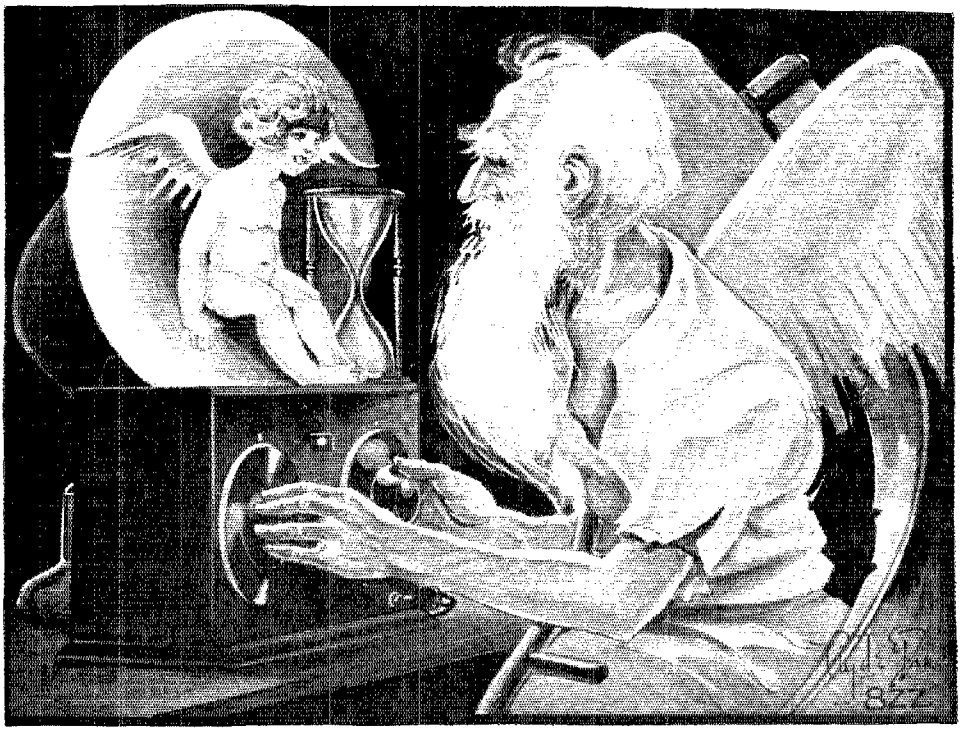
QST

DEVOTED ENTIRELY TO

AMATEUR RADIO

Published by the American Radio Relay League



January
1926

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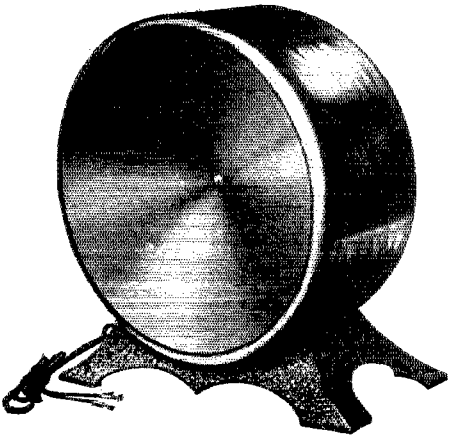

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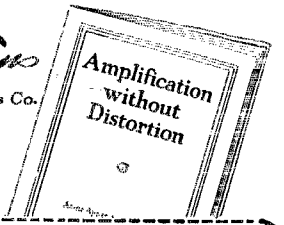
Claude Hairs

President Acme Apparatus Co.

Send for your copy!



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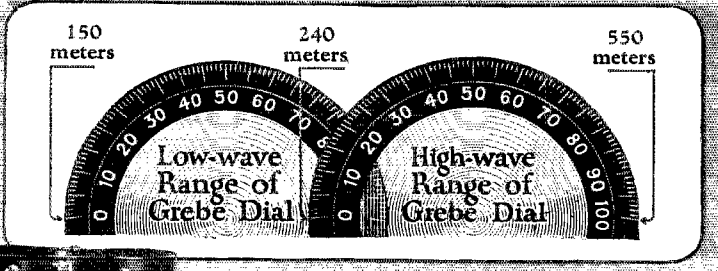

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Ask your dealer to demonstrate this and other Grebe advances in radio development

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"The Gods cannot help one who loses opportunities."

—*Mencius*

The wise man will provide against the future by securing a Synchrophase.

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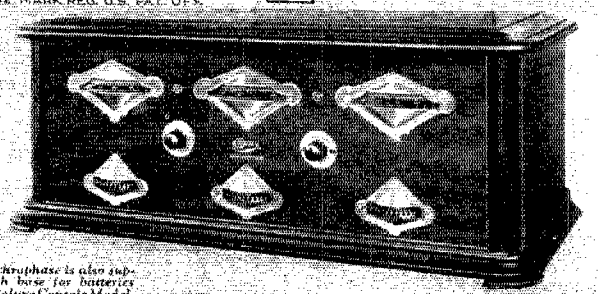
THE GREBE SYNCHROPHASE
TRADE-MARK REG. U.S. PAT. OFF.

This company owns and operates stations WAHG and WBOQ; also low-wave rebroadcasting stations, mobile WGMU, and marine WRMU.



All Grebe apparatus is covered by patents granted and pending.

The Synchrophase is also supplied with base for batteries and in attractive Console Model

QST

The Official Organ of the A·R·R·L

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Official Organ of the International Amateur Radio Union

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THE AMERICAN RADIO RELAY LEAGUE

The American Radio Relay League, Inc., is a non-commercial association of radio amateurs, bonded for the promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is non-commercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its Board.

"Of, by and for the amateur", it numbers within its ranks practically every worth-while amateur in the world and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisites. Correspondence should be addressed to the Secretary.

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EDITORIALS

Making These Brasspounders

A COUPLE of months ago we wrote an editorial which we have had much occasion to remember. It was addressed to the loyal brasspounding members of the League and it was called "Make A Brasspounder". Today there are scores of letters reposing on the editorial desk from all over the country, and the common theme of all of them is this: "I am in that class you spoke of; I am not a brasspounder, but I have been looking through the window at you fellows for a long time, and now I want to come in through the door. How can I do it?

Think of it, fellows! Here we have been considering it necessary for us to carry carefully-planned propaganda into the broadcast camp in order to interest some of the broadcast listeners in our game, and instead we find that there are already dozen upon dozens of them sold on brasspounding and only waiting for someone to give them the key so that they can come in with us.

They have called us and it is now up to us to deliver. We are sure that we shall be more than glad to. Of you, the League membership, we ask cooperation, and something more tangible than that—definite assistance wherever you can render it. It will call for patience and perhaps a sacrifice of time, but it will be worth it. They have put it up to us and we can't fall down on the job.

To you, the future brasspounders, we pledge our assistance. We have already planned a series of articles on entering this great game of ours and the first one will be published in an early issue. We are also preparing an "A.R.R.L. Handbook"—perhaps we had better call it a "Hambook"—which will explain all the mysteries of amateur operation and which will be an immense help in getting started. We expect to be able to announce its early appearance by our next issue. It will take some hard work on your part to learn the code, to acquire speed in reception, and to master the essentials of theory which will be necessary before you can obtain a license to transmit. You will be asking yourself if it is worth all this trouble. We assure you most emphatically that it is, and ask you only to contemplate the ever-increasing number of transmitting amateurs all over the world who are beckoning you to come on and join them. We promise to help.

The Recommendation Factor

THERE is a certain vague uneasiness in the minds of the publishers of most radio magazines. Something is slowly but surely happening to their advertising. There is too much "BCL set" advertising in newspapers and in non-radio magazines of general circulation. It looks as if perhaps a considerable proportion of the set manufacturers had come to the conclusion that the public which buys their sets is not interested in radio for radio's own sake but only in the results which radio brings; that that public therefore is not interested in reading radio magazines; and that therefore the place to spend advertising money is not in radio magazines.

This is not the place to discuss the fallacy of this argument. It is fallacious. The point is the effect that such a viewpoint, right or wrong, may have on radio magazines, including our own. In our A.R.R.L. we have the habit of talking quite frankly about such thinge with our membership, through the Editor's page. This particular affair has an angle that we want to lay before you.

QST carries much advertising of sets and parts that does not directly and immediately result in sales to transmitting amateurs. This is because *QST* has many readers who are not transmitting amateurs but who are direct prospects for this class of apparatus. This is also true because the advertisers realize that in the A.R.R.L. member and the transmitting amateur they are talking to the man who is the expert advisor to the radio public. Every one of us is constantly being approached by friends who are prospective purchasers of broadcast apparatus, who say in effect, "See here, you fellows know radio backwards and forward; what shall I buy?" In just that indirect fashion we are influencing a tremendous volume of sales. *QST* advertisers know that, and that is the primary reason why *QST* enjoys a good volume of that variety of advertising. We speak of that feature of the value of *QST* advertising as "the recommendation factor".

We A.R.R.L. members are the joint owners of this magazine of ours. As we have often pointed out, its future depends upon its advertising revenue, and to maintain that we must show results. One of the biggest ways in which we can show these re-

sults is in the operation of "the recommendation factor". If the trend of radio magazine advertising becomes more unfavorable, we shall be depending upon it even more. We want our members to know this and to appreciate what it means. All that you have to do is to give the best possible advice to your friends when they seek your assistance, and steer them to *QST*-advertised products.

This isn't a bad place to remind you, either, of the continued desirability of letting an advertiser know, when you write him, that you admired his wisdom in advertising in *QST*.

Ho For Experimenting!

WE'RE still smiling, in spite of all the gloom-mongers. So nobody cares any longer about what's behind the panel, eh? We don't believe it a minute. If that were all there is to radio, it would be no better than a phonograph or a cuckoo clock. What B.C.L. wants to spend all his days being merely a dial-twister? He may exist somewhere, but he'll never amount to much in radio.

Fortunately most people of ordinary susceptibilities can't be exposed to radio without wanting to know at least a little about what makes it tick. There is something intriguing about it, something that gets one. Straightway another tinkerer, another potential experimenter, is born. Fine, say we! We want to take the space, on this cherished page of ours, to say that we think that's the spirit, that's the way to make the pursuit and possession of radio worth while—find out something about it! And here's one magazine that believes there are lots of folks interested in just that.

Going Up

SAY, fellows, it would have done your hearts good to have attended the M. Hoover's little radio party down in Washington last month and witnessed the changed attitude towards that little understood animal, the transmitting amateur.

Two years ago, at a similar conference, we had a hard time. Broadcasting had just acquired its maximum momentum and was sweeping everything before it. Two-hundred-meter amateurs were interfering with the single-circuit tuners of that day. We were known as the cause of all static, squeals, line-escapes and fading. Although there had been amateurs since Vermilya discovered macaroni and although amateur representatives had attended every radio hearing at Washington since 1911 or so, we were strangers to the hundreds of new experts who came in with broadcasting. They were surprised and disgusted at our appearance, and their general attitude was, "What! You amateurs here? How did *you* get in?"

But last year it was better and this year the situation was changed completely, so that today the amateur is recognized at these conferences as one of the most important factors in radio. Secretary Hoover himself has told these conferences that he wanted them to take adequate care of the amateur. This year we were repeatedly hailed in open meeting as the folks who had made high-frequency radio possible. "Now that the amateurs have shown us how to operate on short waves . . . ."—that was the way the talk went. Things respecting short waves are not done nowadays without consulting us. It should be a source of tremendous pride to every amateur that we are now so completely recognized. We have arrived. It is important that we bear in mind the factors that have given us, as organized amateurs, this eminence. As we see them, they are: our contributions to the art; our high and absolutely fair standard of conduct in our public relations; and our policy of complete reasonableness in our negotiations. These policies have always paid, and they always will pay.

QRX for QRR

AMATEURS cannot join with the poet in regarding winter as "the melancholy days . . . . the saddest of the year", for to us winter brings the long crystal-clear nights when dreams come true and records are made and smashed. But to the railroads and other public utilities winter days are very likely to be the saddest of the year, for there is never a winter in the United States and Canada that does not produce at least one terrible blizzard in which trains become lost in snowdrifts and groaning miles of poles and wires go down in tons of sleet. On any winter night our friendly international chats are apt to be interrupted by the call to the assistance of our utilities. We must be prepared. Amateur Radio is not the Rotary Club but there is one main job we have to do for Service—the providing of railroad emergency communication. The railroads are counting upon our assistance this winter as they have in the past. It is a way in which we can be of tremendous help to the communities in which we live. Let us be prepared and when the call comes, as it will, let us do our level best.

And don't forget the SOS of railroad distress work, QRR.

—*Kenneth Bryant Warner.*

The Cruise of NRRL Aboard the U. S. S. Seattle

By F. H. Schnell, Traffic Manager

SOMEBODY said, "All Schnell had to do was to touch the key of NRRL and his signals were heard around the world." Judging from the number of reports received at the U. S. Naval Research Laboratory and at A.R.R.L. Headquarters, not to mention those received board the ship, there appears to be much truth in that statement.

Just why NRRL did reach out so well needs a bit of explaining so there will be no lack of understanding. There was nothing unusual about the transmitter and receiver and the location of the antenna would cause anybody to think signals wouldn't even leave the ship. The transmitter used a regular Hartley hook-up, inductively coupled to an antenna 74 feet long and consisting of a single No. 12 bare copper wire. The antenna was almost vertical and it was completely surrounded by guys of one kind or another, the greatest free clearance being about 11 feet. Until a few days before we left Honolulu, the inductances were made of a Radiocorp inductance cut in half. With these inductances we were unable to secure loose enough coupling to prevent heavy QRM in the other receivers of the ship. We then changed to pancake inductances and with a coupling of almost 8 inches were able to reduce QRM considerably, thus permitting operation on the other receivers.

Two .0005 μfd. condensers were used in the transmitter, one in the antenna and the other in the ground lead. The ground lead by the way, was only 15 inches long. Properly balancing of condenser capacity gave me equal distribution of current, normally slightly less than 2.5 amperes, varying now and then with the voltage rise or fall in the ship's mains.

The transmitter, using four 50-watt tubes, was supplied with 60-cycle current upon departure from San Francisco, but just before we reached Honolulu the generator "went west" while Graham and I did a tail spin getting out of the way. This necessitated repairs which Lieutenant Williams (Radio Officer of the Seattle) took care of at once. However, while we were waiting for the generator we discovered a 250-cycle dynamotor which was in good condition. We tried it out temporarily, not knowing how it would work on the 60-cycle transformers. Since the transmitter used full wave rectification, two tubes on each half of the cycle, we got a fairly decent note and one that was distinctive and one that would be recognized once it had been heard. It worked out so well we left the 250-cycle generator in, in place of the 60-cycle outfit.

So distinctive was the note of NRRL that many times I merely called "CQ" just once without even signing and logged from two to five amateurs calling NRRL. Again I would call "CQ" and sign "FS" with the same result. Only when QRM was very bad and most of the time it was fierce (local) did I have to call "CQ" three times and sign three times. At NO time did I ever have to call more than that number of times. Among the others who operated were Chief Radioman Ryan, one of the best operators I ever met; "Red" Graham, a big six-footer, red-headed and a double for Don Mix; Millus, Haggerty and one or two others. They were all interested in high frequency and found much pleasure in working amateurs. It was through the fine co-operation of these chaps that NRRL was installed and operated so consistently. No problem was too difficult for them to solve.

Little need be said of the receiver as it was described in June *QST*. However, it is worthy of note that in spite of the terriffic heat and QRM from high power transmitters we had not the slightest trouble with it. The receiving antenna was 34 feet long, a single No. 12 bare copper wire running almost parallel with the transmitting antenna and within a few feet of it. At times, QRM from the ship's transmitters was so bad we had to disconnect the receiving antenna and do our receiving without antenna. The stronger signals came through without much difficulty in reception.

When Commander S. C. Hooper, Fleet Radio Officer, turned me over to Lieutenant Williams, he warned me that the Seattle was already overcrowded and we would have to look over the ship to find a place for my own outfit. After going from stem to stern and finding nothing but the compass shack, we had to use it—there was no other place. The compass shack is just forward of the main-mast and on the boat deck, about 53 feet above the water line. It is about six feet square and completely surrounded by heavy boiler plate, there being five port holes. On either side of the compass shack are two up-takes from the engine room, from which we were blessed with plenty of heat no matter what direction the wind. Such was the location of NRRL.

For two or three weeks I was without a

room and bunked wherever I could find room, sometimes it was in flag plot and again in the room of some officer who was either on duty or ashore. As soon as the excess baggage and super-cargo left the ship, I was assigned a very comfortable room below the water line, hence no port holes.

We left San Francisco April 14th, in the early afternoon. That evening, just before eight o'clock, I also left the universe, being darn fool enough to contract a severe case of sea-sickness which lasted four nights and three days. During this time I was the most miserable cuss in the world. While I had crossed the Atlantic six times during the war and through heavy seas, I had never been sea-sick. I had asked everybody I knew who had been sea-sick what it was like. Nobody could tell me and I now know why. Neither can I tell you what it is like. I only know that I had one wish, and that for land whether it be in China or at the bottom of the Pacific. No sleep and no eats for that length of time took all the pep out of me but I did manage to get up to the shack on the evening of the 18th and work 6CGW for a few minutes. I passed completely out from the heat and the effects of sea-sickness and came to some hours later.

Although my log doesn't show it, I know Chief Radioman Reeves worked 7MF, our first station on the night of the 14th. 6CGW was worked at 10:50 P. M., P.S.T. on the 18th, and on the 19th we worked 6CMQ, 6BUR and 6CGW again. This was on about 78 meters (3844 Ks.) The morning of the 20th we clicked with 1OW, 1PM, 1CMX, 2WB and also z2AC—our first contact with New Zealand. Such good DX for the first few nights was very encouraging to say the least. I then had visions of working around world and all sorts of other places.

We docked at Honolulu early morning of the 20th. What wonderful sight it was for me, land, land and beautiful sunshine! My first experience in the semi-tropics. Of course, radio silence was the order because of the maneuvers and NRRL was closed down, but we listened just the same and logged j1AA with a flock of others. For some unknown reason, I couldn't account for the good signals on the 40-meter (7500 Ks.) band, yet there were but a few stations operating there. I couldn't believe my ears when 6AWT opened up on 4000 Ks. and then compared signals on the 7500 Ks. band. 6AWT was readable on 4000 Ks. with two two stages of audio amplification, but on 7500 Ks. he was audible 50 feet from the fones.

That was enough for me, I immediately shifted NRRL to about 39.4 meters (7610 Ks.) and although my transmitting time was very limited, we hooked up with station after station. On April 29th our first contact with Australia was with a2DS and we clicked regularly thereafter. m1B was added to the list with j1AA on May 2. May 4th we connected with a2CMand a2YYI, and with a2BK on the 5th. Our first Canadian QSO was with c5BA on May 9th. We added new stations heard and worked nightly and more and more amateurs were dropping down to the 7500 Ks. band. In less than ten days we had every U. S. District, Canada, Mexico, Japan, Australia and New Zealand in our "worked column". All this through the QRM which was many times worse on 7500 Ks. and added to it was the mush from the arc at NPM.

Practically all of May was spent in maneuvers around Hawaii, anchoring once in a while at La Haina, Maui. Radio silence prevented transmission by NRRL and there were times when we had darkened ship and no transmission. It was then that the compass shack "ran a temperature" far above the 100° mark. We had to have light to copy by, but all ports had to be darkened. It was almost air tight inside the compass shack, I know it was water tight. With the heat coming from the up takes, I felt like a turkey being roasted on Thanksgiving day. The compass shack was an ideal oven for just such purposes.

We also were keeping regular test traffic schedules with NKF and several other Navy Stations. That beautiful crystal note from NKF was miles ahead of anything in the way of notes and it would simply cut through QRM like nothing else. No other note during the entire trip equalled it, although c9CK was very close to it.

Our first two-way work on about 20 meters (15,000 Ks.) was with 6XAP on May 19th. QRM was so frightfully bad on this frequency that we merely exchanged calls several times. May 23 I heard 1CMP call a2BK 34 times and signed 3 times. This surprised me somewhat as 1CMP seemed to operate more intelligently than that. I excuse it with a thought that some lid must have been at the key. Further 15,000 Ks. work on May 25 was with 1HN, 6AGK, 6XAP, 6CGW, 6BUR, 6TS and 6LP.

It was on May 25 that the 6ZD-NRRL combination started and, surprising as it may seem, we maintained a schedule until the Seattle anchored at San Diego September 26. True, we missed some nights, but practically every time we were on the air together we clicked. This was due in no small measure to the absolute reliability of 6ZD and his clear conception of the meaning of exact time. I could set the clocks of the entire Fleet from the minute I heard 6ZD. Time and time again I checked him and found that he started calling exactly on the minute. Our schedule was at 10:30 P. M., P. S. T., and it meant

10:30, not 10:29 or 10:31. Such accuracy is what makes working on schedule a real pleasure. Whenever there was a delay, it was at NRRL, and for reasons beyond my own control. This QSO with 6ZD was one of the real thrills of the entire trip—consistent, orderly and timely operation. 6ZD never sent double unless he was asked. He never asked for double transmission unless it was necessary—something I noticed a great many amateurs overlook.

Mr. Babcock, our Pacific Division Director may be over 60 years of age, but I take my hat off to him as a real ham, thoroughly imbued with the spirit that makes this game what it is today. My congrats to 6ZD!

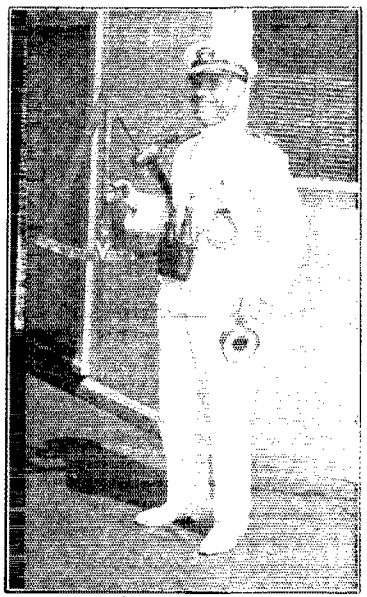
We turned out a nice piece of DX on May 29 when we worked NUQG, the U. S. S. Pillsbury near Shanghai, China. We learned that NUQG used a 5-watt tube. May 30 we docked again at Honolulu where we remained the entire month of June, where we piled up the number of amateurs worked and heard. June 3 was one of our best nights, we logged 58 different amateurs, including 4SA at Porto Rico, and Australia and New Zealand and Canada. 60 was our total number of stations for June 6. French 8QQ was first heard June 8, working z2AC. 66 stations were logged June 11, including rCB8, and June 12 we clicked with rA8 about 6:30 P. M., H. T.

