner at the end of the year.

In addition to the stations listed above, Chicago activity is now supported by W9FPE/9, formerly of Willard, Wisc. Ed is using a 522 temporarily, but has worked out to Aurora. GDM GAY BVM HXS DXX CEW IMQ BBU TKL DRN ZNJ and even NFK were active. DXX is enjoying daytime activity, working W9TQ and others around noontime.

W9EQC, Aurora, was off for about 2 weeks, rebuilding the whole a.m. rig. He now has 500 watts input to a pair of 4-125As and really pokes out!

The Aurora 2-meter FM Party Line Net now includes W9EQC WMR, mobile, MWN, MOE and BFY; more coming.

Cards from W9CBW/9 and W9BYG/9 say they're getting pretty well settled, and will probably be on 2, soon. FB.

W9IMQ's "The Orbits" comic page is now seen in the Saturday Herald-American. Congratulations, Orbit!

We hear the W9CGR's are in Europe!

W9WOK has been trying to get a new rig built, in between out of town trips. W9PK is rebuilding, too. He is active in ILN on 3515kc., but will be on 2 with p.p. 826s, 300 watts! Long time no hear from W9VX. W9KCW can be found up towards 146-7 occasionally. EDG still has landlord trouble. UMD heard frequently. Wha' hoppen to MGY? JBH? Guess we'll have to send FBI. NFK: illness; FM; AM-troubles; "News!"

* * *

W2NLY REPORTS FROM SO. PLAINFIELD, NJ.

Have been keeping schedules with W3 QKI from 10 to 1030, Monday, Wednesday and Friday nights, for several weeks. Have been hearing Herb four out of five nights, altho signals aren't too strong. But, the path is over 300 miles, over rugged terrain.

The purpose of the schedules is to detect band openings, and also to see what can be done when conditions are not the best. When an opening is discovered, the tip-off can be given to east coast stations to look to the west, and vice versa. In the past, I am sure we have missed some good openings because of lack of systematized listening and transmitting.

The antenna at W2NLY will go up 2 times its present height, in late March; that should help haul in DX!

I agree with W3NXT (See "The VHF News", page 7, January, 1951) that calling, as well as listening, should be done!

S. H. F. SPECTRUM CHART
By
Joan Hajostek and
D. L. Barr, W9KJU

The super high frequency bands in terms of wavelength, centimeters and inches, and megacycles.

BAND	FREQUENCY	WAVE LENGTH	
24 cm.	1215 Mc.	24.69 cm.	9.72 in.
	1255 Mc.	23.90 cm.	9.40 in.
	1295 Mc.	23.16 cm.	9.11 in.
12 cm.	2300 Mc.	13.04 cm.	5.13 in.
	2375 Mc.	12.63 cm.	4.97 in.
	2450 Mc.	12.24 cm.	4.81 in.
8 cm.	3300 Mc.	9.09 cm.	3.57 in.
	3400 Mc.	8.82 cm.	3.47 in.
	3500 Mc.	8.57 cm.	3.37 in.
5 cm.	5650 Mc.	5.30 cm.	2.08 in.
	5750 Mc.	5.21 cm.	2.05 in.
	5850 Mc.	5.12 cm.	2.01 in.
3 cm.	10000 Mc.	3.00 cm.	1.18 in.
	10250 Mc.	2.92 cm.	1.14 in.
	10500 Mc.	2.85 cm.	1.12 in.
1 cm.	21000 Mc.	1.42 cm.	.55 in.
	21500 Mc.	1.39 cm.	.54 in.
	22000 Mc.	1.36 cm.	.53 in.

W5FEK REPORTS FROM HOUSTON, TEXAS

Sub-freezing weather, an unusual occurrence for south Texas, the last few days in January and the first of February took a heavy toll of beams in the Houston area. Icing cost W5s GLS BHO and BDI their 2-meter beams.

FSC lost both of his 6 and 2 meter arrays, but is back in business again with a 24 element 2-meter array and a stacked 6 element 6-meter beam.