We met the amateurs of Honolulu and helped put 6BUC, the station of the Radio Club of Hawaii, on the air. Dr. O. E. Wall took us around and showed us things of interest. Our entire stay in Honolulu was most enjoyable and the many pleasant swims at the famous Waikiki Beach will never be forgotten—I wish I were there now. Our best DX was with pi1HR whom we worked June 16. Let me mention it now, this is the last station NRRL worked before NRRL was removed from the Seattle just three days before we anchored at San Diego. pi1HR closes the official NRRL log September 23 at 6:56 A. M., P.S.T., with 55 minutes of perfect QSO.

I saw enough of the maneuvers of the Fleet while we were in Hawaiian Waters to appreciate and respect the Navy. Nowhere have I ever seen anything like it—that tremendous organization of nearly 50,000 men functioning as a single unit. Perfect co-ordination and organization is the answer. Everything is done according to schedule and right on the minute. Everything is done quietly and one never hears loud talking or shouting. Our Navy is a well kept piece of machinery and to see it and appreciate it you must be with it at sea where it is at home.

The Hawaiian waters were a theater of mimic warfare where those high marks of proficiency and efficiency were attained. Battleships of some 32,000 tons are handled as easily as one would handle an automobile. Provisions are carried for the entire personnel and the sick are cared for as if they were in some fine hospital ashore. No small detail is omitted in any department of the maneuvers. Those of you who are fortunate enough to be in the Naval Reserve should make every effort to take advantage of a cruise. If you are not in the Naval Reserve, you ought to enroll now—get your bed made and know how it is going to feel to sleep in it. Don't wait for somebody to assign you one which you may not like. I am sure no man or officer in or out of the Navy has greater respect for it than I have.

Promptly at 9:00 A. M. on July 1 we shoved off for Melbourne and Sidney, Australia, part of the Fleet going to one port and part to the other. We were then carrying out regular daily official traffic



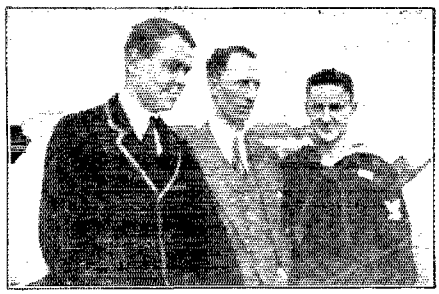
Lieut. Comdr. J. G. B. Gromer, U.S.N., Navigator of the U.S.S. Seattle. He gave us seven perfect "land-falls." (No, he doesn't use these instruments in his regular navigation work).

schedules with NKF and NPU and our work with amateurs was very limited. It was then that we had to show the Navy what high frequency radio could do—we had to move traffic when all other transmitters would fail to cover the great distances confronting us; and these distances increased each day. The only possible few minutes I had were given over to 6CGW on 15,000 Ks., and we maintained a schedule daily until the Seattle arrived at Samoa.

July 4 we had all sorts of athletic games, boxing, wrestling and other sports. It was a general holiday.

The eventful day, one which I shall never, never forget was July 6 when we crossed the equator—the day on which Neptunus Rex and his wild gang took command of every ship in the Fleet. At midnight July 5 all ships were stopped for one minute and by the light of the searchlights Davy Jones, secretary to Neptunus Rex came aboard and served the subpoenas that meant our doom next day. Bright and early, Neptunus Rex and his party came aboard, hauled down the Commander-in-Chief's Flag from the mainmast and hoisted the Jolly Roger—skull and cross-bones.

The business of going before the Royal Doc and his assistants was enough to make



Left to right: a2DS, a2CM and u6TS, taken on the roof of a2DS, Sydney.

any man shudder, to say nothing about the many other things that happened before we finally got shaved by the Royal Barber. Doc makes a careful examination of your teeth, using a small brush coated with iodine, gray paint, graphite, quinine and salt water. He literally fixes you up so you won't taste anything for several days. Then he gives you a glass of some concoction made up of the same stuff with the addition of several other poisons which you must swallow after a large pill. The pill is made of bread dough and is about an inch in diameter. Inside it is filled with everything but dynamite—Lord, what a terrible taste, I can still taste it.

If you have behaved yourself and have minded your own business and have a good record, you may escape with all your hair. Otherwise one of the barbers is liable to run a clipper length-wise through your hair and it usually leaves a path big enough for a bob sled to coast down. Next you step up on the platform and the barber smears your face with a half ton of flour and water mixed with gray paint, graphite, engine oil and, I believe, tar. While you are fussing about it you get tipped backwards into a pool of salt water in which about a half dozen graphite covered "bears" take great pleasure in seeing how long you can stay under water without drowning. Once out of the pool (if you are lucky enough to get out) you have to run a gauntlet—try and run it on a slippery deck, while a couple of dozen men try to cave in your ribs with canvass clubs. Great fun, this! Being a "shellback" I am bound under oath to divulge none of the deeper secrets of this organization.

We arrived in Samoa July 10, where I first met Cliff Dow, 6ZAC of the famous Hawaiian-1AW relay some years ago. Since I happened to be at 1AW that memorable night, Dow and I relayed it all over again. We stayed in Samoa just long enough to coal ship. By the way, the Seattle takes on 32 carloads of coal at one loading. We shoved off for Melbourne next morning at 7 o'clock. There wasn't much chance for amateur work, but during a lull on the night of July 13 I clicked with WWDO who was between Seward and Kowasdiak, Alaska. He said he was using a 5-watter. Yes, it was the night of the 11th that I first worked Chilean 1EG, QRA Vilcun, Chile.

I was surprised at the terrific walop of the signals from c4GT who was always very loud. It was my impression that he was using two 5-watters, but it could not have been so. He must have at least a 250-watter to put through a signal of the order of Q S A.

It was 4:00 A. M., Melbourne Time, of July 20 that I first heard g2NM, my old friend, Gerald Marcuse. Just a few minutes before, I heard f8CT working. I called him when I could find a minute in the QRM, but ND. About 6 o'clock the same evening I heard g2LZ and at 6:45 P. M. heard g2NM again. I gave him a blast and oh boy, we connected—didn't we have a great time! Worked him again the next two days on schedule and when we docked in Melbourne on the 23rd, practically all radio ceased. NRRL kept schedules only with NKF and NPU as no other transmitter could reach the distance and I shoved off t omeet our friends the Aussies. NRRL was our only means of radio communication with Washington and Honolulu.

The Seattle wasn't tied to the dock before I became acquainted with Ross A. Hull, a3JU, who was down to meet me. I knew him fully fifteen minutes before we finally shook hands when visitors were allowed aboard. The enthusiastic and sincere welcome of the Fleet was most impressive—there was something so really sincere about it. We felt it wherever we went.

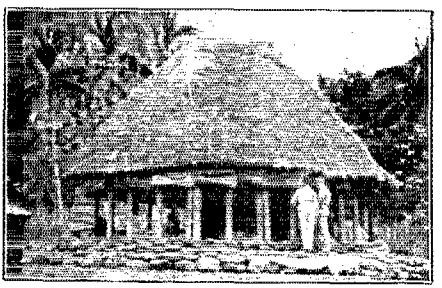
Hull looked over NRRL. We sat and drank a cup of coffee and after the formal official ceremonies were over Hull and I went to his office in Little Collins Street.

It was a duplicate of what I saw when I came to Hartford some five years ago. A little unimposing place on the fifth floor of an office building which is the office of *Radio Broadcast* (Australian) edited by Ross A. Hull. A stenographer, bookkeeper circulation manager and what not seemed to be Miss Mycroft. Another young lady in the outer office was the other only assistant. I mention this only because I hope Australian *Radio Broadcast* will prosper as did *QST* and I hope Hull will have an office as large and with as many employees as we have at A.R.R.L. Headquarters now. I have seen A.R.R.L. Headquarters grow out of a dinky little two-room office on the fifth floor of the Waverly Building. If Hull could have seen this with me, he would be encouraged as I am. Amateur radio in Australia is bound to prosper. About 4 o'clock we had tea—yes sir, it really is done, this drinking of tea we hear so much about. H. Kingsley Love, president of the W.I.A., (Melbourne) a3BM; B. J. Masters Secretary; and Cox, a3BD joined us at "tea" in a short time. It was my first meeting with the Aussies and I found them with the same general thoughts as we hams have over here. They are most courteous and modest. They are thorough in their work and sincere in their wishes to improve amateur radio. Visits to a3BQ, a3BM, a3BD, a3XF, a3LM, a3JU, a3XO, a3EF, a3ZN, a3UI, a3EM and other stations in Melbourne impressed me with the careful handling of current and voltage on the plates of the tubes. Not once in any of the Melbourne stations did I see a plate of any tube change color in the slightest. Ross Hull calls it the land of cold "toobs" and I agree with him. But their sincere welcome more nearly represents how warm the plates of our tubes are when in operation.

A few days in Melbourne and then I went to Sydney where Maclurcan, a2CM, and his crowd met me. Knowing my time was limited, Mac didn't waste any time but got under way at once with visits to a2DS, a2BK, a2JR, a2JM, a2YI and a2CM the first afternoon and evening. Next afternoon Phil Renshaw, a2DE, showed me "our Harbor" from his motor boat. Whatever you hear about the harbor at Sydney, if it is good, believe it. Sydney has an honest-to-goodness harbor. That evening I visited a2CX, a2DE, a2DJ, a2LD and a2IJ.

My visit in Sydney was a most enjoyable one. Mac saw to that in other ways than radio. They do have S.Y.T. and D.Y.T. in Sydney—attention M.H., K.M. and M. M. Next morning we visited the Amalgamated lamp works and Mr. Hook, of Amalgamated Wireless. presented me with a T-250 and three DEVT-24 tubes.

Maclurcan had me as his guest at the Wentworth Hotel and it was from this base we operated and where many hams were met. Of the stations I visited in Sydney, I again came in contact with what I had seen in Melbourne—cold "toobs". But I now think it is wiser to operate at normal voltage and currents than to be sorry for trying to crowd 4000 volts into a poor lone 5-watter. Tubes cost money in Australia, more than we have to pay for them here. The Australian ham doesn't have it quite as handy as we do when it comes to buying decent apparatus. If we burn out a tube or blow a condenser we can usually run around to the corner drug store or newsstand and buy another one. Not so easy in Australia —you've got to have some kind of "drag" to get a tube over there. Most of the apparatus is home-made, such as transformers, condensers, grid leaks and inductances. This is especially true of transmitting apparatus. Good condensers are



A native hut of Samoa, an ideal place for all kinds of radio work—no amateur QRM within 2500 miles and not one BCL on the whole island.

scarce as hen's teeth, but in spite of these handicaps the Australian amateur is forging ahead rapidly as is shown by the work they are doing.

It was my pleasure to address a meeting of the Wireless Institute of Australia in Sydney and again in Melbourne—once the Victorian Section and the other time the New South Wales Section. In each case I found something that reminded me of one of our own conventions—it was so utterly different. There was absolute quiet and order—no whistle blowing, no buzzers, no loud noises of any kind. I don't know whether it would be better for our hams to do things that way or whether it would be better for the Australians to follow our methods; although I lean toward the former.

I shall remember Mr. George A. Taylor, of Sydney who presented me with a boomerang—meaning to come back. I have hopes of returning again to Australia because it is a wonderful country with wonderful people, especially the hams.

What are our signals like in Australia? Briefly, there is nothing like them. It is

just one scramble of QRM, interspersed with rotten notes. NKF was audible 100 feet from a loud speaker on two audio stages. American hams rip in with signals that you couldn't imagine. Really, I was never more than a few hours from home by radio, although I must have been about 8,000 miles from Hartford. I believe every U. S. District could be logged in the course of a few hours—not one station but many of them. I worked 6BUR from a2YI one evening and a few hours later worked 6CGW from a2CM. We just happened to pick them out of the scramble.

Returning to Melbourne I met Mr. James J. Malone, Chief Manager Telegraphs and wireless, and Mr. Brown, both of whom were very appreciative of amateur radio Australian amateurs are not permitted to handle messages and no doubt this is a handicap in their work. It means they have no incentive for relay organization because there is nothing to relay. There is some discussion about the active organization of the Australian Radio Relay League.. It doesn't seem to materialize, but I feel certain it would develop if those amateurs were permitted to relay messages. Mr. Malone was kind enough to prepare an article for me which appears in our International Section. Be sure and read it.

Getting back aboard NRRL; we left Melbourne and many good friends but took

The T.M. and a native of Samoa. The native is the partially clothed gentleman on the right.

with us only the warmest feelings and best wishes as we shoved off August 6 for Wellington. Because NRRL was the only station capable of working NKF direct, practically the entire evenings were used for official business and no amateur QSO, what with schedules with NPM and NPU! There wasn't much amateur work on the way across to Wellington where we docked August 11.

Again as in Melbourne, I found an amateur friend before the ship had docked. z2BX was there to meet me. Later z2AC, z4AR, z2GJ, z2XA and old Syd Strong, z3AE, came to visit NRRL. Because of increased schedules and the heavy increase in traffic, I had but a few hours ashore all the while in Wellington. It was thoughtful of the Zedders to come down to NRRL, because I was unable to get away as much as I had in Melbourne. z4AG, z4AK, z2AB, and many other hams visited NRRL where we had regular ham-fests every day.

There were regular observations to be made on sun-set effect and fading. Many afternoons there were from two to six amateurs sitting by quietly in the compass shack with me. Imagine, as early as 4 o'clock i1ER sarted putting signals through. The sun was still high in the Heavens. As early as 2:57 P. M. I logged g2NM and for eight nights during our stay in Wellington we worked on schedule; g2NM using voice a good part of the time. French amateurs came in like locals; in fact much louder, as it was next to impossible to read some of the Zedders only a hundred or so miles away. Holland OSV was heard August 16 at 4:45 P. M. and shortly after that I heard some funny noise which turned out to be WAP—Lord, what a note! August 19 I clicked with WAP, after 6AWT fixed us up, and WAP was worked several times after that without much trouble.

One evening, August 20, I was over to visit z2XA and at 10:00 P. M. QSO'd u1KA. We worked for a half hour sending single and without a single repeat. 1KA was copied on a loud speaker during the entire time—so you get an idea of what signals are like at z2XA. This was on one step of audio as I remember it. It was just like meeting 1KA at a convention where we all get together and tell lies about our notes and QSA etc., only I was truthful—his note wasnt the worst I heard; but it wasn't the best nor pure D.C. by a good many chokes.

The New Zealand hams are up against the same problems as the Australians in getting good apparatus and tubes. They are real hams. In fact I would venture a guess that we are all alike no matter in what part of the world. z2ac spent several days aboard NRRL and I can truthfully say we talked along the same lines of amateur radio as if I had known him all my life. There is something about this amateur game that is completely different from anything I have ever encountered elsewhere.

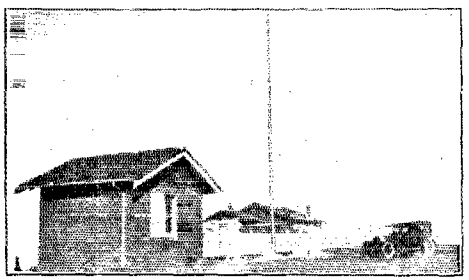
We left Wellington August 21 and I find in my log a call 6ZK. I believe this to be a station in Palestine. He was QSO IDH at 7:21 A. M. Heavy traffic and further schedules again prevented as much work with amateurs as I would like. I must not forget to mention the terrific signal

that 6CGW pushed through with his rebuilt outfit—signals readable 50 feet from the phones; and 6CGW made the old diaphrams rattle all the way back to San Diego—he now has the NRRL phones which he rattled harder than any other amateur.

There was nothing exciting as we returned to Samoa; except I logged 5EW calling 9TJ 84 times August 26. We anchored at Pago Pago, Samoa, August 30 and NRRL was closed down because NPU was handling all our business. I had an opportunity to visit natives and native huts. Cliff Dow and I had some further hamfests. 6ZAC is the same as NPU—a dual station signing 6ZAC when working amateurs and NPU when working other Navy Stations. Dow hasn't started any of the Samoans up with transmitters. He has a paradise, being all by himself and not a B.C.L. or another ham within 2500 miles. No QRM.

We left Samoa September 3rd for Papeete, Tahiti, where we anchored September 8. KFUH was also anchored within 50 yards of the Seattle and we had to divide operating hours to some extent, NRRL taking about 98%. Hi! A new station that may be on the air signing DON most any time, is that of R. C. Donaldson, QRA Papeete, Tahiti. DON was unable to get over to see NRRL because of an infection in his leg but we managed to have a few hours together anyhow.

September 13 at 7:45 A. M. found us



The "shack"—newly constructed, of the Wireless Institute of Australia, Victorian Section. Here will be installed one of the premier Australian ham stations.

headed for home—the last and longest jump of the cruise—3,650 miles to San Diego. I remember that we coaled ship in Papeete and Captain Kempff, commanding the U. S. S. Seattle, told me that we were going to make 67 r.p.m. (the propellers); that we were going to have 250 tons of coal left over and that we were going to "drop the hook" in San Diego at 8:00 A. M. September 26. Imagine that! Have you ever started out on an auto trip of a couple of hundred miles and tried to follow a schedule? How near did you come to hitting it? Well, we did everything Captain Kempff said we would do except for one thing—a rather serious offense. We had 254 tons of coal left over instead of 250 and nobody can account for that error. Not one quarter turn did the propellors vary, not once did we change our prescribed course and we "dropped the hook" at 8:00 A. M. September 26 at San Diego. That's navigating!

There were many hundreds of little incidents that space does not permit mentioning, but they will make good strays in the future. NRRL averaged over 1,000 messages per month of official Navy messages in addition to about 200 messages per month of personal nature and which were handled by amateurs. We either worked or heard amateurs in every U. S. District, Canada, Mexico, Japan, China, Philippines, Argentina, Brazil, Chile, Australia, New Zealand, Italy, Holland, France, England, Hawaii, Samoa, Guam and Palestine.

Obituary

With deep regret it is our unhappy duty to record the death of the following A. R. R. L. members—all of them amateurs in the true sense of the word, friends of ours and friends of yours. Their calls will be missed but they themselves will never be forgotten.

Willis W. Wick, 9BMU of Sheboygan, Wisconsin. Both City Manager and Publicity Correspondent as well as an active member of the Milwaukee Radio Amateurs Club, he was one of Wisconsin's best radio men and a hearty and enthusiastic A. R. R. L. supporter.

George J. Shadick, c4AR of Regina, Canada. He was in charge of the radio testing department of the Canadian West Electric Company, second operator at CKCK, the broadcasting station of the Leader Publishing Company, and an amateur of very high standing.

Edmund M. Prince, jr., 5AGJ, Birmingham, Alabama. One of the best amateur operators in Birmingham. His signals were known from the North Pole to Panama and from the Netherlands to Australia. One of the mainstays of the Birmingham Radio Club and a friend of all radio men in that city.

Donald E. Wilson, 9CPL, of Marinette, Wisconsin. His station was not in operation at the time of his death as he was attending the University of Wisconsin. He was planning to get back into the amateur game, tho, and had assembled most of the equipment. Well-known and well liked, his death has made a vacancy that will be hard to fill.

Joseph A. Sjogren, 1AEA of New Haven, Connecticut. A true A. R. R. L. man, owner of an Official Broadcasting Station, active and progressive. His familiar call will be missed by all.

Strays

Pancost, of 8ZF, is being reported from all parts of the globe when it is probably the F8Z Naval tactical call that is really being heard.

A Simple Wavelength Chart

By Harry Etkin*

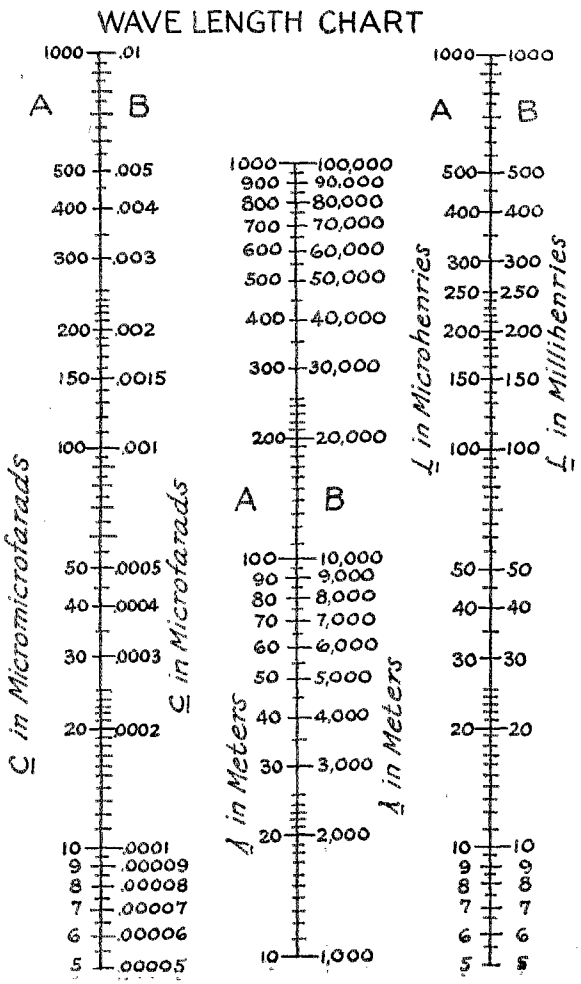
HERE is a Wavelength Chart that will be found very useful for the determination of wavelength, inductance or capacity, when any two of the values are known. Only one operation is necessary and no mathematics are needed. Both micromicrofarads and microfarads are used in the capacity scale and both microhenries and millihenries in the inductance scale. Be very sure that you are using the right units.

The chart is used as follows:

A—For wavelength determinations.
For wavelengths from 10 meters to 1000 meters align A.A.A. For from 1000 to 100,000 align B.B.B.
Take a straight edge such as a rule or piece of paper and simply lay it across the three scales so that it intersects with the two outer scales at known values of inductance and capacity. It will then cut the wavelength scale at the correct answer.
Example: A circuit has the inductance of 250 microhenries and the capacity of 50 microfarads. The circuit will then oscillate at app. 210 meters.

B—Determination if inductance of capacity and wavelength are known.
Example: The capacity used is .0005 microfarads and the circuit is to oscillate at 300 meters. The inductance is then found to be 500 microhenries.

C—Determination of capacity if the inductance and wavelength are known.
Example: Coil has the inductance of 450 microhenries and it is to be used in a closed tuned circuit which is to oscillate at 400 meters. The capacity is then found to be 97 micromicrofarads.



Strays

8EU is getting out after good messages to handle. He has collected a raft of good traffic and now threatens to stand in front of the Western Union office and tell all prospective customers that the A. R. R. L. will handle 'em free of charge!

If you are grinding your own quartz crystals and want to get the frequency down to within a hundredth of one per cent the final "grind" should be made with rouge (face-paint). It is perfectly possible to grind the crystals to this accuracy if plenty of time is taken and if you can measure the crystal's frequency with this degree of accuracy.

* 520 McClellan St., Philadelphia, Pa.

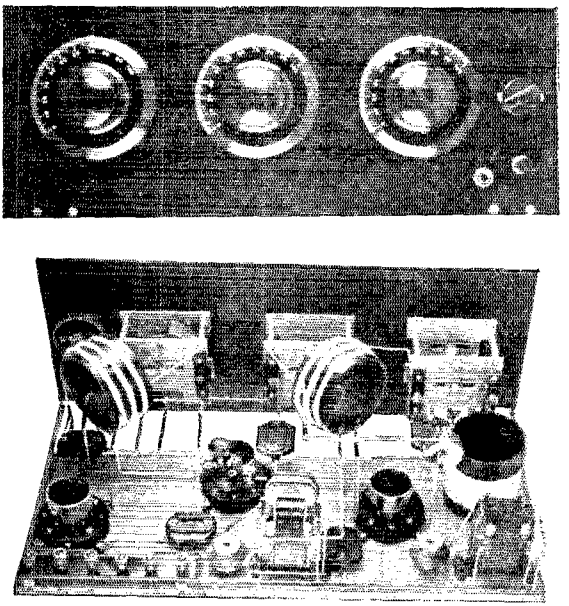
A New Reflex Circuit

By L. W. Hatry*

SINCE the reflex circuit traveled in from France and since the presentation of it, as inversed by Grime's first in *QST*, it has been the bane of more fans than any other circuit. Reams have been written about it, praising it and recommending it, but the latter days are seeing it condemned regularly.

Providing the proper precautions are taken the reflex circuit is theoretically sound. Considering the incoming wave with its audio envelope, the perfect reproduction of that audio envelope in the plate circuit of a vacuum tube operated properly in the center of its characteristic curve without overload, and the audio-frequency through the same amplifier tube for the reflex gain, there is no theoretical bogey to curse the reflex.

Practically the matter is quite different. Up to the present very few months we have had but few good audio amplifying transformers. Either the transformer sacrificed amplification to gain quality or quality to gain amplification. Where transformers needed a primary inductance in the vicinity of 55 henrys to gain an impedance of the order of 20,000 ohms at 60 cycles (which is fairly low in the musical scale) the transformers normally to hand had primaries with inductance values from 12 to 5 henrys. The curves of these latter transformers had tremendous drops at the bass end of the musical frequency scale. *That* was one source of distortion in the usual reflex. Another source of, and cause for, distortion lies in the fixed condensers with which it was necessary to shunt the audio transformers. The primary by-pass condenser was not so bad but the large secondary by-pass did things to the transformer output curve. A good transformer not bypassed would have a curve of the general nature of A in Fig. 1. The good transformer with a secondary shunt condenser would then have a curve like C or D. Depending upon the size of the secondary the resulting curves of the transformers of C_1 and D_1 with a fixed secondary shunt condenser would be something like C_2 and D_2. C_2 is a good curve and D_2 a bad one with excessive volume on a rather narrow band of frequencies. The quality of C_2 would be good but the amplification would be low. From C_2 we can understand two things: the audio transformer used should have a rising characteristic curve of voltage against frequency for use in a reflex with by-pass condensers and the secondary must be either too small or too large to resonate within the audio-frequency band with the shunt condenser required.[1]



THE COMPLETE SET

The right-hand and central dials can be replaced by a single dial controlling a 2-unit variable condenser. It is then necessary to use great care in matching the tuning ranges of the second and third grid circuits. One then has a first-rate 2-control set—and everyone has two hands.

Good reflexes have been built out of casual components by sheer luck in picking out the right parts, but this has happened very seldom. However, using a good audio transformer with a *very* small shunt secondary capacity ought to produce a good

*10X, Information Service A.R.R.L. also Radio Technician Hartford Times, Hartford, Connecticut.

1. A capacity across the primary of an A.F. transformer of 5 to 1 ratio of transformation (which is nearly the same as the ratio of turns) will have roughly the same effect as a secondary condenser 1/25*th* as large. Thus a fairly large primary by-pass can be used without harm.—Tech. Ed.

audio curve, since the reactance of a small condenser on the order of .00005 μfd. is high enough to prevent much loss of potential and hence volume.

As will be seen from the above the possibilities of a distorted audio output being superimposed on the incoming modulated R. F. and modulating it again are definite. When the process is through, the original audio envelope may bear no relation to the step-child that, translated, resounded in the irritated ears of the listener. Both the broadcasting station from which the signal

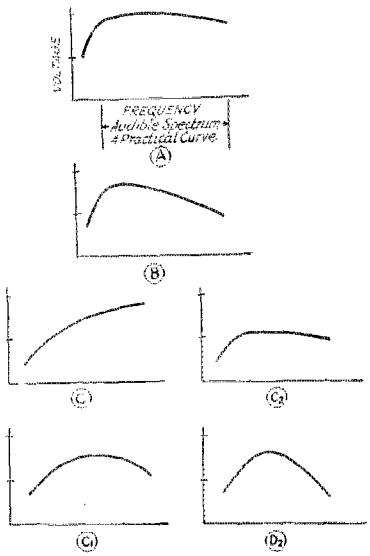


FIG. 1 AUDIO TRANSFORMER CURVES SHOWING EFFECT OF SHUNT CAPACITIES

originated and the loud-speaker that produced it finally could disclaim any responsibility.

However, there was still one other trouble. In avoiding the loss of amplification and possible harmful resonance obtainable with a large secondary by-pass condenser on the audio transformer, the by-pass was often reduced to a size that made it partly ineffective. Consequent of this the audio-transformer became full of R.F. and the result was instability — the main and most immediately noticeable fault of the usual reflex. The instability was often overcome by deliberate or unsuspected lossers that sacrificed amplification — the reflex failed to give all the results one would have supposed it should. Nor was this enough trouble. The builders of the reflexes that the public emulated would put their by-pass condensers directly across the audio transformers and consequently the audio transformers with its iron core near the R. F. inductances. This was poor design. A combination effect resulted that added stability to the R.F. circuits through increased R.F. resistance due to iron hysteresis the short leads having brought the iron core of the audio transformer into the R.F. fields of the coils and condensers.

However, in spite of the above, the one tube reflex (Fig. 2) has proved in general quite satisfactory, particularly in the case of one like the Roberts reflex that uses a detector at its regenerative point and has the reflexed tube properly biased. The Roberts circuit uses no secondary by-pass on the audio transformer which in part accounts for some of the neutralizing difficulty found.

Thus you see there were practical evils that brought on others. The most amazing thing is that the commercial reflex kits and sets have been pretty good in spite of all these practical bogeys. However, the writer had never heard a reflex set that entirely satisfied him in regard to quality, sensitivity or volume.

The things that must be done to solve the problem of producing a decent reflex set are obvious. The capacity across the secondary of the audio transformer must either be very small or else dispensed with. The R.F. energy must be kept out of the audio transformers. The solution that does both these things is as simple as it is obvious. (See Fig. 3). An R.F. choke should take care of the R.F. if a by-pass condenser is impractical. The first circuit to make proper use of this idea was conceived according to Fig 4 and took advantage of the circuit capacity to do without a condenser for the filament return. It is more advisable to use a small capacity on the order of 50 micromicrofarads such as can be obtained in an accurate value in the Sangamo fixed mica condenser; this is indicated by the dotted lines in Fig. 4. The Rice neu-

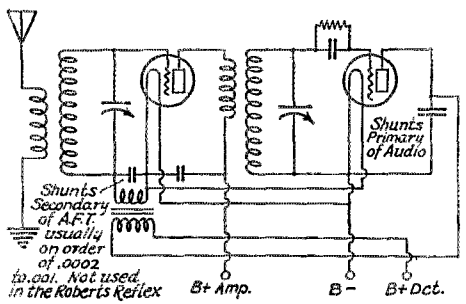


FIG. 2 THE USUAL ONE-TUBE REFLEX

tralizing method can be added by means of the small variable condenser indicated for plate connection. Blocking in any case is prevented by the grid-filament shunt leak

provided by the resistance of the audio secondary circuit.

The probably ideal circuit for reflex purposes will use resistance coupling since no distortion should then occur. Very likely it will be inversed and will use high-mu tubes because of the greater amplification obtainable from them with resistance coupling. The R.F. transformers in such a set will have a lower ratio due to much increased primary windings and the fact that the high-mu tube operates effectively without high voltage stepup—perhaps there will be auto-transformer (choke) R.F. coupling. This arrangement is being experimented with.

Further Considerations for Quality Reproduction

The inverse system of reflexing is not ideal for reflexing with transformer audio coupling if audio quality is desired. The final audio amplification is put into the first tube where also is the weakest R.F. The audio energy is so much stronger than the weak R.F., having gone through several stages, and it is so much more likely that modulation because of distortion will occur.

The circuit to be described frees the secondary of the audio transformer of most of the by-pass capacity. The primary circuits should also be similarly freed. A greater by-pass than 1000 μμfd. should not be used since that amount will generally be found adequate. If a smaller capacity will work it should be used. While 1000 μμfd. primary by-passes are specified please don't take this as a holy commandment. The capacities worked out with remarkable

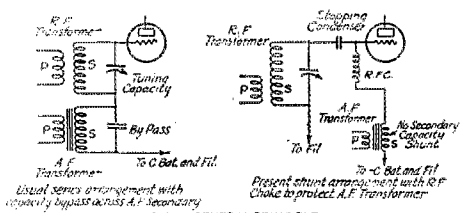


FIG. 3 THE GENERAL PRINCIPLE

nicety of quality for the old-style Amer-Tran transformers used. A more modern transformer (the new over-size Amer-Trans for instance) will probably be found to work better with by-pass capacities of only 250 μμfd or 500 μμfd. It is entirely possible that some transformers with a large distributed capacity in the primary will not need a by-pass capacity at all. Don't use any more capacity on a good transformer than necessary.

Biasing grid potentials should be used wherever possible as indicated by the C battery connections.

Very high capacity by-passes can confine the R.F. and audio components to the shortest possible paths if used where they can do no harm. A capacity greater than 1μfd is not needed as an R.F. by-pass but a capacity greater than 15 μfd. is necessary to be an adequate audio by-pass.

An absurdity has been offered the public in the way of 1 or 2 μfd. by-passes for audio frequencies across battery lines whose resistance for those frequencies is very, very appreciably below the reactance of the condenser. What good purpose such audio by-passes can serve is problematic.

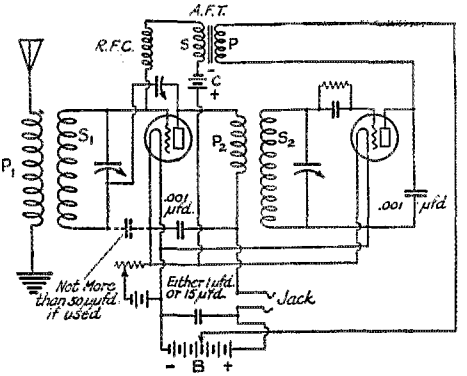


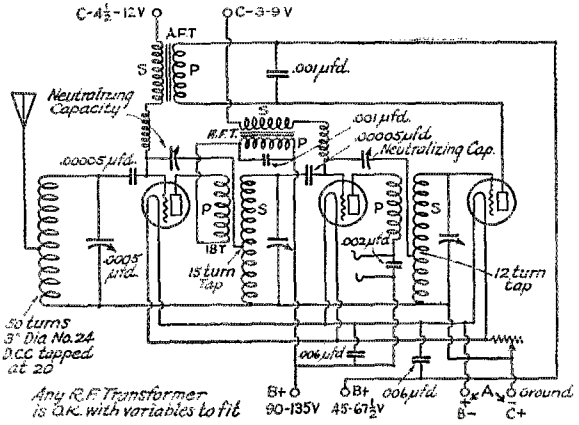
FIG. 4 THE GENERAL IDEA IN ONE STAGE

Fig. 4—The general idea in one stage.
P1—20 turns wound on same form as S1.
S1—Wound in two sections of 25 turns No. 22 d.c.c. on 3" tubing.
R.F.C.—500 turns on spool lump-wound. Use No. 32-36 wire. Don't wind in layers.
P2—25 turns No. 36 D.S.C. inside S2.
S2—45 turns No. 22 D.S.C. 3" tubing.
Detector regeneration can be added a la Browning-Drake, et al.
The constants are experimental.

The tubes should be used in accordance with the work to be done. In an un-inversed reflexed set the first tube has the least load, the next more and so on. Assuming a set with three stages of R.F. amplification and three A.F. straightly reflexed, the first tube would be a 201A with 45 volts of B and the 1½ volts of C; the second tube also a 201A with 90 volts of B and the consequently greater C, and the last tube either a 201A with unusually high plate voltage and increased C or else, much safer, a more poyerful tube such as the 112, or 210. The detector could be satisfactorily a 201A tube with relatively high plate voltage on the order of 45 to 90 and the C bias to go with adjusted for best results. The writer has found it advantageous to operate the detector with no grid-condenser.

A suitable grid bias is obtained by placing the rheostat in the negative A battery lead and returning the detector grid circuit directly to the -A battery terminal. This arrangement is satisfactory for a detector plate voltage of 22-45. A greater C voltage is necessary when higher detector plate voltages are used or when very strong signals are being received.

In the event that a grid-condenser and leak are desired, leaks on the order of .1 to 1 megohm should be experimented with instead of the usual sizes. Biasing the grid of the detector tube negatively as here suggested usually results in less distortion and sensitivity alike. However, this reflex circuit is planned with today's demand in view—it must deliver good quality of reproduced music.[2]



This circuit is the practical one of the set in the photographs. The condenser in shunt to the audio-transformer secondary has been moved up to the grid end of the R.F. transformers to permit connecting the filament end directly to the filament. This puts the rotary plates of the variable condensers at filament voltage which is the same as ground. This eliminates capacity effect to the hand when tuning. The fundamentals of the circuit are unchanged from that of the article. The circuit is known as the "Times Reflex" because the experimental work has been done in the radio department of the Hartford Times.

The antenna-coupler, an R.F. auto-transformer, is of 42 turns of No. 24 D.C.C. 3" in diameter. Actually this dimension will vary with the antenna where the antenna is tapped in as shown. The first inter-stage R.F. couplers is an air-core transformer with an 18 turn primary of No. 34 D.S.C. and a 48 turn secondary using No. 24 D.C.C. in two banks of 21 turns and one narrow layer of 6 turns. The banks are straight layer-wound pyramids separated ¼" at the bases. The secondary diameter is 3½" and the primary fits closely inside. Any good R.F. transformer will serve. This, it happens is tuned with a 250 μμfd. variable condenser. The detector-coupler is similar save that the primary has 15 turns and the secondary 53. The secondary sizes are accounted for in saying they were unwound from oversize coils to approximately match inductances and fit the broadcast spectrum.

The neutralizing taps include 14 turns from the filament-end of the secondary of the inter-stage R.F. transformer, and 12 turns on the other.

It is important that the condensers in the grid leads of the first two tubes be accurate and permanent. The accuracy is necessary so that the R.F. transformers will give the same performance with similar tuning condensers. The permanence is necessary so that the set will maintain this performance both as to accuracy of tuning and as to quietness.

The R.F. chokes used in the set although not critical are important. If they are too small or have excessive distributed capacity they will be ineffective and the set will not be sensitive. If they are too large the set will tend to oscillate unless carefully compensated. Desirable chokes are those that tend to by-pass somewhat at the higher frequencies and less at the lower frequencies (longer wavelengths). This somewhat checks the tendency toward oscillation at the higher frequencies, thereby permitting the use of more turns in the primaries of the R.F. transformer with corresponding better performance at the longer waves.

In practice useful chokes can be made by winding 1000 turns of No. 34 D.S.C. wire on a thread spool or short length of broomstick. The winding should be "scrambled" and not in layers. It is entirely possible that these dimensions (and others in this description) are not the best ones. More work is being done.

Strays

Page 24 of *Radio Reviews* ". . . which determines whether or not a station *that is slightly below the point of audibility* may be logged." Wow!

2. The usual condenser-and-leak arrangement has the advantage of automatically increasing the detector grid bias when stronger signals are being received and decreasing it for weaker signals. The A battery-bias arrangement, on the other hand, offers the advantage that it does not block or squeal as readily. It has the disadvantage that the bias depends on the setting of the rheostat and (unfortunately) that the bias decreases when one cuts out rheostat to increase the filament current. Two arrangements which get around the difficulty are suggested in the figure "potentiometer arrangements." Of course these add another knob and thereby complicate things a bit. I presume the broadcast receiver builders would call the extra knob a "sensitivity control" or label it "volume."—Tech. Ed.

Practical Crystal-Controlled Transmitters

THE use of crystal control in amateur transmitters represents an advance that is here to stay. The crystal-controlled transmitter produces a signal the frequency of which is beautifully steady and whose note is splendid to copy The addition of crystal control to any amateur transmitter only requires the use of an additional tube plus a crystal, a crystal mounting and some miscellaneous coils and condensers found in the cast-off pile of almost every amateur. The transmitter can be operated either from direct current supply, or if two crystal controlled tubes and two power amplifier tubes are available for use they may be operated direct from A. C. by connecting them in the familiar full wave rectification circuit with one tube of each group on each side of the cycle.

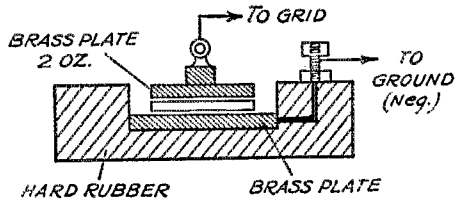
There follows a description of a set of each of these types; a D. C. set and an A. C. set. Both have been in operation for some time and both have been giving splendid results.

Crystal Control at 4XE

By William Justice Lee*

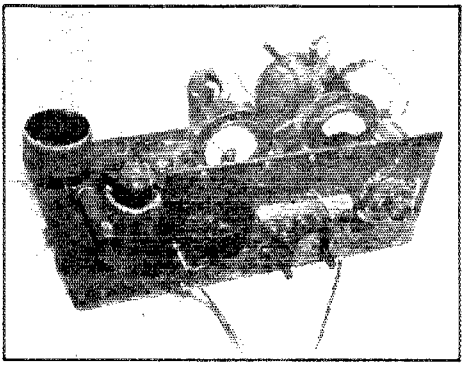
EXPERIMENTAL work at 4XE, Winter Park, Florida, for the past 15 months has been almost exclusively along the line of constant frequency in the 40- and 80-meter bands. For this purpose various different master-oscillator circuits were tried until at last the quartz crystal oscillator was used. This has proved to be the most perfect control yet tried.

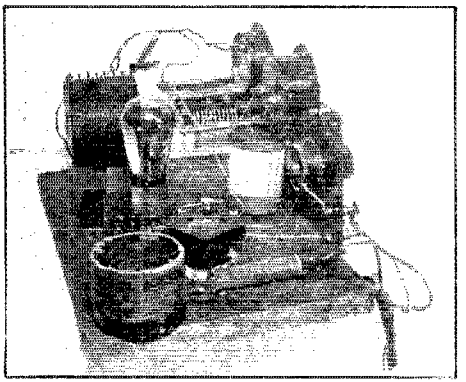
The present transmitter consists of a crystal oscillator circuit employing a UX210 thoriated-filament tube as master oscillator the output of which is supplied as excitation to the grid of a UV-204A radiotron. The set is supplied with plate power by D. C. generators at 400 and 2000 volts.



THE 4XE CRYSTAL HOLDER

The result is a wonderfully clear steady whistling note the constancy of which will remain unchanged for hours after the crystal has once assumed its mean operating temperature. There are a good many interesting kinks in getting a set like this to work smoothly and consistently day after day. These I will mention in due course.





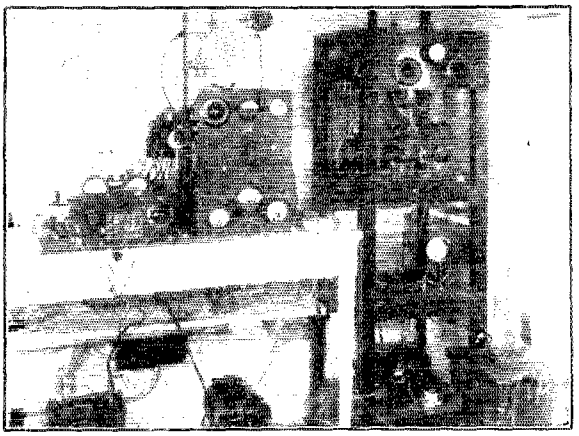
THE CRYSTAL OSCILLATOR AT 4XE

Referring to the upper view one can see at the left the grid leak and the radio frequency choke in a series with it. Next comes an inverted socket used as a crystal holder. Next is the plate circuit milliammeter behind which is the UX210 vacuum tube and in front of which is the filament rheostat controlled by the knob on the panel. The two switches next beyond control the plate current and the filament current respectively. At the right is the tuned plate circuit consisting of the helix, the Cardwell variable condenser and the 2½ ampere General Radio hot wire ammeter. Referring to the side view of the set the plate feed choke can be seen standing underneath the two meters and the plate stopping condenser can be seen at the back of the set.

The choke in series with the crystal can be seen underneath the crystal holder. It is shielded with tinfoil as mentioned in the text. The dimensions of all parts can be gotten from the diagram.

The tuning is extremely sharp and critical, but once adjusted only a change of antenna capacity will necessitate retuning. The metal of the crystal holder surfaces must be flat and true to each other. They can best be

* 4XE, 4IU, 1BCY, Lieut. U.S.N.R.F., Experimenters Section A.R.R.L., I.R.E.