BDI has a 15-element squirter a'la W2NLY, at 70 feet and is building a pair of 24Gs to replace the ARC-4.

ONS, Victoria, lost his 10, 6 and 2 meter beams! After much urging from W5SM, FEK put up a conventional 16-phased array, and it is doing a better job than the old 15. However, now Worden won't talk to us! We didn't use the tennascope on this one, so there should be some r.f. on the beam as well as on the feedlines.

No real openings have been observed yet, but it is getting close to the time that the Gulf Coast inversions start. Hope there will be some activity on 2 in Georgia and Florida this summer, so we can get some new states. (What say, Florida gang? - Ed.) FM broadcast stations in those states are heard occasionally in the summer. FBT, Baytown, has found that FM stations are a much better indicator of band conditions than weather maps. When we hear out-of-town FM stations with better than usual signals, we can count on a band opening in that direction.

A mystery to the Houston stations is why we don't hear anything out of the Oklahoma stations. The extreme-north Texas and northwestern Louisiana boys put in strong signals here most of the summer. Could it be low power and small beams in Oklahoma?

Hey, W5CVW! Houston is in south Texas, too! Why not look this way when you are listening for Beaumont? We have a fair amount of activity here at all times and stations comparable to those of the Beaumont gang. However, it seems that mornings offer the best conditions towards the north.

420Mc. activity is under way with W5IRP AYU and IGL using low-powered modulated oscillators. IRP plans to use a pair of 8012s.

Because of loss of beams, W5FSC has done no work on the 400-watt 2-meter job, recently. PMM is working on a 15-element beam. W5LLT, George Ashenden, of the local FCC office, and W5QZG are mobile with converted commercial FM rigs on 2, but have to work each other as there are no other 2-meter FM stations operating, yet.

The Gulf Coast Emergency Net, Houston, will continue to operate on 146.78 Mc., because the frequency is in the recently assigned defense bands.

* * *

IN THE MAIL . . .

From Leland Stowe, W7HXN: "Enclosed is my subscription . . . Haven't been doing any 2-meter work for the past four months, but will drop you a line when activities resume. The XYL, Jean, is W7HIQ."

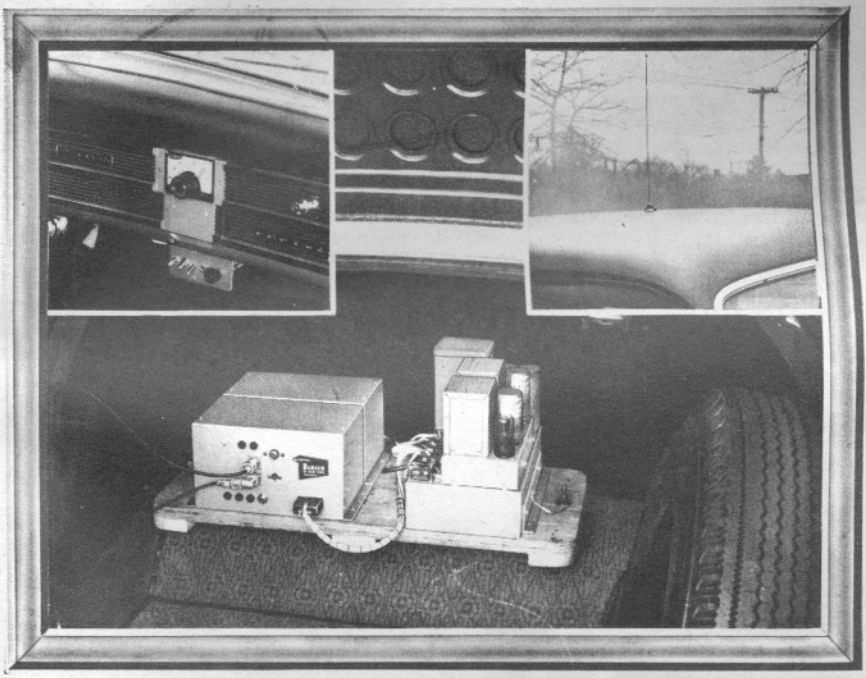
From Gordon B. Huggard, W1PZA: . . "Things are kind of looking up for v.h.f. in this neck of the woods with civil defense as a motive. Our old 222.75Mc. net is still very active, with new stations coming on now and again. To anybody interested: we are on every Thursday and Sunday nights from 2000 until at least 2100."