THE COMPLETE TRANSMITTER AT 4XE
Underneath the table are the storage battery and the generator which supply the filament and plate of the crystal controlled master oscillator which is in the small panel at the left. It is shown in detail elsewhere. The medium sized panel on the table carries a UV204A tube. This acts as a frequency doubler and converts the 83.6 meter output of the master oscillator into 41.8 meter output which is then fed to the main amplifier at the right. At the extreme right of the picture is the transmitter frame carrying two 204A tubes operating in parallel. These tubes are supplied by the filament and plate transformers shown on the bottom shelf of the frame and on the floor respectively.
The complete connections are shown in the diagram.

turned out of brass bar stock and ground flat wth fine emery.[1]

The crystal oscillator circuit must not be overloaded. Fifty milliamperes to the plate at 400 volts is ample to control the frequency of the big tube.[2] Condenser C is most important as this neutralizes the capacity of the P.A. tube. Without it the circuits cannot be tuned to resonance.

In operation the crystal and crystal holder plates get quite warm; about 110° to 120° F., or warmer if overloaded. The top plate of the holder should float free on the top of the crystal and will sometimes move about a little when the crystal first starts oscillating. The crystals must be kept clean with Pyrene liquid.[3] Greasy fingers will stop their action entirely. The tuning of all circuits is extremely sharp. When all three are in resonance the emitted wave is clear and practically free form harmonics excepting the second. The crystal tends to eliminate parasite harmonics and inter-action between tubes.

It is noted at 4XE that a perfectly clear, pure, D. C. note can be obtained from the motor generators used with no chokes (audio) or condensers used for filtering. However, if the crystal should be removed the note sounds like a buzz-saw immediately.

Every report received on the operation of this crystal transmitter is to the effect that it has the best note and steadiest wave ever heard on the amateur bands, and is equal to the Navy's transmitter on 41.3 meters at Bellevue when compared on questions of clarity and steadiness.

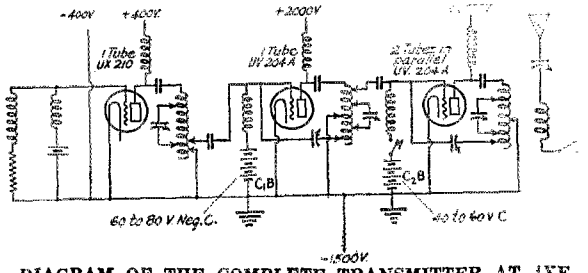


DIAGRAM OF THE COMPLETE TRANSMITTER AT 4XE, INCLUDING THE FREQUENCY DOUBLING AMPLIFIER
All fixt condensers have a capacity of 2000 micro microfarads (.002 microfarads) and are of mica.
All variable condensers are of the 1000 micro microfarad (.001 microfarad) size but have been double spaced, making their capacity 250 micro microfarads (.00025 microfarads).
In all other respects the diagram remains the same as when shown without the frequency doubling stage.

If the crystals do not oscillate freely I use a small inductance in the lead to the top plate of the crystal holder. This inductance should have a fundamental frequency about 1/3 higher than the natural frequency at which the crystal will oscillate. This inductance tends to start the crystal oscillating more freely. The coil should be wrapped with tinfoil to shield it from the

1. Use the method shown in connection with crystal grinding, Fig. 7, p. 11, November, 1925, *QST*.

2. This seems decidedly doubtful. The grid losses of an oscillating tube are fairly large, frequently 10% of the output. A UV204A can hardly be excited to full output with 10 watts grid input. It would seem that the UV204A in this set is under-compensated so that some of the grid power is supplied from the plate of the same tube.

3. This is carbon tetrachloride. Any grease-solvent will answer, though it should preferably be non-corrosive.

field of the transmitter (see diagram L_2). This coil may be scramble wound and two or three taps brought out through the tinfoil shield. Ordinarily for 80 meters, 12 to 15 turns of No. 26 D. C. C. wire on a 2-inch diameter will be about right.

The best way to tune a crystal set is to get the "CO" running first. Then pick up its double harmonic in a nearby receiver and make adjustment until the harmonic is strong, clear and steady. Next tune the PA circuit until the key can be depressed with a small load on the plate (40 milliamperes or so) and then tune the antenna circuit to resonance. Of course a good wavemeter is vitally necessary to do all this tuning.

One crystal being used at 4XE has two fundamental frequencies; one on 72 meters and one on 83.6 meters. The set can be made to function and to amplify either frequency.

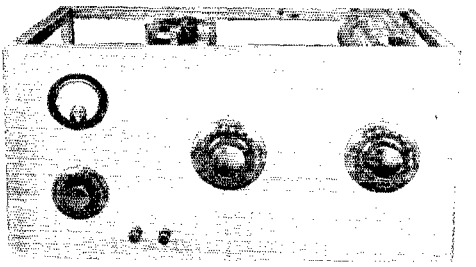
My crystal controlled transmitter delivers about 260 watts to the antenna. The antenna is worked 30% below the unloaded fundamental wave. The antenna current is 2.4 amperes on 83.6 meters and the 204-A input is 465 watts at 1500 volts.

It is a pleasure to listen to the weak remote harmonics of this transmitter. No matter how remote and how weak, their beat notes will remain constant and clear. One last thing—the crystal oscillator circuit should be mounted in such a way as to prevent any vibration in the small MO tube or the leads. Any vibration will "queer" the note and ruin the whole object of crystal control as the slightest vibration will modulate the output of the whole set with the same period as of the vibration.

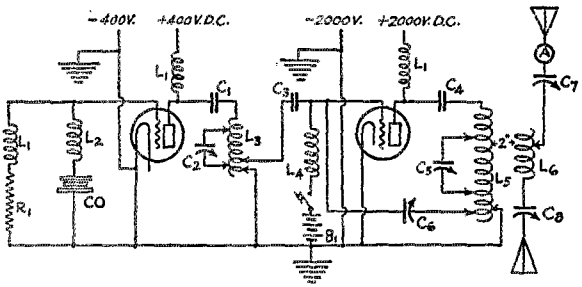
An A. C. Crystal Control Set

By John M. Clayton, Asst. Technical Editor

ALTHOUGH direct current supply to the tubes in a crystal controlled set is superior to A.C. supply, in that the note from D.C. set is usually superior, all of us cannot afford the necessary M.G. with which to supply the tubes with plate voltage. With this in mind a small A.C. set was built up in an effort to see how much of a job it was to get such an outfit to work; and to see what the note was like. The set uses two UX210's, crystal-controlled, and supplied with 400 volts A.C. One tube was connected on each side of the cycle, giving full wave rectification. The power amplifier was designed to operate at the fundamental frequency of the crystal controlled tubes. The amplifier uses two 203-A tubes also connected "back-to-back" from the A.C. transformer. The plate voltage on the power amplifier tubes is normally 1,500.



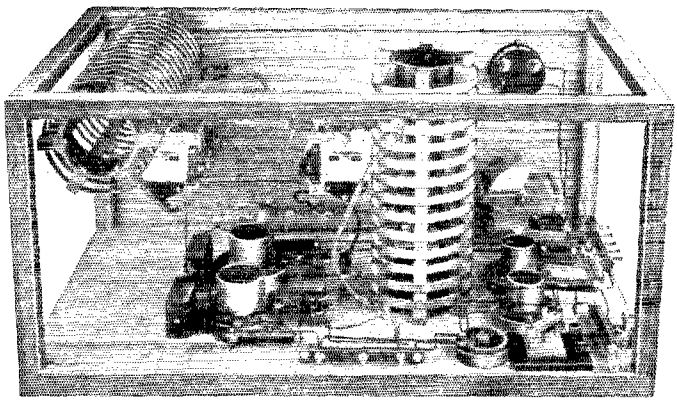
FRONT OF TRANSMITTER. PANEL AND FRAMEWORK OF OAK



THE CIRCUIT OF THE 40-METER CRYSTAL-CONTROLLED SET

L1 & L4 = usual 100 turn choke coils.
L2 = sensitizing inductance of 60 meters natural period.
L3 = 20 turn 3½" space wound inductance.
L5 = 20 turn 6" edgewound copper ribbon.
L6 = 11 turn 3" No. 16 insulated wire.
R1 = grid leak 5000 ohms.
B1 = 45 volts neg C bat.
CO = crystal and crystal holder details of which are shown below.
C1, 3, 4 = .002 stopping condensers.
C2, 5 = .0004 Var. air.
C6 = .00025 var. air neutralizing condenser.
C7, 8 = .00025 var. air.
Note—All air condensers are double spaced transmitting condensers.

The crystal oscillates at 41.5 meters and this oscillation is carried from the control tubes through the power amplifier to the antenna, the set operating on 41.5 meters. No effort has been made to use some form of frequency doubler for 20 meter work, although ths can probably be done with little trouble. The crystal mounting consists of

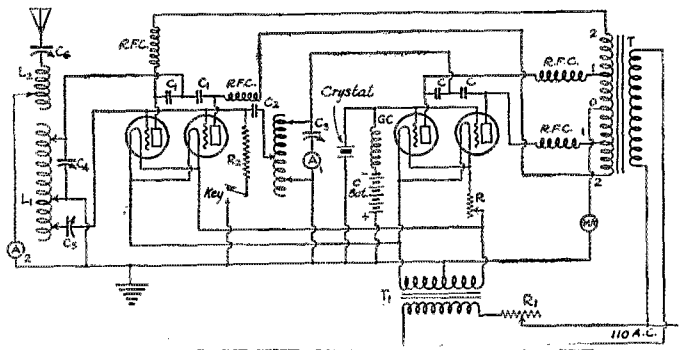


REAR VIEW OF TRANSMITTER. ANTENNA INDUCTANCE, CONDENSER AND AMMETER MOUNTED EXTERNALLY

two brass plates an eighth of an inch thick and an inch and a half square. The inner surfaces of the two plates are ground flat. A phosphor bronze spring exerts a light pressure on the top plate. Although not shown in the photograph, the lower plate is insulated from the two 8-32 machine screws supporting the upper bar by virtue of extra large holes in the lower plate, through which the machine screws pass. A flexible braided lead connects the upper plate with the quarter-inch brass support rod.

Referring to the photograph of the front of the set, the left hand knob and dial controls the tuning condenser in the plate circuit of the crystal controlled tubes. Above this is a 0-5 ampere thermocouple meter also in the plate circuit. Although not absolutely necessary, this meter is quite handy to have around as it keeps one informed as to whether or not the crystal is oscillating. The center dial controls the condenser connected across the plate inductance of the power amplifier tubes. The right hand condenser is the neutralizing condenser connected between the grids of the P. A. tubes and the end of the plate inductance associated with these tubes. The two binding posts are for the key.

The photograph of the transmitter shows almost all of the equipment. The antenna inductance, the antenna series condenser and the antenna ammeter are mounted on the wall behind the transmitter. The antenna inductance is a spiral placed directly behind the inductance shown in the left of the photograph. The crystal mounting is near the right hand corner of the set. Directly to its left is a 2 ohm rheostat used in the filament circuit of the 210 tubes. The vertical inductance is the crystal-tubes plate coil and the

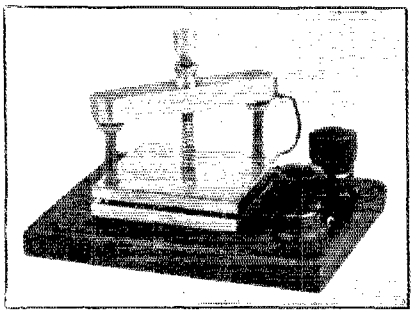


COMPLETE CIRCUIT OF THE A.C. CRYSTAL SET

T. Plate transformer tapped to give 400 volts between 0 and 1, 1,500 volts between 0 and 2.
T1. 250 watt filament transformer 12 volt secondary.
R. 2 ohm rheostat to adjust filaments of crystal tubes.
R1. Compression type primary rheostat..
R2. 5,000 ohm RCA grid leak.
RFC. 200 turns No. 30 d.c.c. on half inch wood dowel.
GC. 140 turns No. 26 d.c.c. wire on half inch dowel, tapped every 20th turn after the 80th.
C. 2,000 micro microfarad Sangamo blocking condensers.
C1. 2,000 micro microfarad mica blocking condensers (7,500 volts).
C2. Grid condenser, 400 micro microfarad, 4,000 volt.
C3. Double spaced Cardwell receiving condenser, resulting capacity 250 micro microfarad.
C4. National 100 micro microfarad transmitting condenser.
C5. Ditto.
C6. Ditto.
C. Bat normally 40 volts.
L-L1. 14 turns 3/8 brass strip wound flatwise. Diameter of 4½ inches, turns spaced 3/8 inch.
L2. 15 turn spiral of 3/8 inch strip, outside diameter of 12 inches. Turns spaced 3/8 inch.
A1-A2. 0-5 amperes thermocouple meter.
MA. 0-500 milliamperes.

horizontal inductance (at the left) is the coil in the plate circuit of the power amplifier tubes. Both of these inductances are wound with 14 turns of 3/8 inch brass strip, wound flat-wise. The turns are supported in knotched hardwood strips and are spaced 3/8 inch.

The various R.F. chokes splattered about in the set are wound on half inch wooden dowels. Each coil has 200 turns of No. 30 D.C.C. magnet wire. The choke coils were made small (physically) in order to prevent any stray fields getting mixed up.



CRYSTAL MOUNTING CONSTRUCTED BY H. WESTMAN OF 2BQH

The choke in the grid circuit of the crystal tubes is shown at the extreme right. This choke consists of 140 turns of No. 26 D.C.C. wire tapped every 20 turns after the 80th. The exact position of the tap will have to be found by experiment as it will vary in different set-ups and with different wavelengths.

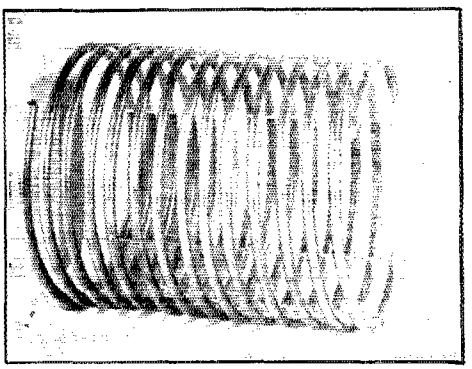
Little difficulty was experienced in getting the set in operation. It was found that the output from the crystal controlled tubes was materially increased when the spring on the top plate of the crystal mounting was adjusted to exert quite a bit of pressure upon the crystal. The set has been in operation for some time and in almost all cases the note has been reported as being excellent, although not pure D.C.

The greatest difficulty has been in the crystal itself. A 41.5-meter crystal is so thin (and incidentally so hard to get) that the normal heating of the crystal when the set has been in operation has caused a great deal of speculation as to how long this particular crystal will continue to exist. It would probably be much more satisfactory to use an 80-meter crystal (or even a 120-meter affair) working the power amplifier at the same wavelength and taking off a harmonic of the power amplifier for 40-meter operation; or better still, the frequency doubling scheme as shown by Mr. Lee, using a two stage power amplifier. The crystal oscillating at the higher wavelengths are much easier to obtain and will stay put better than the extremely thin ones. Below 75 meters the crystals begin to look mighty thin for transmitter work. With that in view this particular set is being rebuilt to work on the second harmonic of an 80-meter crystal.

Good Helix Construction

NECESSITY has been recognized as the mother of inventions, and high frequency transmission with its great cry for low-loss this and low-loss that has brought out a number of innovations in the design of parts.

There is submitted herein something new in a transmitting inductance which should prove interesting to those who wish to have the best at a nominal cost. Figure 1 gives a good idea of the method of construction. Two pieces of double thickness window glass, 1" wide x 6½" long are notched so as to take a 3/16" diameter copper tubing. The process of filing the semi-circular notches is very simple—consisting first of nicking with a three-cornered file and then with plenty of turpentine and a so-called rattail file (3/16" or ¼") cutting the notch in the same manner as though one were filing steel. A little practice will enable one to make a notch in just about one minute. Without



turpentine the file will be used up very rapidly. The end pieces of the helix frame are made of white wood and notched with a mitre saw to fit the glass used. The coil in this particular case is made of 3/16" copper tubing which was wound on a Lucky Strike Tobacco can 4" in diameter by stretching out the tubing on the floor and rolling the can over and over until the right number of turns had been made; the recoil of the tubing is just enough so that the coil can be slipped off without any trouble. The coil in question has 14 turns and was designed to be used on a wavelength of 40 meters. The tubing can be purchased from a hardware store at a cost of possibly $1.50 and the pieces of glass for 10 cents. We are indebted to A. A. Hebert, the A.R.R.L. Treasurer for this contribution.

The Berkshire Brass Pounders

By A. W. Everest*

MINUTES of special meeting called to order July 4th, 1924, at 8.01, D.S.T., to witness the community fireworks and to discuss the merits of large wire versus small.

The fireworks were good.

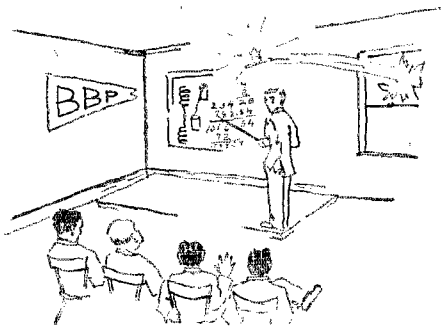
So was the discussion.

The first speaker of the evening was Ray Boize of 1OM who said, "We ought to use large wire because the technical editor says so."

This brought Thomas Tomascus of 1XU sharply to the floor. "Bah, on that tech. ed. stuff. He wouldn't even print my list of calls heard. However, I agree with him. We all know the current carrying capacity of wire varies with the area of the cross-section, so why argue?"

Someone yelled "Sit down!"

Elmore Acket of 1CEK, who seemed to be pondering deeply during this last lengthy address, now stood up. "Well, Tom, your argument is fine but it holds true for direct current only. With alternating current, as the frequency increases, the current tends to forsake the interior of the wire and travel in the outer portions until at radio frequencies, and especially amateur frequencies, it is wholly a surface effect and the resistance then varies inversely with the circumference or diameter and not with the



area of cross section. Just the same, this means lower losses so we ought to use the larger wire."

This was met with numerous nods of approval.

Then Heck Sobeit, E.E., A.I.E.E., and R.E. of 1CKE, noted for his 150-watt radiophone QRM, opened up. "That last sounds pretty good, but you are forgetting something. I say, you are forgetting something. You must remember that, to cover a certain band of wavelengths, your coil must have a certain inductance—and that the larger you make the wire, the more turns you will need to get the same inductance. Now then, in a cylindrical coil of given diameter, the inductance varies with the ratio $\frac{\text{turns squared}}{\text{length}}$ exactly true for pancake coils or very short cylindrical coils, the error in figuring well designed amateur low-loss coils in which the length approximates the diameter, is very small and can be neglected. That is for a fixed value of inductance, the ratio $\frac{t^2}{l}$ must remain unchanged. Suppose we put 10 turns on a form 1" long. The $\frac{t^2}{l}$ ratio would be $\frac{100}{1}$. Now, just for argument, double the size of the wire and see what happens. 20 turns on a 4" winding form will be needed to get that ratio of $\frac{100}{1}$. or the same inductance as the other coil. These 20 turns, being twice the size wire, will have half the amateur frequency resistance per unit length, but will be twice as long—one offsets the other—and I don't see as it makes any difference *what* size wire we use!"

Heck sat down with a smile of satisfaction.

The next entertainer was Baron Karl of 1CLN, who always has an argument. He had never been known to keep still so long before and all faces now turned expectantly in his direction. "Boys, I hate to admit it, but you are *all* wrong. I shall now prove by a simple calculation that the *smaller* the wire the *better*, providing it is large enough to prevent heating, which doesn't require much for reception." He stepped to the blackboard. "Starting where Mr. Sobeit left off we are confronted with the further effect of increased strays in the larger wire owing to the fact that it has a larger cross-sectional dimension at right angles to the electromagnetic axis of the coil. Now then, lets see how much loss this amounts to. Starting with wire of zero diameter and considering the portion of it of zero length, the axis of stress may be considered as intersecting the electromagnetic axis at right angles. Let the point of intersection of axes be the origin of coordinates. Imagine cross section of the axis of stress passing thru the origin; it is a circular surface. On this surface erect a differential column ending at the level of the surface of the coil. If "a" be the radius vector from the origin to the point on the cross section on which the column is erected the width of the base

*1ARE, 15 White Terrace, Pittsfield, Mass.

of the column is "da" and its breadth "ad". Its height is $\sqrt{R^2 - a^2 \sin^2 \Phi}$ and the volume of the differential column,

$$dV = a\ d\ a \sqrt{R^2 - a^2 \sin^2 \Phi}\ d\ \Phi \quad (1)$$

The total volume of stray stresses for the portion under consideration there equals,

$$V = 8 \int_0^r a\,da \int_0^{\frac{\pi}{2}} \sqrt{R^2 - a^2 \sin^2 \phi}\ d\phi$$

FIG. 1

Where "R" is the radius of the coil "o" is the angle between the radius vector "a" and the axis of the cylinder. The integral gives the stray stresses set up in one quadrant of half the column; hence the factor "8".

Taking "R²" outside of the radical sign, equation (2)" becomes:

$$V = 8R \int_0^r a\,da \int_0^{\frac{\pi}{2}} \sqrt{1 - \left(\frac{a}{R}\right)^2 \sin^2 \phi}\ d\phi$$

FIG. 2

The first integral on the right is the elliptic integral E $(\pi/2)$ (a/R) and gives:

$$V = 8R \int_0^r a\,da \frac{\pi}{2} \left[1 - \left(\frac{1}{2}\right)^2 \left(\frac{a}{R}\right)^2 - \left(\frac{1}{2}\right)\left(\frac{1\cdot 3}{2\cdot 4}\right)^2 \left(\frac{a}{R}\right)^4 - \left(\frac{1}{2}\right)\left(\frac{1\cdot 3}{2\cdot 4}\right)\left(\frac{5}{6}\right)\left(\frac{a}{R}\right)^6 \cdots\right]$$

$$= 4\pi R \int_0^r \left[a - \frac{1}{2}\frac{a^3}{R^2} - \frac{1}{8}\frac{a^5}{R^4} - \frac{1}{16}\left(\frac{5}{6}\right)\frac{a^7}{R^6} - \cdots\right]$$

$$= 4\pi R \left[\frac{a^2}{2} - \frac{1}{4}\frac{a^4}{R^2} - \frac{1}{6}\frac{a^6}{R^4} - \frac{5}{48}\frac{a^8}{R^6} - \cdots\right]$$

$$= 4\pi R \left[\frac{r^2}{2} - \frac{1}{4}\frac{r^4}{R^2} - \text{etc}\right]$$

$$= 2\pi R r^2 \left[1 - \frac{1}{2}\frac{r^2}{R^2} - \frac{1}{8}\frac{r^4}{R^4} - \frac{1}{16}\frac{r^6}{R^6} - \cdots\right]$$

FIG. 3

The terms in the brackets form a rapidly convergent series and eliminating small quantities of the second order.

A merciful sky rocket came sailing thru the door and the Berkshire Brass Pounders adjourned thru the window.

—*Secretary BBP.*

Warning

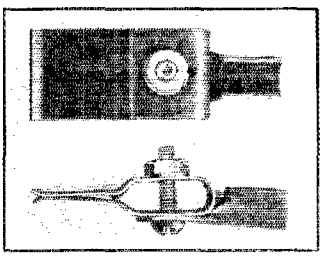
MR. Walter B. Ford, Instructor of Radio at the Le Conte Junior High School of Los Angeles has brought to our attention a serious misunderstanding of transmission circuits. Apparently a good many of our readers have misunderstood the article "The Hertz Antenna at 20 and 40 Meters," which appeared on page 24 of our August issue under the signature of Mr. Howard M. Williams. As a consequence of this misunderstanding stations are now operating with direct coupled transmitters, merely omitting the ground lead. This may or may not operate in the desired manner. In several cases the antenna system has apparently *not* operated as described in the installation at 9BXQ, but has in addition radiated with the whole thing (antenna and feeder) operating as a direct coupled transmitter. This causes the emission of an additional wavelength in the broadcast band where it is exceedingly annoying.

Before making use of this method of transmission by all means test it with a broadcast receiver next door to make absolutely sure that you are not emitting another wave above the one you are supposed to be using.

The ruling of the Department of Commerce in such matters is that special circuits must produce the same results as the ones which are approved. If a special circuit cannot be made to produce these results it must not be used.

Inductance Clips

TO fit the edgewise-wound inductances for transmitters, E. F. Johnson at Waseca, Minn., has designed and marketed a very good copper clip. The clips are some three-quarters of an inch wide and an inch long. A soldering lug (as seen in the illustration) provides ample space for the terminal of the flexible wire or ribbon connecting strip and the tension with which the clip grips the inductance can be varied over wide limits by loosening or tightening the 8-32 machine screw that holds the clip together. If desirable the lug need not be used. A hole can be drilled in the connecting ribbon and the ribbon can be bolted directly on the clip. A good job, OM.



Strays

A newspaper clipping sent in gives the following red-hot news: "Sir Oliver Lodge, paying tribute to Marconi, complimented him on his *new* discovery that a long wave preferred the darkness while a short wave preferred light." Hi! Guess we will have to send the Senatore a sub to *QST*.

9SJ working at the Illinois Merchants Bank in Chi has gotten to be such an adding machine expert that he can call "CQ" on the blame thing.

Getting Down Below 5 Meters

By Harry Lyman*

IT is easy enough to put a set on wavelength of 5 meters and make it work but a little different circuit arrangement is necessary to get down to still shorter wavelengths. The first thing to think of is the tube. A UV201 or CX201A may

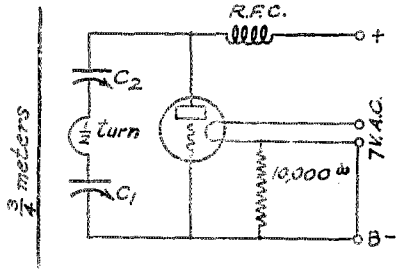


FIG. 1 — THE TRANSMITTER

C1 and C2 15 plate, double spaced, maximum capacity about 17 micromicrofarads.

be used. A UV202 will be satisfactory also. The capacity of these tubes is low enough to get down without a great deal of trouble. The next thing to think of is the external capacity and inductance. The leads must be as short as possible and there is no harm done by using large wire and soldering the joints. The inductance

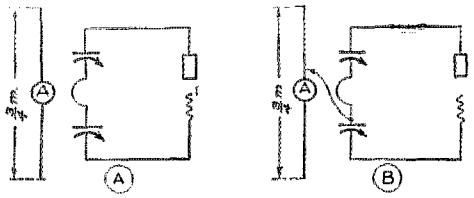


FIG. 2 — TWO METHODS OF COUPLING AN ANTENNA TO THE ¾ TRANSMITTER

(A) This method is the same as the inductive coupling used by most stations at present.

(B) As far as I can see, this method is the best of the three. When a wavemeter is set at a given distance from the transmitter there is more current shown on the galvanometer of the wavemeter when this method is used than when any of the others are used.

in my transmitter is ½ turn 3" in diameter. The condensers are double spaced 15 plate condensers.

The circuit is the same as used in the 5 meter receiver shown on page 51 of the March *QST*. Both transmitter and receiver use the same circuit with a slightly different arrangement of plate and filament supply for each. In the transmitter I am using 700 volts A. C. for plate supply and between 7 and 10 volts A. V. for filament supply.

The most difficult problem of all is a

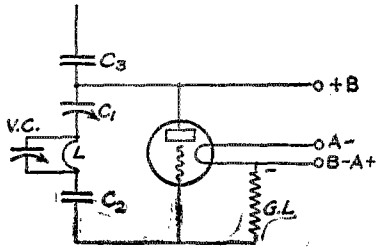


FIG. 3 — THE RECEIVER

L—¼ turn No. 14 wire. Diameter of turn 2".
V.C.—Remler variable condenser cut as shown on page of March, 1925.
C1—3 plate variable condenser.
C2—250 micromicrofarads.
C3—2 plates 2" square spaced ¼".
G.L.—Variable grid leak.
Phones in positive "B" lead.

means to couple an antenna to this arrangement. There are three ways of doing it but whether they are really efficient

FIG. 4 — THE WAVEMETER

C1—Remler Variable Condenser.
C2—2 plates 2"x2" spaced ¼".
T.G.—Weston 115 mil. thermo-galvanometer.

is to be found out as yet. The methods are shown in Fig. 2.

Mr. W. L. Adams of Los Angeles is working with me. He has a set like mine and these sets as described here. They operate at a wavelength of 1.5 meters but I am having a special tube built and believe that we can shortly go into the 77 centimeter band and find out something about it.

Strays

It's simple OM: to change from μfd to μμf move the decimal point six places to the *right*: .001 μfd is 1000. μμf, and to change the other way move the decimal point six places to the *left*.

Mr. Arthur Batcheler, Supervisor of Radio of the 2nd District, announces that the offices of the Supervisor have been moved from the Customs House to the third floor of the Treasury Building, Wall, Nassau and Pine Streets, New York City.

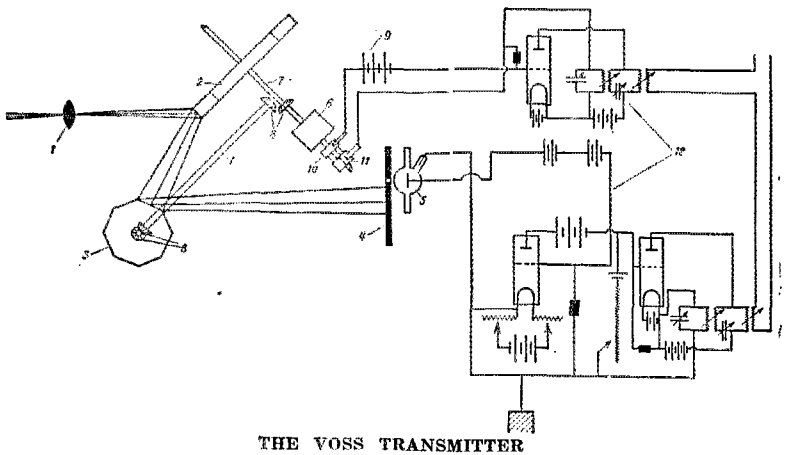
* 6CNC, 709 Amarosa Place, Venice, California.

The Voss Picture Transmitter

IN *Radio-Umschau* for August there is a description of a picture transmitter designed by August Voss. The system differs sufficiently from those we are familiar with to make it interesting.

The Transmitter

The picture to be transmitted is placed at the lens 1 which projects an image on the rotating octagonal mirror 2 which causes the beam to wipe lengthwise of the second rotating octagonal mirror 3. This mirror in turn causes the beam to travel up and down so that it traverses the screen 4 in just the same fashion as when the Jenkins rotating prisms are being employed. As the picture shifts over the screen 4 various portions of it fall upon the small opening in this screen. The



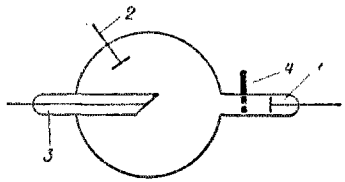
THE VOSS TRANSMITTER

particular portion which is striking the screen at any instant effects the photo-electric cell 5 and thereby modulates the output of the vacuum tube which output is sent into a line or into an antenna. In the sketch the parts 6, 7 and 8 will be recognized as the driving motor, gearing and shafting. The motor shaft also carries the commutator system 10 and 11 which breaks up the current from the battery 9 thereby transmitting to the grids of the upper tubes a pulsating voltage which is amplified and transmitted to the line or the antenna. Thus the outgoing signal is not dissimilar from that emitted by the Jenkins Junior, that is to say it contains picture modulation and also synchronizing modulation.

The Receiver

At the receiving end the sytem differs from the Jenkins one. The Jenkins high frequency neon lamp is replaced by a modified X-ray tube. The high voltage is applied to the terminals 1 and 2 as usual. The cathode ray thereupon streams out from the electrode 1, strikes the target 3 and causes X-rays to be emitted as usual. However the grid 4 lies in the path of the cathode ray and is able to block or defect it. Therefore if an alternating voltage is put on the grid 4 the output of X-rays will vary accordingly. This device operates with very little lag according to the claim of the inventor.

The actual apparatus is more nearly (although still schematically) presented in the last figure. The input from the radio receiver or the end of the transmission line is fed to the vacuum tube system where it is detected. By tuning the input circuit of the tube and by the use of a heterodyne it is possible to cause the synchronizing frequency to appear in the

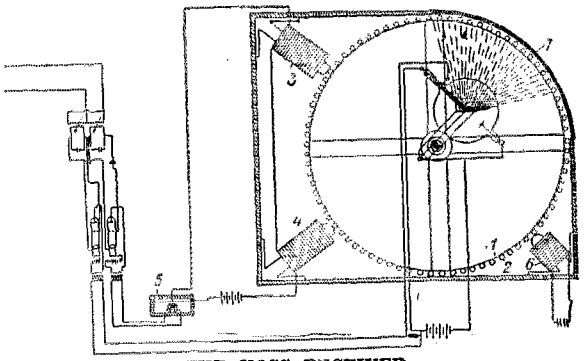


THE X-RAY TUBE

output of one tube and the picture modulation to appear in the output of the other tube, just as in the Jenkins system. The synchronizing frequency is fed to the tuned high-speed relay 5 which interrupts the power from the battery, at this same fre-

quency. This current flows through the magnets 3, 4 and 6 causing them to pull intermittently on the little iron studs at the edge of the large copper drum surrounding the X-ray tube. This drum is thereby caused to rotate synchronously with the operation of the light ray at the transmitting end. The copper drum carries a spiral row of holes, therefore the output of the X-ray tube is caused to wipe back and forth across the receiving screen 7. This screen 7 is quoted with a fluorescent substance, therefore any portion of it exposed to the X-rays glows in proportion to the intensity of those rays.

The article from which this description is written does not make one point especially clear. It is evident that the rays from the X-ray tube are spread in a number of directions, indeed they are shown in this way in the illustration which is reproduced from the original article. It will be noticed therefore that a number of the openings in the copper drum (in fact all of those which are under the screeen at the moment) will be receiving light and therefore a large number of them will cause glowing patches on the screen whereas only a single one should be showing at any given instant. There must therefore be incorporated in the device some additional synchonous moving device which covers all but one of the openings in the copper screen at any moment.



THE VOSS RECEIVER

It would seem that the system would encounter some difficulty because of the time required for the target of the X-ray tube to heat up and to cool. However, there is renroduced in the original article a photograph of fair quality which is said to have been transmitted over a 50 kilometer wire line in about one tenth of a second.

—*R. S. K.*

Central Division Ohio State Convention

ALTHOUGH "Father Pluvius" kept pouring down barrels and barrels of rain from above, and was responsible for a number of Ohio amateurs staying home, those delegates who arrived on November 5th, 6th and 7th from Cincinnati, Canton, Dayton, Findlay, Cleveland, Ohio, Detroit, Fairgrove, Mich., and a few other cities, and registered at the Hoitel Waldorf, Toledo, Ohio, for the third annual convention, will remember the good programme prepared by the Toledo Radio Club under whose auspices the convention was held.

Dr. Hinckley, of the U. S. Light & Heat Corporation, gave a very illuminating lecture on Dry batteries, their uses and abuses. It was most interesting, if the number of questions asked thereafter was any criterion.

The Convention was also very fortunate in hearing Prof. W. L. Everitt, University of Michigan, speak on short-waves, which subject continues to be so interesting.

Visits were made to ham stations, the Western Union Telegraph Co's plant, at which latter place unusual courtesies were extended the delegates. Every one realized, after examining all the modern equipment of a telegraph company, that our little sets looked very simple in comparison. Radio movies were shown and other entertainments given so that the time from morning to night passed very quickly. A big pail of good smoking tobacco surrounded by good old fashion "Corn Cobs" and fellows sitting around the table, seemed to work on the imaginations of a number with the result that most interesting stories were told and appreciated by those listening besides provoking arguments that are always the delight of conventions. The Convention closed with one of those banquets for which Toledo is famous. The principal speaker was A. A. Hebert, A. R. R. L. Treasurer, who spoke on the business end of *QST*.

The Cleveland delegation, so well represented by Messrs. Gimmy and Spiller, landed next year's convention for Cleveland, and there is no doubt that the next Ohio convention will be as successful as all previous ones.

The thanks of every one are extended to M. S. Brainard, W. W. Dorrell, P. M. Barnes and other members of the Toledo Radio Club, for the hard work put into the making of this convention successful.

—*A. A. H.*

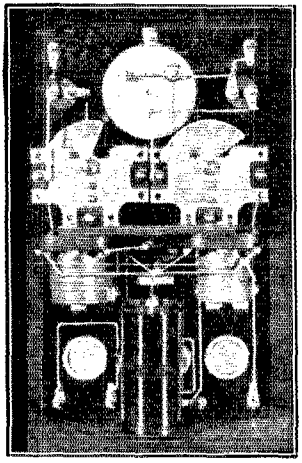
A Portable Transmitter

By A. H. Waynick*

IN the September *QST* under the Experimenters Section Report I noticed an appeal for data on portable transmitters so I decided I had better send in the details on the one I constructed to take to the last National A.R.R.L. convention in Chicago.

During the convention the set was operated at the Edgewater Beach Hotel using a 35-foot single-wire antenna hanging from a window.

Receiving tubes and 5-watt tubes were used. With the latter the antenna current



REAR OF TRANSMITTER PANEL

was .3 ampere at a wavelength of 40 meters and .8 to .9 ampere at a wavelength of 80 meters.

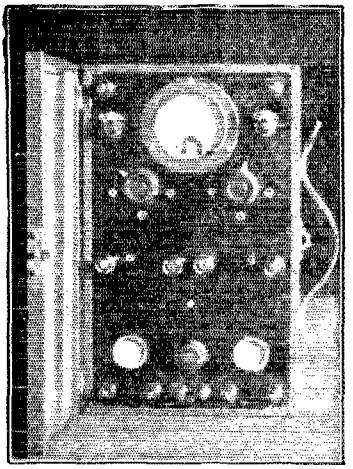
The set uses the arrangement popularly called the "Reinartz Sending Circuit". This circuit was chosen because of its simplicity and the ease with which it adapts itself to antennas of various characteristics.[1]

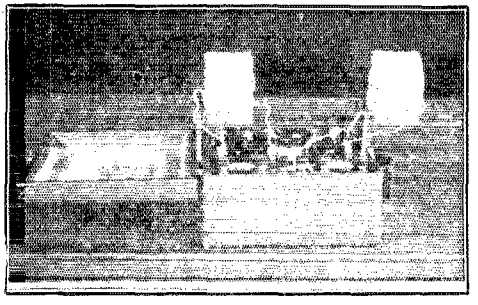
As may be seen by the picture the inductances are simple Lorenz coils made of No. 18 annunicator wire as these make a very compact rigid and efficient coil if due care is used in their making.[2]

The inductances are mounted on two glass rods which are supported by rubber forms, though this method might easily be improved.

The panel, contrary to popular ideas, is made of bakelite as this was the only material obtainable that would not be harmed by the moisture and would not warp with the outdoor use the set must receive. The form for the chokes is made of the same material.

The twin chokes pictured are wound on a common tube. This was the only method by which efficient chokes could be placed in the space available. These chokes are wound in opposite directions so the fields will buck. They are wound of No. 28 enameled wire. They have a fundamental





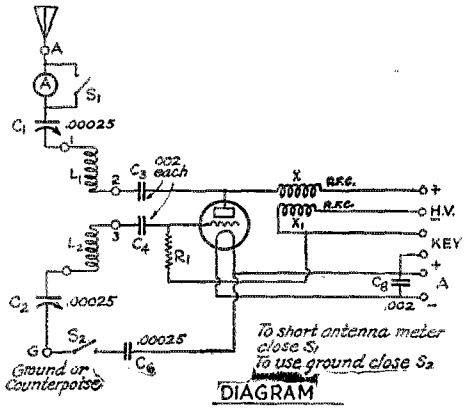
PANEL AND END VIEWS OF THE TRANSMITTER

of about ninty-five meters, thus eliminating R. F. feeding into the A. C. lines on the harmonics of the chokes, as these harmonics are not coincident to any of the frequencies used for transmitting. I believe a few fel-

* 8ACH-8CR, 774 Casgrain, Detroit, Michigan.

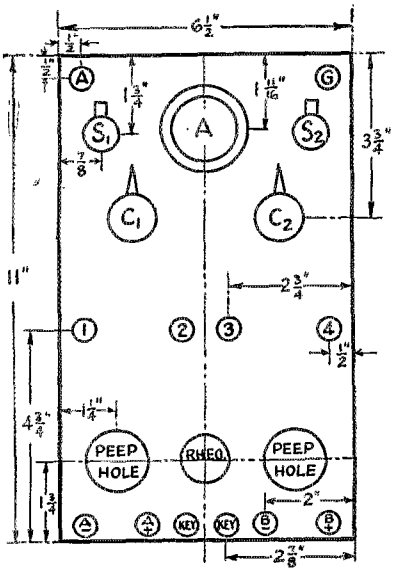
1. Unfortunately the circuit tends to change its mode of operation when the antenna is small and the series condensers are set at too large a value. The system that then goes into a mode of oscillation very like that of a direct-coupled Hartley circuit with series condensers in antenna and c. p. This is rather bad for the neighbors.—Tech. Ed.

2. It would be interesting to compare results with those obtained when using a pair of helices of more usual construction. At low powers the Lorenz coils may show up well. Will someone make the test and report? By the way, "in the same mail *QST* has been accused of (A) "ridiculing the excellent Lorenz coil" and (B) "Continuing to push the inferior Lorenz coil".—Tech. Ed.



DIAGRAM

C-1 and C-2 .00025 Rosko variable condensers.
C-3 .002 micadon.
C-4 .002 micadon.
C-5 .002 micadon.
6-6 .00025 micadon.
L-1 and L-2 15 turn Lorenz coil 3" dia. for 40 meters.
L-1 and L-2 30 turns Lorenz coil 3" dia. for 80 meters.
S-1 and S-2 Carter Imp switches.
R-1 No. 10 Bradleyohm used as grid leak.
X and X, two chokes wound on the same tube in opposite directions. 90 turns each, 28 enameled wire tube 1½ by 3½ inches long.
Notes—Cutler-Hammer sockets were used. The meter is of General Radio make and has a full-scale reading of 1 ampere. Either ground or c.p may be connected to the "G" post. The switch should be closed when using a ground.



PANEL LAYOUT
Labels correspond to those on diagram.

lows would find this to be their trouble if they investigated closely the cause of their houselights lighting when the key is pressed.

The wiring of the set without provisions for a center tap on the filament circuit may look wrong but if the wiring of the completed set is examined it will be noted that the filament connections on the two sockets are reversed, thus by shifting tubes both sides of the filament will be used up equally.

The auxiliary apparatus (such as plate and filament transformers, S tubes and antenna equipment, key etc.) is carried in a separate case of about the same dimensions as the set and as the set was used on the boat while going to Chicago two C-301A tubes were also carried. These were used with battery plate supply.

As for results, the longest distance worked with this set so far is about 800 miles but as the set has only been tried about five or six times this is by no means the best it probably will do.[3]

3. There is no reason why this set should not equal the average performance of 10-watt" sets. Tech. Ed.

INTERNATIONAL RADIO WEEK

By E. M. Glaser, 2BRB.

The National Radio Trade Association and manufacturers of radio apparatus is preparing for international broadcasting tests the week of January 24th to 30th. This will be known as International Radio Week. The N. R. T. A. has asked the members of the A. R. R. L. to relay messages to mayors in some 500 cities asking them to proclaim International Radio Week.

Plans for this big relay are in the hands of E. M. Glaser, 2BRB who is cooperating with Mr. L. Nixon of the N. R. T. A. The plan is this: starting about January 15th, these messages will be started from New York City, Chicago and San Francisco. All amateur wave lengths will be used. Stations in and around New York City starting messages are: 2BRB, 2PF, 2KW, 2BBX, 2CLA, 2WC, 2AMJ, 2CZR, 2EV, 2KR and 2AEP.

The number of messages makes it possible to roll up high traffic totals at all stations. One big point to remember is that they MUST BE DELIVERED PROMPTLY and before January 24th. This is a most splendid chance to make direct contact with your mayor—a chance to show him what we amateurs can do, let's do it.