From Rad Fincher, W5MKP: "Enclosed are 2 new subscriptions . . I think your main trouble is not lack of interest in the 'News' - it's human procrastination! If there is anything I can do about same, in addition to the above, I'll do it!"

From Vincent L. Carr: "I've been wondering if you run any news on Civil Air Patrol activities on the vhf? Personally, I am connected with CAP and am very interested in its work and would like to see some of the advancements made in this net on vhf. In the near future, there will be an article in one of the national radio magazines on equipment made by a friend and myself."

(Ed. Note: The point of running CAP vhf news in "The VHF News" has arisen several times. At the risk of making fellows unhappy, I've taken the standpoint that the "NEWS" should stick to its policy shown on the cover heading, "Devoted Solely to VHF Amateur Radio". Sorry, OM!)

From Ken Myers, W8WRN: "Keep on plugging the summer v.h.f. meeting at Turkey Run, or similar location!"



A typical CD mobile installation. Shown in photo is a neat, compact installation of an Eldico 2 mtr rcvr. xmtr. and complete power supply, all mounted on a one foot by two foot platform. Upper left insert shows the Eldico remote tuning oscillator mounted right into car panel with control switching below. Right insert shows simple, efficient 2 mtr vertical whip on car roof.

Eldico is the first and only manufacturer to have a complete line of mobile and fixed station equipment specifically designed to meet all Civil Defense requirements. There are Eldico transmitters available covering the proposed bands on 80, 10, 6 and 2, the major CD frequencies. There is a complete line of high-efficiency, interchangeable mobile transmitters and receivers including all essential accessories for fixed or portable installations. For further details on the units listed and the other Eldico products, see your local distributor or write for catalog 51. Remember . . . whether your requirements are a single station or a community-wide system, Eldico can supply "engineer-balanced" equipment, reasonably priced, sturdily constructed, with or without installation and maintenance. Engineering specifications adjusted to your community needs available at no cost.

Fixed Station Equipment

RECEIVERS. Individual superhet receiver for 2, 6 or 10 meters with broad or sharp selectivity to order.

TRANSMITTERS. Crystal controlled transmitters for all the CD frequencies. For 160, 80 or 10 meter operation: the TR-1 300W. AM Phone or C.W.; TR-75 for 75 Watts C.W.; MD-40 or 40P for 75 Watt AM phone. For 10, 6 or 2-meter operation: AM phone, multiple channel transmitters; choice of 10, 50 or 100 watts output.

ANTENNAS. Eldico's "Vxer" for non-directional coverage on 6 and 2, Eldico's ground plane for 10 meters. Rotary beams if desired.

ACCESSORIES. Microphone control units, frequency standards, test equipment, gasoline generators and hardware. Everything that is needed for the *complete* fixed station operation for CD.

MOBILE EQUIPMENT

RECEIVERS. Complete superhet for 2, 6 or 10 meters with provision for trunk installation and remote tuning.

TRANSMITTERS. Complete crystal control AM phone for 2, 6 or 10 meters with provision for trunk installation and remote control.

POWER SUPPLIES. Single and dual vibrator or dynamotor supplies with built in filtering for interference-free operation. AC supply for test or fixed station operation of mobile equipment.

ANTENNA. Mobile or fixed for 2, 6 or 10 meters; bumper, windshield or roof mount, coaxial feed.

ACCESSORIES. Microphones, control units, cable, relays, plugs and test equipment. Everything that is needed for the *complete* mobile installation for CD.

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