Strays

8AJX hooked up two amplifying transformers with their primaries in parallel and secondaries in series, used the thing to supply plate voltage (from 110 volts 60 cycle supply line) to a single 201-A and was heard in Brazil! Tie that one!

The Fourth National Radio Conference

We Retain Our Wave Bands—Only Trivial Changes Affecting Amateurs—Government Services Get Some Short Waves

By K. B. Warner, Secretary-Editor, A.R.R.L.

NO additional channels were found available for broadcasting except by sacrifice of the major wave band used by the amateurs; and careful analysis showed that even if this entire band were to be transferred to broadcasting the contribution toward the reduction of interference would be relatively slight. Furthermore, any such change in broadcasting channels would inevitably render at least partially obsolete the millions of broadcasting receiving sets now in use. No benefit proportionate to the certain damage could be found, and consequently the broadcasting wave band was not changed."

In these words the Fourth National Radio Conference disposed of what was probably the question of greatest amateur interest—the possibility of broadcasting absorbing the amateur's only exclusive band, 150 to 200 meters.

All of the amateur bands remain as they were before the conference. Three recommendations affecting amateurs were adopted.

(1) The opening of a 100 kc. band from 83.3 to 85.7 meters (3500 to 3600 kc.) to amateur phone operation, the usual quiet hours applying.

(2) The opening of the so-called amateur 80-meter band to naval aircraft and naval vessels working naval aircraft.

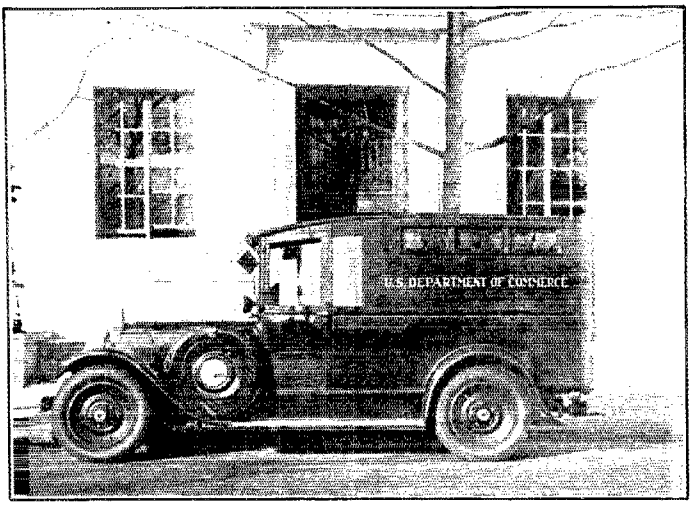
(3) The prohibition of the spark on all waves below 200 meters.

At this writing these changes are not yet actually in effect—they are merely recommendations, and until announcement of their inauguration is made by the Department of Commerce, the regulations of the past year continue to govern us. Early announcement by the Department is expected, however.

Much Accomplished in Three Days

Nearly seven hundred delegates, representing every conceivable sort of a radio interest all over the country, gathered in Washington on November 9th for this conference, the fourth of the sessions called by Secretary of Commerce Hoover. The work of this conference was so skilfully managed that, although the attendance was the largest of the series and the problems more numerous, the job was done in three days and the meeting dissolved on the afternoon of November 11th, as contrasted with a week last year and eleven days in the previous year. The A.R.R.L. was represented by President Hiram Percy Maxim, Vice-President Chas. H. Stewart, and the writer. Secretary Hoover presided at the various general meetings of the conference. His handling of the different questions which presented themselves was nothing short of masterly. He opened the conference with an address on radio progress and problems, in the course of which he touched upon the amateur 150-200 meter band, saying:

"It has been suggested that the remedy [for congestion] lies in widening the broadcasting band, thus permitting more channels and making it possible to provide for



THE CENTER OF ATTRACTION AT THE CONFERENCE

Radio inspection truck of the Eighth District Supervisor. The body was designed and built in Detroit under the supervision of Supervisor S. W. Edwards, and is mounted on a Packard chassis. The general arrangement is still regarded as experimental. Eventually each of the nine Supervisors' offices is to be so equipped. (Photo Underwood & Underwood).

more stations. The vast majority of receiving sets in the country will not cover a wider band. Nor could we extend it without invading the field assigned to the amateurs, of whom there are thousands and to whose constant experimentation radio development is so greatly indebted. Radio in this branch has found a part in the fine development of the American boy, and I do not believe anyone will wish to minimize his part in American life. And if we did absorb the upper amateur band from 150 to 200 meters it would not even solve the immediate difficulties. . . ."

The actual work of the conference was carried on by nine committees, each in charge of a section of the radio problem, and at the conclusion of the opening session of the conference these committees started their deliberations in smaller committee-rooms around the building. Most of the problems dealt with of course were directly related to broadcasting. The committees in which we amateurs were chiefly interested were No. 1, on the general allocation of frequency bands, and No. 6, on amateur matters.

This first committee, presided over by Dr. J. H. Dellinger, of course was the most important one—the key committee. Early in its deliberations it adopted as a basis for discussion a reallocation recommendation from the Interdepartmental Advisory Committee, submitted by the Navy representative, Lt. Commander T. A. M. Craven. This plan had for its purpose the changing of many of the frequency bands so as to facilitate naval communication. There was method in this. It must be admitted that the 1924 conference short-changed the government services in quite a few respects, particularly rgarding high-frequency bands, the Navy in particular getting almost nothing. This year they got the jump on the situation and fared immeasurably better, the interdepartmental plan being used as a guide and, with innumerable minor modifications, finally adopted.

It was in this committee that the real determination respecting the extension of broadcasting was made. Mr. A. H. Grebe led the move to extend broadcasting down to 150 meters by taking away the amateur's 150-200-meter band, in which he was joined by Mr. E. J. Simon. The leading engineers present, Dr. A. N. Goldsmith, Mr. J. V. L. Hogan and Mr. C. W. Horn, and the Navy representative, joined the amateur delegates in opposing this proposal. Then it became apparent that the majority of the broadcasters themselves were opposed to the idea. It seems that the Class-A station owners, at present operating between 200 and 286 meters and greatly outnumbering the Class-B owners, figured that such an extension of the broadcasting range would redound solely to the benefit of the Class-B stations, whose territory would be expanded by driving all the poor Class-A stations down between 150 and 200—where they did not want to be, by a jugful. The result of all this was that no change was made in the broadcasting assignment.

It was in this committee too that the spark was ruled out on all waves below 200 meters. Here also it was agreed that the amateur 80-meter band should share with the naval aircraft service. The interdepartmental plan proposed holding all waves below 16.6 meters as an experimental reserve, but at the request of the amateur delegates the amateur waves at 5 meters and 75 cms. were restored.

The Western Electric Co., speaking for the Mutual Telephone Co. of Hawaii, requested that the band 171-200 meters be taken from Hawaiian amateurs and assigned for commercial radio telephony between the Hawaiian Islands. They stated that five months' experiments had convinced them that this service could not be carried on successfully in the available band, 133-150 meters, but that it could be done perfectly satisfactorily in the amateur territory. The question was considered by Amateur Committee No. 6, which could not persuade itself of the accuracy of the company's statements. The amateur delegate, Mr. Maxim, accordingly opposed the point in Committee No. 1 and it was not granted. The committee recommended, however, that, provided it can be demonstrated to the satisfaction of the Department of Commerce that no other waves than 171 to 200 meters can be used to provide this service satisfactorily, that portion of the allocation to amateurs be assigned for this commercial phone work in the Hawaiian Islands only. It is to be noted in passing that if the company used the 133-150m. band they might experience interference from other services in that band, while if they could get a slice of amateur territory for their exclusive use there would be no competitive interference—which may or may not have something to do with their dissatisfaction with 133-150.

Committee No. 1 allocated waves up to 3156 meters. We publish below the assignments of greatest amateur interest, those from 545 meters down.

Meters	Kcs.	Service
545-200	550-1500	Broadcasting only
200-150	1500-2000	Amateur only.
150-133	2000-2250	Point-to-point, non-exclusive.
133-130	2250-2300	Aircraft only.
130-109	2300-2750	Mobile and govt. mobile only.
109-105	2750-2850	Relay broadcasting only.
105-85.7	2850-3500	Public toll service; govt mobile; point-to-point by electric power supply utilities; point-to-point and multiple-address msg. service by press organizations.

85.7-75.0	3500-4000	Amateur: army mobile; naval aircraft and naval vessels working naval aircraft.
75.0-66.3	4000-4525	Public toll service mobile; govt. point-to-point; point-to-point public utilities; all non-exclusive.
66.3-60.0	4525-5000	Relay broadcasting only.
60.0-54.5	5000-5500	Public toll service only.
54.5-52.6	5500-5700	Relay broadcasting only.
52.6-42.8	5700-7000	Point-to-point only.
42.8-37.5	7000-8000	Amateur and army mobile only.
37.5-33.1	8000-9050	Public toll service; mobile; govt. point-to-point; point-to-point by public utilities; all non-exclusive.
33.1-30.0	9050-10000	Relay broadcasting only.
30.0-27.3	10000-11000	Public toll service only.
27.3-26.3	11000-11400	Relay broadcasting only.
26.3-21.4	11400-14000	Public toll service; mobile; govt. point-to-point; all non-exclusive.
21.4-18.7	14000-16000	Amateur only.
18.7-16.6	16000-18100	Public toll service; mobile; govt. point-to-point; all non-exclusive.
16.6-5.35	18100-56000	Experimental
5.35-4.69	56000-64000	Amateur.
4.69-0.7496	64000-400000	Experimental
0.7496-0.7477	400000-401000	Amateur

The Amateur Committee

Committee No. 6 on Amateur Matters was presided over by Mr. Maxim, with Supervisor R. Y. Cadmus assigned as secretary. The other members were our vice-president, C. H. Stewart; W. A. Parks, 3ZW-3BE, representing the Washington Radio Club; John R. Ward, 6CKC, representing the Western Amateur Radio Assn., Berkeley; P. C. Oscanyan, Jr., representing the Second District Executive Radio Council; F. Kral, 3HS; H. A. Daly, 3IW; and the writer. This was 100% an amateur committee and its meetings were ham rag-chews. After a series of meetings in which the amateur situation was gone over thoroughly, the following report was filed:

Committee No. 6 on Amateur Matters has made a careful study of matters affecting amateur operation. Committee No. 1 on Allocations has assigned for amateur uses the same frequency bands as were assigned a year ago. Amateur operation during the past year under existing regulations has been generally satisfactory, and in our consideration at this Conference we have endeavored to depart as little as possible from existing regulations, in order that the administrative burden upon the Supervisors of Radio might be minimized. We therefore recommend to you that existing amateur regulations be continued in force, with the following minor modifications:

1. That the Conference recommend to the Department of Commerce that it no longer license the use of spark transmitters on amateur bands.

2. That amateur phone operation be permitted in the amateur band between 3500 and 3600 kilocycles (83.3 to 85.6 meters), provided such stations observe the prescribed amateur silent hours.

3. That, to fill a need that has been felt for years, a monthly supplement to the "List of Amateur Radio Stations of the United States" be published by the Department of Commerce, listing additions, changes and delegations, and available on annual subscription.

In conclusion, the Amateur Committee directs attention to the fact that for many years past the Department of Commerce has not had sufficient funds properly to administer the radio laws and regulations, and it recommends to this Conference that it go on record as urging the Congress at its next session to provide sufficient appropriations to the Department of Commerce for the proper control and encouragement of radio.

About Broadcasting

The most amazing thing to us about the conference was the attitude of the broadcasters themselves about broadcasting and its difficulties. Whereas in previous years everything had been a mad scramble for greater priveleges, with no agreement on anything except that the Department of Commerce shouldn't have too much dictatorial power, this year there was frank admission that broadcasting was in a precarious position because of the congestion of stations, and recognition of the fact that heroic measures would be necessary to preserve it as an institution. The result was

INTERIOR OF THE RADIO "BLACK MARIA," showing Radio Inspector J. E. Brown at the instruments. An operating bench runs around three sides of the body. The equipment includes an amateur-wave 50-watt transmitter short-wave receiving superheterodyne receiver, radio compass, field strength measuring device wavemeters, etc. (Photo Underwood & Underwood).

that committee after committee recommended the adoption of the most stringent regulations to safeguard the ether, and the placing of all manner of authority in the hands of Secretary Hoover to accomplish this. The conference went on record as recommending:

That no new stations be licensed until, through discontinuance, the number of stations is reduced and until it shall be in the interest of public service to add new stations.

That public interest as represented by service to the listener, as opposed to private desire, be the basis for the broadcasting privilege.

That further division of time among stations is not in the interest of public service and that the Department decline to grant any more licenses until the present number of stations is substantially reduced.

That duplication of frequencies not be permitted in the case of stations of greater than 500 watts power.

That advertising efforts via the broadcast be confined to the providing of meritorious programs which build good will for the sponsor.

That the Department in issuing licenses use discrimination looking towards the locating of all broadcasting stations outside of congested centers.

That permits issued and approved by the Secretary of Commerce be required in advance of the construction of new stations.

That Congress be requested to enact new radio legislation vesting the administration of radio in the Secretary of Commerce, subject to appeal to an appropriate court.

The complete report of the nine committees on Allocation, Advertising, Licenses, Regulations, Marine, Amateur, Interference, Legislation, and Copyrights makes a bulky document for which we cannot hope to find the space in *QST*. It is to be published soon and will be available from the Superintendent of Documents, Government Printing Office.

The unanimous adoption of these many reports and resolutions indicates an agreement within the radio industry to accept an administration of broadcasting which in several respects will exceed the authority granted the Secretary of Commerce by the 1912 radio law. We understand that the Department will act in accordance with the conference's decisions, and thus better days are in sight for broadcasting. Meanwhile new legislation must be prepared, and this will be the next big move. There is now a disposition throughout the art to regard with favor a bill akin to the last effort of Congressman White, as was indicated by the report of Hoover's Committee on Legislation. To us it seems very probable that some such legislation will be enacted this winter.

The First All-Canada Convention

NOVEMBER 26, 27 and 28, 1925, will always remain impressed on the minds of those amateurs from all parts of Canada, and the few from the big country South, who journey to Montreal to attend the first National Convention of Canadian Amateurs, held under the auspices of the Quebec Division.

Addresses of welcome in English and French were made by Division Manager Argyle and Mr. J. Adam, respectively.

Lieut. F. H. Schnell, the League Traffic Manager, opened the proceedings and, reinforced by some 150 slides, gave an interesting account of his trip abroad NRRL, the U. S. S. Seattle, keeping everybody quiet for two hours. (Fred, the next time you describe those four days of seasickness, put up a railing first.)

A most interesting lecture was that of Mr. J. H. Thompson, Chief Engineer, Canadian Marconi Co., on "Beam Transmission"; followed by a demonstration on an experimental apparatus made by J. V. Argyle, c2eg, which proved very instructive.

Mr. C. W. Horn, Supt. Radio Operations, Westinghouse Electric Co., Pittsburg, was listened to very attentively during his lecture on "Short Wave Transmission" and every one was appreciative that his company should have sent him such a distance to address us.

The Burgess Battery Company seem to take delight in springing surprises on the amateurs, and no one was disappointed after listening to Mr. L. R. Baker of their Niagara Falls Canadian Plant. There seems to be something new to learn all the time about "Dry Batteries."

At the Saturday meeting, A. A. Hebert, A. R. R. L. Treasurer and Field Representative, addressed the delegates for over an hour on the subject "Our League" going into the early history of amateur radio and the vicissitudes through which the League passed until today it stands as the leader and standard bearer for the best there is in radio.

Of great interest was the initiation of some 11 candidates into the most coveted order, the ROTAB. The public part of the initiation was hugely appreciated and the secret work carried out behind locked doors seems to have created enviousness in the hearts of the unfortunates who have not had the pleasure to QSO across the big pond.

Two big Busses carried the crowd some twelve miles into the country to visit the Canadian Govt. Coast station VCA where the newest type of tube set was fully explained. (Oh! for at least two of those tubes.) CKAC, the only bi-lingual sta-

(Continued on Page 39)

The Tone Meter

By L. J. Wolf*

ONE of the greatest difficulties in the operation of a transmitter is the maintenance of a good plate supply. A steady D.C. source will give a more easily readable note and will cause less interference near the transmitter.

Unfortunately most stations do not have a high-voltage battery for the plate supply of the transmitting tubes. Instead of such a battery they are compelled to use a high voltage rectifier and filter. These devices are not perfectly uniform in their action. Their performance is changed by the corrosion of the elements (in a chemical rectifier) or the aging of tube rectifiers. These changes can easily turn a good note into a very bad one.[1]

Therefore it is desirable to have some simple apparatus which will tell the condi-

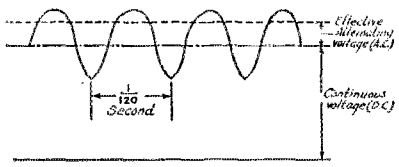


FIG 1

tion of the plate supply. Such a device will be a great asset for the effective operation of the transmitter.

The present methods of doing this are: oscillagraph, "modulascope"[2], and a step-down transformer with a telephone receiver.[3] The oscillagraph is too expensive for general use, while the others do not give accurate comparative measurements. The method about to be described will give such results with very little expense.

Rectified alternating current may be considered as consisting of a direct current with an alternating current superimposed upon it. The smaller the superimposed A.C. can be made the less local interference will result and the nearer we are to pure direct current.

Now the ordinary direct current voltmeter will not tell us anything about the *alternating* voltage, it will only measure the direct voltage. An alternating voltmeter will not work at all unless we keep the direct voltage out of it. Therefore we need some arrangement to measure the alternating voltage while paying no attention to the direct voltage. We will then have a basis for judging the smoothness of the plate supply. (See Fig. 1.)

The alternating voltage can be measured without interference from the direct voltage by using a blocking condenser in series with an alternating voltmeter. The condenser then acts to keep out the D.C. and also acts as a "multiplier" for the voltmeter. (Fig. 2a.)

The low-reading voltmeter used for the transmitting filaments may be used for this work. It can be connected to a D.P.D.T. switch so that it can be shifted to the filaments or the "tone meter" in an instant. The connections are made as in Fig. 2b, the condenser being a ½ microfarad filter condenser able to stand the plate voltage.

The condenser, as stated above, acts as a multiplier. This means that the voltmeter will not read the actual A.C. voltage between the wires in Fig. 2a. The actual A.C. voltage between these points is much higher than the voltmeter reading and can be found by multiplying the voltmeter reading by a number called the "multiplying factor." The

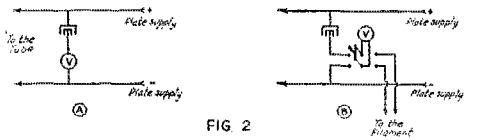


FIG 2

value of this "multiplying factor" depends on the frequency, the capacity of the condenser and the resistance of the voltmeter.

Operation

For ordinary operation (or mere comparison) the "multiplying factor" is not needed. If it is found that a certain reading on the "tone meter" gives freedom from interference the operator will know that any increase of this reading calls for attention.

When putting new apparatus into the rectifier or filter system it will be possible to tell at once if the output is better or worse than that formerly gotten.

It will be noticed that the percentage of D.C. will often be high when the key is open but will drop when the key is closed. The drop will be greater as the number of rec-

* 9DKT, 920 South 28th Street, South Bend, Indiana.

1 In the Technical Editor's experience nothing is more easy to filter than the output of an electrolytic rectifier—if it is in good shape. If the rectifier is sparkling in even one jar it is practically impossible to get rid of the "mush". Incidentally — don't ask the fellow 100 miles away how the thing works, ask the B.C.L. next door.

The output of ordinary "sink" rectifiers is extremely hard to filter and steady care is necessary. If the brushes spark the thing is making awful local interference.

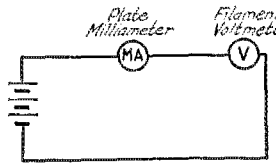
OLD "S" tubes, old kenotrons and some mercury arcs are extremely hard to filter.

2 See Page 7 of *QST* for June, 1923.

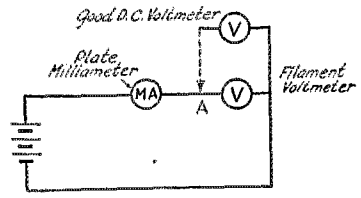
3 A suitable transformer is shown in Fig. 6 page 45 of *QST* for October, 1924.

tifier jars is made fewer or the water level in them allowed to lower. This is an argument for a rectifier of greater capacity and a larger number of jars.

It only takes an instant to throw the switch and if the meter gives a low reading the operator knows that the rectifier is al-



Connections to be used when the filament voltmeter will work on D.C. and READ CORRECTLY. Better check this by measuring some battery voltages with the filament voltmeter and a good low-reading (not 99¢) D.C. voltmeter



Connections to use when filament voltmeter will not read correctly on D.C. First disconnect the D.C. voltmeter. Now try connecting the movable contact at A. If this changes the reading of the milliameter more than a very little the D.C. voltmeter has too low a resistance for this work. A higher grade instrument is needed. The "watch case" variety usually cannot be used. Switchboard, portable or high-grade pocket meters usually are satisfactory

FIG. 3 FINDING THE ALTERNATING VOLTMETER'S RESISTANCE

right; however if the reading is high then the percentage of A.C. has gone up (and the percentage of D.C. down.) The rectifier needs attention.

The Multiplying Factor

The value of the multiplying factor is found as follows.

Since part of the voltage drop from 1 to 2 is across the condenser and part across the voltmeter we must find out the proportion of the drop taken by each. The drop across the condenser will be the current times the reactance.

Now the reactance X_C of the condenser is

$$X_C \quad \frac{10^6}{2 \times 3.14 \times f \times C}$$

where

f is the frequency of the alternating current (make no mistakes here—it is NOT 60 cycles.)

X_C is the condenser reactance in ohms.

C is the capacity of the condenser in farads.

In all ordinary plate-power rectifiers we rectify both sides of the cycle, therefore the frequency of the alternating-current part of the rectifier output is twice that of your power line, in other words 120 cycles.[4] Therefore f is usually 120. If your line happens to be a 25-cycle one f will be 50.

Now we have the condenser reactance, next we need the impedance. Fortunately we can use the resistance instead because the instrument is usually the Jewell No. 76 filament voltmeter whose impedance is only about 1% greater than its resistance.

The easiest way to find the resistance of the meter is by the fall-of-potential ("IR drop") method. Connections are made as in Fig 3.

As soon as you have made the readings the resistance of the meter can be found by using Ohm's law that

$$R = \frac{E}{I}$$

where R is the resistance of the A.C. voltmeter.

E is the voltage shown by the filament voltmeter or else by the D.C. voltmeter.

I is the current in amperes (Divide millampere reading by 1000)

The resistance of the Jewell No. 76 0-10 volt instrument will be between 80 and 130 ohms, that of a 0-15 voltmeter will be between 150 and 200 ohms.

Having found X_C and R we are ready to find how the voltage divides across the condenser and A C voltmeter. To do this we must find the impedance of the combination. This is done as follows.

$$Z = \sqrt{R^2 + X_C^2}$$

Where Z is the impedance of the A.C. voltmeter and condenser in serie

R is the A C voltmeter's resistance as before

X_C is the reactance of the condenser at 120 or 50 cycles as before.

Now then: The total A.C. voltage drop from point 1 (in Fig. 1) to point 2 is across the impedance Z. The part of the voltage that moves the voltmeter needle is the voltage across the resistance R. The same current flows thru Z and R. It follows that our "multiplying factor" is Z/R.

The A.C. component for our plate voltage can now be found by throwing the switch to the left (See Fig. 2b) and multiplying the A.C. voltmeter reading by Z/R.[5]

4 This is accurate enough for ordinary work. Other frequencies are present as may be seen from Fig. 96 on page 166 of Ballentine's "Radio Telephony for Amateurs".

5 This suggests that the little A.C. filament voltmeter will also make a good high-voltage A.C. meter when there is NOT any D.C. present. Just use the same multiplier and use the condenser-meter combination to measure the voltage at your plate transformer. If it is a home-made affair you are likely to get some surprises here.

More Exact Work

If we wish to make quantitative comparisons we must have some way of stating the A.C. voltage as compared to the D.C. voltage. In other words, we must have a way of stating the percentage modulation. This term has come to be used for speech transmission and may be out of place here. However we can express the matter conveniently as

$$\frac{\text{Alternating Voltage}}{\text{Alternating Voltage} + \text{Direct Voltage}} \times 100 = \%\ \text{modulation.}$$

As an instance of this usage; if the plate voltage consists of equal parts of Direct and alternating voltage we will call the combination 50% D.C.[6]

6 There are a dozen ways of expressing "per centage modulation". The present method is as good as any. One of the other methods would call this same thing "100% modulation"

The 1925 Elections

ELECTIONS were held in November to elect successors for seven A.R.R.L. Directors whose terms expire January 1, 1926. In four of the divisions, the Dakota, Delta, Pacific and Southeastern, the present Directors were renominated without competition, and as a result, Messrs. Jansky, Painter, Babcock and Dobbs have been declared re-elected to succeed themselves as the Directors from these respective divisions. In accordance with a recent amendment to the League by-laws, this action was taken by the Executive Committee instructing the Secretary to cast one ballot for each candidate, avoiding the necessity of sending out ballots. The membership in the divisions concerned has been notified by post-card of the action taken.

There were two candidates for Canadian General Manager, Mr. A. H. K. Russell, the present Manager and Major Wm. C. Borrett of c1DD. Major Borrett withdrew his name in favor of Mr. Russell, whereupon Mr. Russell was declared re-elected to succeed himself, in the same fashion as for the four U.S. divisions mentioned above.

In the other two divisions, the Atlantic and Midwest, there was competition, and the election in both cases has resulted in a change in Directors. In the Atlantic, Mr. George L. Bidwell is succeeded by Dr. Eugene C. Woodruff, of 8CMP-8CIK, State College, Pa., the official ballot count being as follows:

Eugene C. Woodruff	505
Geo. L. Bidwell	267
Paul C. Peterson	174

In the Midwest, Mr. L. Boyd Laizure is succeeded by the Division Manager, Mr. Porter H. Quinby, of 9DXY, Omaha, who won over Mr. Frank L. Root of St. Louis by the following count:

Mr. Quinby	385
Mr. Root	109

In welcoming Dr. Woodruff and Mr. Quinby to the Board we are none the less sorry to lose "Doc" Bidwell and Boyd Laizure, both of whom have labored faithfully and diligently to represent their memberships.

This is a good place to call the attention of the general membership to the fact that the annual meeting of the Board of Directors will be held in February, at which time League work for the following year will be planned. The Directors are anxious to know the views and desires of their members. If you, as an individual member, have any suggestions or constructive criticisms to offer, write promptly about them to your Director. His address appears on page 6 of this issue.

—*K. B. W.*

THE FIRST ALL-CANADA CONVENTION

(Continued from Page 36)

tion in the world was visited on the return trip.

Like all well ordered conventions ,the proceedings closed Saturday night with a Banquet that was *not only* pleasing to the palate but made more enjoyable by the great fraternal spirit shown all through the evening. The principal speaker of the evening was Comdr. C. P. Edwards, Director, Dominion Government Radiotelegraph Dept. The way he can change wavelengths was a revelation to one from the States. Presentation of prizes took place during the evening and that "Speed Lightning Op.", General Manager Keith-Russell, was awarded the beautiful silver Cup donated by the Burgess Battery Co. It is to be contested for every year. Watch for Jack Cartier, Bill Choat and R. M. Foster next year. Harold Sacks, u2chk and Charley Scheafer, u8adg, will always remember this convention as they each were fortunate in winning a prize.

Great credit is due, c2be, c2hv, c2bv, c2au, c2cm and last but not least the man responsible for inaugurating this first All canada Convention, Jack Argyle, c2cg. Our thanks also to the firms who so generously assisted by sending representative and contributing the prizes.

With the bidding of Adieus and Aurevoirs, delegates departed with the good intentions of meeting again next year at Toronto.

—*A. A. H.*

Experimenters' Section Report

IT now seems that means will be found to make use of the very great interest which has been shown in this section. The Executive Committee has taken time to discuss the financial future of the Section in more detail and definite plans will soon be completed. The actual carrying out of the plans may be somewhat delayed and therefore this can be regarded as a preliminary announcement only.

Outlines Being Written

Various members of this Section have offered to write outlines to a total number of fourteen. While this is encouraging it falls far below the final requirement and others are urged to consider whether they cannot write at least one of the outlines. This is especially the case since it is quite likely that some of the present men will not be able to do all the work they have undertaken.

There is nothing special about the requirements. The outlines should be written along the same lines which are found useful in high school laboratory work, remembering always the financial limitations and apparatus limitations of the people that are doing the work. It is perhaps especially important to call attention to the possible sources of errors in doing work.

Horizontal Transmission?

Members of this section are urged to keep track of the work which is being done from WGY on polarized transmission. A good general article on the subject appeared on page 4 of the New York Herald-Tribune Radio Magazine for Sunday, December 6th. Special schedules are being transmitted from WGY with various wavelengths, types of antennas and powers. Those interested are urged to write to the General Electric Company direct and to send a carbon copy of the letter to the attention of the Experimenters' Section. This saves time all around.

Some interesting matter on the question of wave front distortion and polarization appeared in the September, 1925, issue of *Experimental Wireless and the Wireless Engineer* (British). It is to be found on page 737.

Beam Transmission

Beam transmission seems to be coming in for much less than the amount of space that it deserves. This method of polarized transmission (for it can so be regarded by a very slight stretch of definition) has considerable possibilities at short waves and these should not be neglected as at the present time.

Outside of the amateur game, this method of transmission is being taken quite seriously, as can be seen by the erection of the beam compass station at South Foreland, England, which is described on page 778 of *Radio News* for December and is at least pictured on page 168 of the December issue of *Radio Broadcast*.

Still another type of beam station is now being erected on a large scale for the British postoffice. This is pictured on page 168 of *Radio Broadcast* for December and described on page 54 of the October issue of the *Wireless World & Radio Review* (British).

5 Meters

General practice has brought forth quite a bit of information on the 20- and 40-meter waveband but the 5-meter band (and for that matter the 77-centimeter band) remain unexplored. It may interest our readers to know that the radio compass at South Foreland operates at 6 meters very successfully. Our difficulty would appear to be that we do not *direct* transmission properly.

Horizontal Reception

In this issue or the next there should appear an article of the greatest interest for all those working with the shorter wavelengths. Improvements in the method of horizontal reception are of course necessary and desirable.

The Micro-Microfarad

The paragraph "Picofarad?" on page 27 of the December issue has brought some correspondence, although less than was expected. One suggestion was to the effect that the "micro-microfarad" be called the "Hertz".

Another letter putting a different face on the whole business is reprinted in full herewith. Comment on the whole question is desired from all members.

Goldfield, Iowa.

Editor, *QST:*

When I came across the remarks on page 27, December *QST*, regarding our polysyllabic friend "micro-microfarad," I was pleased to learn that more are thinking along the same line as myself. Only—why keep this clumsy unit at all? It is nearly as much too small, as the microfarad is too large. I would suggest the adoption of a new unit equal to .00001 microfarad and giving it a one-syllable name; something that would fit in properly with Watt, Ohms, etc. Our ordinary condensers then would be 13, 25, 50 or 100 units, about the most convenient numbers to use in calculations.

(Continued on Page 56)

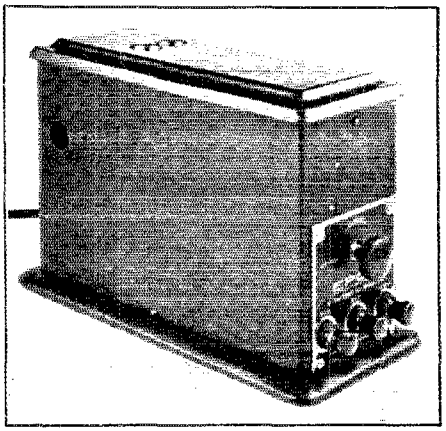
The Epom Rectifier and Filter

By Robert S. Kruse, Technical Editor

THE Epom B battery substitute like the Raytheon device previously described in this magazine[1] makes use of a tube without a filament. While the general principal in the two devices is the same, the Epom device differs in ways which make it worthy of independent discussion from the standpoint of both the receiving man and the low power transmission man.

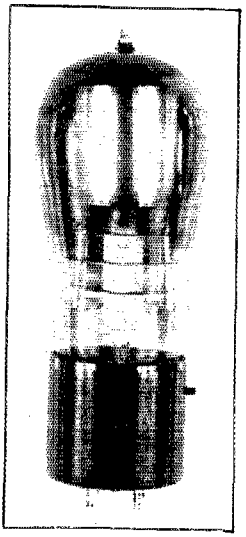
The information in this paper is taken from an interview with Mr. H. P. Donle of the Connecticut Telephone & Electric Company which manufactures the device.[2]

As has been intimated the tube operates without a filament and rectification is due to a peculiarity of the conduction of electricity through a gas at low pressure. Referring to Fig. 1A if the black spot represents a point made of some metal and the large circle represents a cylinder, also of metal, we have the main parts of a gaseous rectifier. It is only necessary to enclose this thing in a glass vessel in which there is present gas at very low pressure. The pressure is in the neighborhood of the one used in the familiar Geissler tube.



A COMPLETE B BATTERY SUBSTITUTE.

In the "Epom" tube the gas happens to be Argon which is used because it breaks down at lower voltages than some of the other gases which can be used. It is important, of course, that the gas be something which is not very active chemically, also its electrical resistance must not be too high. Argon fulfills both requirements pretty well. Returning now to our figure. If we make the little rod at the center positive and the cylinder negative we can easily see that a free electron E is attracted very decidedly in the direction of the arrow. It will start at once with a good deal of speed and will thereby collide with the un-ionized gas with enough violence to jar free some more electrons. The net result is that very promptly the gas becomes ionized and conduction takes place through the tube. At the end of this half cycle the transformer voltage goes down to zero, the gas becomes deionized and we are all ready to try the thing in the reverse direction. If now as in Figure 1B the central rod is made negative and the plate positive we will find that our free electron is attracted in all directions as shown by the arrows. It will move but not with the same speed, and therefore its chances of causing more ionization are so good. The conductivity of the tube in this direction is therefore poor. The practical tube does not use a single rod but uses two rods and one plate as shown in Figure 1C. Here the plate is connected to the positive side of the filter and remains positive during the entire operation of the set. We can therefore think of the voltages as being in Figure 1B. During one-half of the cycle the one point is doubly positive and the other one is at zero (-B) Voltage. During the next half cycle these things are reversed as shown by the dotted symbol.



THE RECTIFIER TUBE, SHOWING THE HEAT DEFLECTORS.

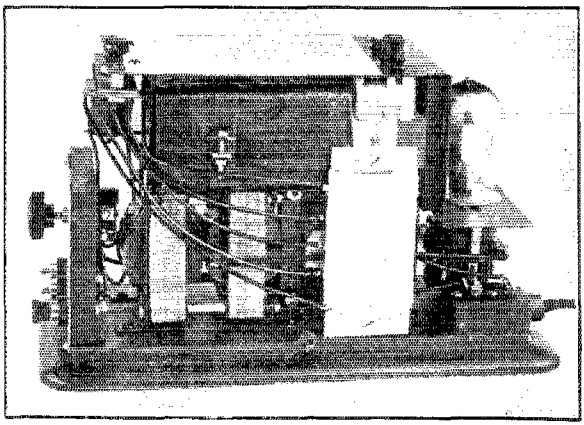
Passing down through the heat deflectors are two glass tubes carrying the plate support, also two fairly large lava tubes carrying the points which project up inside the plate.

Tube Construction

The actual construction of the rectifier tube brings up difficulties not found in the design theory. Very small impurities in

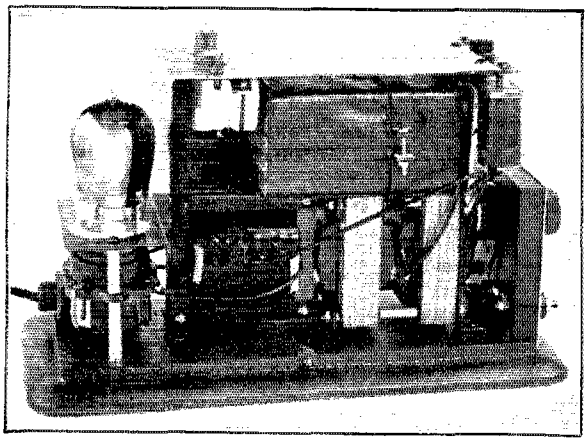
1. Page 38, *QST* for November, 1925.
2. The interview was made possible through very fine cooperation on the part of Mr. H. P. Donle and Mr. E. C. Wilcox of the Connecticut Telephone & Electric Company, as well as Mr. David H. Houghton and Mr. John M. Clayton of the A. R. R. L. organization.

the gas used in the tube are enough to prevent satisfactory operation or to make the tube "go West" in very short order. This not only means that the gas must be very pure but that the parts used in the tube must not give off any gas. As they get fairly hot during operation this means "de-gasing" treatment for all the parts used.



SIDEVIEW OF ONE TYPE OF B BATTERY SUBSTITUTE USING THE "EPOM" TUBE.

The upper panel carries the primary resistance switch at its left end and the line switch at the right. Leads from the primary resistance switch run to the flat resistance card at the right front. The small panel at the left carries the terminals also the detector plate rheostat shown in Figure 4. At the extreme right is the rectifier tube.



The transmitter and filter system is better shown in this view. The large bulk at the top center is the pack of filtering condensers. Just to the right of that is the cylindrical detector feed condenser (C4 in Figure 2).

On the lower level from left to right are the rectifier tubes, the transformer and the two filtering chokes having an inductance of rather more than 30 henries each. Note the ventilating opening around the tube.

If the gas can be kept pure the life of the tube is limited mainly by the life of the glass that is to say the tube will work as long as the glass remains undamaged. Those who have used 5 watt transmitting tubes know that they usually die from electrical leakage through the glass at the stem and that this is caused by overheating and over voltage. If the stem is kept cool the over voltage generally does not harm. In the photograph of the Epom tube will be seen three metal discs which serve the purpose of keeping the heat of the tube away from the stem. It is hard to give definite figures for the life of any vacuum tube but a guarantee of six months' satisfactory operation is regarded as entirely safe in this case. Without the metal disc the life was very much shorter. With no shield at all the temperature of the stem ran to about 210 degrees centigrade. With two shields it ran at 160 and with four (present construction) about 85, which is quite satisfactory. This is when the tube is handling 35 milliamperes at an input voltage of 300.

Transmission Possibilities

Before now it must have occurred to the reader that here was a good plate power supply for the small transmitter. Just what can be expected from the device in this regard can best be seen by inspecting the curves in Figure 3.

When used for transmission less perfect filtering will answer than is necessary where device is used to supply the plate circuits of a receiver. Removal of a part of the filter system will enable one to get higher voltage to the tubes than are shown in Figure 3. The filter should, however, always have a shunt condenser at its *input* end as this will increase the output of the device. This shunt condenser should be on the *rectifier* side of the choke where it does not only serve as a filter capacity but also provides a "starting voltage" which causes the tube to break down more quickly at each half cycle and thereby gives bigger output. Other condensers further along in the filter system may be used as usual. By the way, we will next month present a simplified explanation of filtering action,

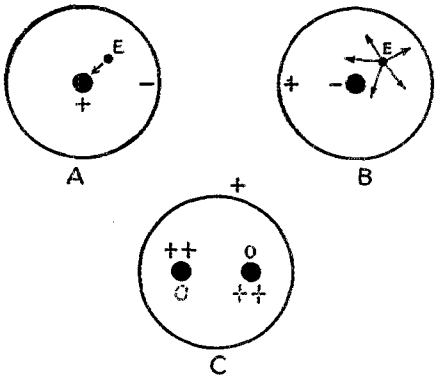


FIG 1

Fig. 1 The theory of the tube.

which accounts for the part played by the various filter condensers.

Why the Gas Tube

Making a satisfactory gas tube is possibly a more delicate job than making a satisfactory kenotron (hot filament and cold plate tube). There are several advantages, however. One naturally thinks of the advantage of having no filament to burn out but that is not the main advantage. Filaments, carefully handled, are likely to last a good many hundred hours and may even get into the thousand class with good design. The regulation of filament tubes leaves something to be desired. This sounds complicated but isn't. If the voltage of the house lighting system drops 10% one naturally has 10% less voltage supplied to the rectifier by the transformer. If the rectifier is a kenotron then the filament becomes dimmer at the same time and there is an additional drop in voltage. The only way to get out of this additional drop is to make the filament so large that its full output of electrons is never required even with the lowest line voltage and the heaviest load. This is perfectly possible but is nevertheless a weakness in this type of rectifier. On the other hand in the gaseous tube there is a sort of "ballasting effect" which tends to counteract the line variation.

The business of regulation is not particularly important when one is dealing with a super-heterodyne or with any kind of a set in which the tubes are operating well below oscillation. When one is anywhere near the oscillating point a change in the output voltage is likely to cause the set to go into oscillation or to go dead suddenly. If the set is being used to supply a small transmitter the note is likely to waver when variations occur.

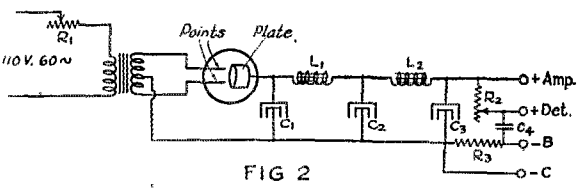


FIG 2

FIG. 2. DIAGRAM OF CONNECTIONS FOR A COMPLETE B BATTERY SUBSTITUTE AND C BATTERY SUBSTITUTE.

C1, C2 and C3, 4 microfarad condensers. C4, detector feed condenser, 1 quarter microfarad. R1, primary rheostat. R2, Detector late rheostat. R3, biasing resistance. This is omitted in some cases. L1 and L2, 30 Henry Chokes.

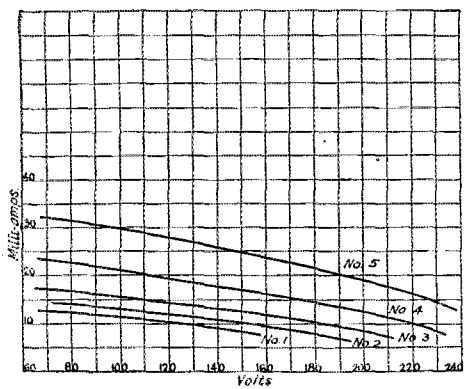


FIG. 3

FIG. 3. OUTPUT OF RECTIFIER AND FILTER AS CONSTRUCTED IN A B BATTERY SUBSTITUTE.

There is one curve for each position of the switch on the primary resistance. The input voltage at the left end of curve No. 5 is 300. This drops somewhat to the right because some primary resistance must be left in. The voltage at the tube is higher than that shown by the curve since there is also some drop through the filter. A transmitting filter would give higher voltages.

On the other hand one must admit that there is always some leakage directly between the two little rods in the gaseous tube. This consumes some power but not as much as the power used in heating the filament of a kenotron.

Construction of the Complete Device

The wiring of the complete "Epom" device shown in Figure 2. It will be noticed that there is a center-tapped input transformer, a two stage filter and special arrangements for providing a variable detector voltage and a biasing voltage. The scheme for providing the biasing voltage is

(Continued on Page 56)

Official Wavelength Stations

THE Jansky-Wallace OWLS committee have the following new plan to announce. From time to time reliable OWLS standard frequency stations will be appointed, and they will transmit on regular schedules on definite wavelengths for an accurate checking of wave meters.

The OWLS stations as they now exist are primarily telegraphic stations and the accuracy of the wavelength which they use in signing off is well within 2%. The OWLS standard frequency stations however should be within 2/10 of 1% and more of them will be announced from time to time. We hope that more will volunteer their services with suitable standards.

The first is the Massachusetts Institute of Technology, 1XM. Standard frequency work is in the charge of K. V. R. Lansingh. Schedule is as follows for the month of January:

u1XM Standard Frequency Schedules

Time: Eastern Standard

40-Meter Band		80-Meter Band	
Time (PM)	Freq. k. c. Wavelength meters	Time (PM)	Freq. k. c. Wavelength meters
9:00-9:07	9100 (33)	10:06-10:13	4300 (69.8)
9:11-9:18	8000 (37.5) (U.S. limit)	10:17-10:24	4000 (75) (U.S. limit)
9:22-9:29	7500 (40)	10:28-10:35	3750 (80)
9:33-9:40	7000 (42.9) (U.S. limit)	10:39-10:46	3500 (85.7) (U.S. limit)
9:44-9:51	6400 (46.9)	10:50-10:57	3250 (92.3)

Intermediate Point

9:55-10:02 5300 (56.6)

Dates for January, 1926: Every Friday commencing January 8th.

The frequencies indicated above (corresponding approximate wavelengths given in parentheses) will be transmitted *every Friday night during January* except January 1st from u1XM, the experimental station of the Massachusetts Institute of Technology Radio Society, acting in co-operation with the M. I. T. Communications Laboratory. It is hoped that the Intermediate Point and a point or two in the 80-Meter band may later be omitted, their place being taken by points in the 20-Meter band. Further announcements will appear in February *QST*. Each frequency will be approximately that given above, but while the "long dashes" referred to below are being sent, the exact frequency will be measured by a very carefully checked standard frequency meter, and then announced. All transmissions will be by unmodulated continuous wave telegraphy.

The 7-minute period of each transmission will be divided as follows:

2 minutes—QST QST QST u 1XM 1XM 1XM, etc.

3 minutes—Series of long dashes broken by "u1XM."

1 minute—Announcement of exact frequency just sent.

1 minute—Announcement of approximate next frequency to be sent.

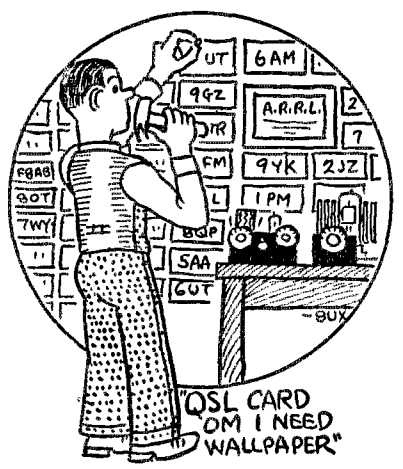
Four minutes will then intervene while the transmitter is being adjusted to the next frequency. The accuracy that may be expected is 0.2 of 1% or better. It is hoped that more stations will later join in the work of transmission of signals of about this accuracy.

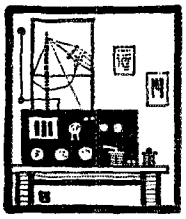
Considerable doubt has been expressed as to whether or not a fair number of amateurs will use this service; if you use it, drop a card to Standard Frequency Committee of u1XM, M. I. T. Radio Society, Cambridge, Mass., U.S.A., telling us so. If the service from 1XM seems to be of but little use, it will be abandoned.

COMPLETE LIST OF O. W. L. S.

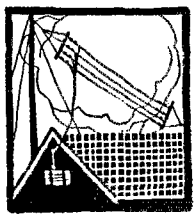
NKF	9DXN	6TS-6XAG	c4FV
1XAM	9EGU	8GZ-8ZG	a2CM
6BQB	6ZH	9BGK	g2OD
7BU	5AKN-5XBH	6XAD-6ZW	6CAE
5MN	2MU	g2NM	5AGN
9AAL	4BY	6TI	9AXQ
z2AC	9ZA	c3NI	9DOA
2WC	7GE-7GX	c9AL	5EW
9ZT-9XAX	1IV	6CDN	1CPQ
9FF	9EIB	8APZ	6CDY-6CPX
8GU-8XC	7GQ	2SZ	9BGH
9XI	2DS	7QK-7MX	g2SZ
1CK	1BZQ	6LJ	1XM*
1AWW	6BGM-6CVO	5OX	
3ZW-3BE	2XI	9BMR	
8AA	9IG	6BCP	
8EG	7AC1	1AAC-1ZO	
3APV	1ZL-1AVW	8BZT	
4XE**	2CLA	c3CO	
5ZAV	6ZE	9AXQ	

* Special OWLS Standard Wave Station.
** Crystal Controlled OWLS Station.

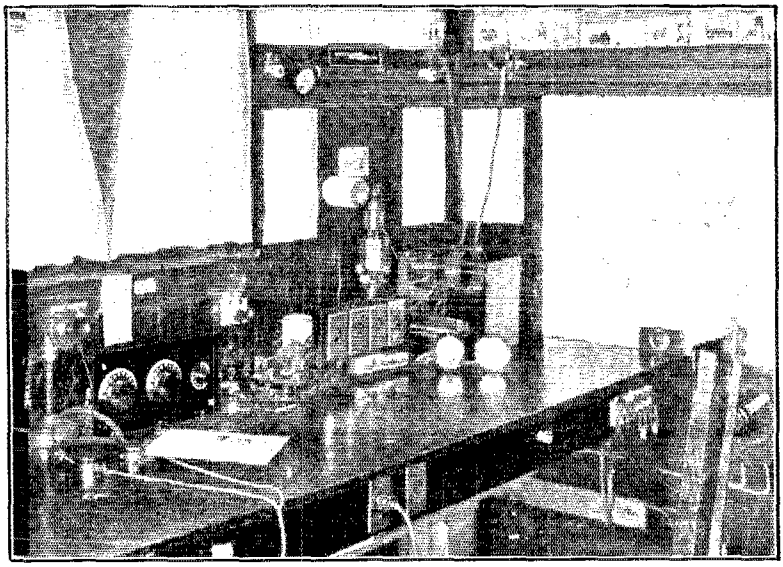




Amateur Radio Stations



6BUR Wins Modesto Wouff-Hong Trophy



FOR constructing, owning and operating the best all-around amateur station in the 6th District, L. Elden Smith of the well-known 6BUR has been awarded the 1925 edition of the Modesto (California) Radio Club's Wouff Hong trophy. The award was based upon four points: The station log, consistency of operation, DX in miles-per-watt, neatness of arrangement and percentage of "home-made-ness". In addition to being highly symbolical the trophy (when figuring the list price of vacuum tubes) is worth thousands of dollars, for it is cast solid from the "innards" of transmitting tubes (without the vacuum)!

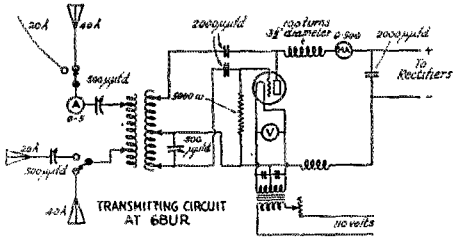
6BUR is located at Whittier, California, and is entirely the product of Smith, who is a student at Whittier College. The station proper is housed in a 12 x 14 foot shack at the rear of the residence at 340 North Painter Avenue, right in the middle of the residential section of the town.

The antenna systems are a result of months of experimental work which was performed in an effort to find out what particular size, shape and "setting" fitted 6BUR's locality. Separate antennas are used for 20 and 40 meter work. The 40 meter antenna is a single No. 12 enamel copper wire 35 feet long suspended vertically above the ground. It is held up by a 40-foot self-supporting stick and is entirely clear of any trees, guy wires or other obstructions. The counterpoise consists of two wires in a fan 18 feet long. The fundamental of this system is 44 meters. A Cardwell 23-plate series condenser is used. The 20-meter aerial is made up of a single 18-foot copper tube supported by five-inch Pyrex insulators on an 18-foot 2 x 3 pole. A 4-inch copper ball is attached to the top end of the tube. The counterpoise for this antenna is a single wire of the same length as the antenna, supported horizontally. The antenna lead-ins are brought in to the shack through the window panes. The counterpoise leads come through homemade Pyrex

dish insulators and are arranged so that the set can be connected to either antenna-counterpoise system almost instantaneously. All insulation is Ohio Brass and Pyrex.

The transmitter, although not mounted to look elaborate or particularly dolled up, is arranged for greatest efficiency and flexibility. The inductances are made of 5-inch edgewise wound copper strip spaced with glass beads and mounted on glass towel bars. There are 5 turns in the antenna coil and ten turns in the oscillator coil. The transmitting circuit is a coupled Hartley. The primary is tuned by a large double-spaced variable condenser. Indicating meters are provided for the antenna circuit, tube filament, tube plate circuit and line voltage. A UV-204-A tube is used. Details of the transmitting circuit are shown in the diagram. Referring to the photograph the switch panel to the left of the transmitter controls all power, voltages and combinations of plate supply. By merely throwing the appropriate switch either A.C., synchronous rectified A.C. or chemically rectified A.C. can be put on the tube. The reversing switch used on the synchronous rectifier is also located on this panel. A snap switch between the panel and the keys starts and stops the whole transmitter. The switch is located so the operator does not have to perform contortions to stop the set. Keying is done in the primary of the plate transformer, through a relay operating from the 6-volt A battery. The filament voltage is controlled by a large field rheostat in the primary circuit of the filament transformer. Filament voltage comes from a rebuilt potential transformer. It will give 30 amperes at 15 volts and cost one dollar!

The plate voltage is supplied by an old pole transformer obtained from the local



electric light company for three dollars and a half. It is connected backwards and gives any voltage up to 2,200. All power is supplied from a special three-wire 220 volt 50 cycle line direct to the meter in the shack. The plate transformer is connected across one side of the line and the neutral wire and the synchronous motor and filament transformer are connected to the other side. Consequently when the key is pressed and the load goes on the line the filament voltage is *raised* slightly, instead of dropped. This results in a very steady note. The synchronous rectifier is an Advance, fitted with special brushes and mounted on sponge rubber under the table. The rectifier runs for several months at a time without the least attention. Although no filter is used, the note is reported to be a good one. The total input to the transformer never exceeds 600 watts and normally is only 400. On 40 meters an antenna current of 5 amperes is usual, while on 20 meters the current is 3 amperes.

The receiver is a single-tube affair using a throttle-control condenser. Many audio-frequency amplifiers have been used at 6BUR but none of them have been any help due to the almost continual trouble with power leaks. The coils in the receiver are wound with No. 16 wire space-wound and supported on thin celluloid strips. Behind the receiver is a small binding post panel from which any A and B battery voltage can be taken off. A Grebe CR-9 and a Magnavox provide entertainment on BCL waves during quiet hours. The world map sprinkled with a large supply of pins shows the station's DX and entertains the BCL friends. A telephone is always handy for QSRing local traffic. On the shelf directly above the 204-A tube is the valued Wouff Hong trophy.

6BUR was the first station to communicate with Japan in daylight on 20 meters. It was one of the first West Coast stations to communicate with England when g6RY was worked on 80 meters in December of 1924. The following countries have been *worked* by 6BUR: England, Greenland, Brazil, Argentina, Chile, Porto Rico, Panama, Cuba, Mexico, Every state in the U. S., Every Canadian District, Alaska, Hawaii, Tahiti, Samoa, New Zealand, Tasmania, Australia, Guam, Philippine Islands, China, Japan and ships in all parts of the Pacific. The signals of 6BUR have been reported in every civilized country on the globe and ships in the Indian, Pacific and Atlantic oceans. Twenty-meter daylight work has been done with Japan, Australia, New Zealand, Samoa, Hawaii, Mexico, Argentina, Porto Rico, the U. S. fleet from Hawaii to Australia and all U. S. and Canadian districts.

A complete log of all work has been kept ever since the station was placed in operation. All cards are answered, although they are sometimes a little late due to QRW. The station is both an O.R.S. and O.B.S. and handles an average of 50 messages per minth. Smith is District Superintendent of District number 2, an ardent A.R.R.L. man and a peach of a good scout—a typical American amateur.

National Presidents Elected in Belgium, Brazil and Switzerland

The solicitation of nominations for National Presidents for the newly-formed sections of the International Amateur Radio Union in Belgium, Brazil and Switzerland resulted in but one name being placed in nomination in each country. Many nominations were received for each candidate, clearly indicating his acceptability to the membership. In the absence of competition, the respective candidates have been declared elected, by the International President, for two year terms beginning November 15, 1925. The new Presidents are as follows:

For Belgium, Mr. Robert Deloor, 26 Avenue du Mont-Kemmel, St. Gilles, Brussels.

For Brazil, Mr. Carlos G. Lacombe, bz1AC, 105 Cosme Velho, Rio de Janeiro.

For Switzerland, Dr. Walter Merz, Berne-Bumplitz.

Letters of advice are being sent the I.A.R.U. membership in these countries, and their support of their new officers is earnestly solicited.

England

"Withtheopening of the season associated in the past with the dark evenings and the return to those conditions in the Northern hemisphere which heralded the opening of progress made by amateurs on 40 meters last year, we have become aware of still further possibilities on these wavelengths. On October 4 g2LZ established two-way communication with South African A4Z at Capetown on 45 and 34 meters respectively. g2NM has similarly worked India KHB, at the same time running a two-way telephonic test with success. About the middle of the month g5MO commenced logging stations 7,000 miles east at 2 P. M. GMT, which, if they take the shortest route, appear at first sight to pass through more than half the distance in daylight and in some instances over land all the way. An examination, however, of Pletts Zenithal Azimuthal Graticule shows that this course would run well North with a possible proponderance of darkness. These signals, unlike those which come from the Antipodes, are audible for six hours or so. Dusk is at 6.30 P. M. The stations heard include Philippine ICW and NUQG, Chinese PNP at Pekin, and Australian 6AG and 3BD, the latter two having been heard by g2SZ as well. The first contact between Australia and South Africa, in which a6AD and oA3E participated, was logged here complete from both stations at 3 P.M. on the 26th by g5MO. It now has been established that Australians hear us strongest at 7.30 P.M., while their signals are always strongest in the morning at this end. g2NM has been very busy on phone recently and seems able to put over speech whenever his Morse will carry. His cheery voice certainly seems to spread. g2LZ has been first QSO to South Africa. g2SZ made first contact with the Pacific coast of the U.S.A. on Oct. 18 by working u6VC and u6CTO at 7.30 A.M. Congrats, OM, and also 'gone fone fever.' g2CC has worked about 20 'Z's' and 12 'A's' as well as Chilean 2LD and many Argentine stations. g5SI has succeeded in raising and QSOing three Z's on less than 10 watts input. Wonderful work, OM. g2KF has had many reports from 6th district U.S. stations on 46 meters and is doing good work on 23 meters. g5LF seems able to QSO 5th district U. S. stations whenever he wants to on 46 meters, and also on 23 meters. g6TD is QSO Antipodes almost every morning and gets out well. g2AO has worked a2BK and a6AG in the evening with good reports."—**W. G. Dixon**, Sec'y. British Section, I. A. R. U.

Holland

"The month of October has been very quiet as far as DX work is concerned. Most of our stations were occupied with QRP tests, reducing power for European QSO (1000 to 2000 miles) from the average 100 watts input to about 5 watts, and getting better QSLL in most cases. oWC ran a 24-hour test with three operators to study the best time for QSO with European countries. oBQ is specializing on harmonic transmission to explore the effect of radiation and reflection of short waves from different angles. He will soon run a series of world-wide tests on this subject. oBQ complains that American stations are lis-

tening on their own wavebands only so that it is necessary to arrange tests to call on American wave bands. A few stations carry on experiments with telephony on a wavelength of 120 meters. oXX raised his power to 150 watts and was at once QSO pr4RL on 40 meters. His ambition is to make many QSO's with the other side of the puddle. oGN is reaching out FB now, having made several QSO's with U.S.A. on low power. oFP is the next candidate for linking up with the other side. Watch for him, please. oBA had just started a daily schedule with z2AC when his big bottle 'went West,' so ND at present. PB3 got a report from Abbatabat, India. He is working 'u,' 'c' and 'bz' without difficulty as early as 2200 GMT. The Technical High School at Delft is running a 3¾ meter set under call PC2. An ordinary 20-80 meter transmitter is used under the same call to arrange schedules for the 375 centimeter set. The aerodrome of Soesterberg erected a short-wave transmitter to test with airplanes. The station is working on 40-46 meters under call STB and asks anyone to listen for its signals and please QSL to Chief Radio Dienst, Aerodrome, Soesterberg, Holland. All reports will be answered. The activities of the Holland Section are growing rapidly. There are more than 70 members now in Holland. The first steps for the organization of an experimenters' section have just been made. The first OWLS will soon be on the air."—*R. Tappenbeck*, President, Holland Section I.A.R.U.

Switzerland

"The Swiss amateurs are well organized under the S.V.A.S. (Schweizerische Vereinigung der Amateursender Association) a sort of amateur transmitters' club, domiciled at Berne and officially recognized by the Swiss Telegraph Head Office. The S.V.A.S. is working together with the Swiss Section of the I.A.R.U. President of the S. V. A. S. is Dr. W. Merz, Berne-Bumplitz. Transmitting and receiving licenses are issued from the Swiss Telegraph office at Berne. Every amateur who wants to get a transmitting licenses must pass the examination of radio operator, Class C. These examinations are held at the Telegraph Head Office. At the present time only four or five amateur operator's licenses have been given. Only one station, 9XB, Marcel Roesgen, Geneva, has been officially licensed. 9XA is reserved for Dr. Merz. Despite this there are more than thirty Swiss hams on the air each evening! The cause of the small number of official licenses can be laid to the fact that the examinations are quite difficult for the average Swiss amateur to pass, since there are no real 'old timers' in Switzerland. Another reason is that foreigners, who are strongly represented in the small gang of old-timers, are not yet allowed to take the examinations. The S. V. A. S. is organizing a technical course in order to instruct the future hams and also to get milder examinations from the Telegraph Office. Many stations are in operation nightly. All of the owners of these stations are anxious to connect with the U.S.A. 9BB works every day between 1200 and 1230 GMT and 2200 and 2300 GMT on 43 meters, with an input of 20 watts. 9RNA works very often between 2200 and 2300 GMT on 80 meters with an input of 50 watts. 9WWZ is on every day between 2100 and 2400 GMT on 72 meters with an input of 50 watts and 9NAZ is in operation between 1330 and 1430, 2200 and 0200, 0700 and 1000 GMT on wavelengths of 5, 7, 10, 21, 31 and 62 meters with a variable input between 20 and 200 watts. All U.S. hams who hear any Swiss stations will confer a great favor upon them if they will send QSL cards care Dr. W. Merz, Berne-Bumplitz."—*J. Noelting*, Meilen (Zurich), Switzerland; Traffic Manager, N.E. Switzerland.

France

M. Robert Audureau, Secretary of the French Section of the I.A.R.U., has left us for a time. He had joined his regiment. During his absence the work will be carried on by M. Shlumberger, f8DQ. Audureau's last report follows: The existing DX records of 20,000 kilometers are very hard to battle with. In fact, it is practically impossible for any amateur to exceed the best DX that has been done. There remains, however, a lot of work — a lot of experimental work — to be done in determining what wavebands are best suited for traffic handling under various conditions. Shlumberger proposes a schedule of tests this winter to determine the best wavelength between 20 and 40 meters. Work with the U.S.A. is generally very easy, starting at about 2200 GMT. Some American amateurs (in favorable weather conditions) are heard from 1940 to 1000 GMT. At the moment, the QSO's with Australia are not very numerous. The "A's" are not heard as often or as strongly as they were. During the end of October of each year we have a certain amount of thunder showers, whose accompanying QRN makes DX reception rather difficult. No French station, as far as is known, is doing any DX with telephony. (F. B.—JMC). Again let it be said that the R.E.F. has its official organ the *Journal des Huit* at Ruggles (eure). The Journal will forward all QSL cards to French amateurs and in turn the A.R.R.L. Headquarters forwards French cards to American hams. The administration of the P.T.T. is

such that it is useless to say to a French amateur "QTC QRV?" f8AL has been heard in Tasmania on 51 meters with 100 watts input. His signals were reported R4. f8TOK reports reception of the U.S. Naval station NPP, at Pek.n, China. NPP's QRH was 38 meters.

Germany

Lieutenant L. von Stockmayer has been appointed Secretary of the German section of the I.A.R.U. As yet we have received no report from Stockmayer, but probably will have one next month. He informs us that calls will in the future be assigned according to the following schedule: A1 to HQ, Berlin and vicinity; I1 to UO the Empire excepting Bavaria and Wurttemberg; V1 to XO Bavaria, and Y1 to ZO Wurttemberg. Intermediate Kwill be used.

Short Wave Stations

The following is a revised list of some of the more important commercial short wave stations. In general the stations are maintained in the assigned frequencies sufficiently closely for use to be made of reception of these signals for wavemeter calibration and checking purposes.

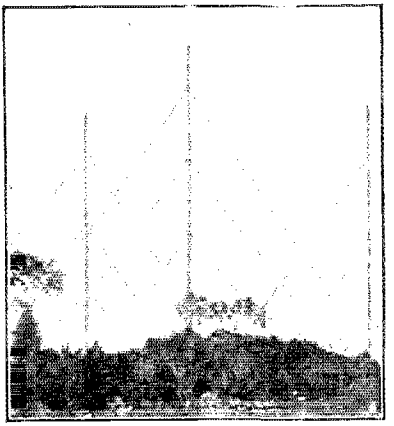
Wave length	Frequency (K.C.)	Location	Call letters	Power
	Frequency (K.C.)			
22	13630	New Brunswick, N. J.	WIK	40 K.W.
35.03	8560	Rocky Point, N. Y.	WQO	20 K.W.
43.02	6970	New Brunswick, N. J.	WIZ	20 K.W.
50.0	5996	Springfield, Mass.	WBZ	20 K.W.
51.5	5820	Rocky Point, N. Y.	WQN	20 K.W.
54.5	5501	Rocky Point, N. Y.	WQN	———
57.0	5260	Rocky Point, N. Y.	WQN	———
58.79	5100	E. Pittsburgh, Pa.	KDKA	20 K.W.
74.0	4052	New Brunswick, N. J.	WIR	20 K.W.
90.0	3331	Kahuku, Oahu	KIO	20 K.W.
95.0	3156	Bolinas, Calif.	KEL	20 K.W.
103.0	2910	Tuckerton, N. J.	WGII	20 K.W.

Ships at Sea

u7OZ at Cottage Grove, Oregon, reports reception of a GDVB, S. S. *Aorangi* in the South Pacific, on November 1st. u5ACL also reports aGDVB as well as sSGC, the motorship *San Francisco* who gave his QRA when 500 miles south of the Cape Verde Islands on November 15th. Cliff Langworthy, u1AAP of Westerly, R. I., worked NTT the U.S.S. *Scorpion* on November 4th while the latter was at Trieste, Italy. The *Scorpion* has a 50 watt tube on board and C. W. Bailey is the operator. u9ECL of Great Bend, Kansas, was QSO AQE on the morning of November 13th. AQE gave his QRA as the *Sir James Clark Ross*, a Norwegian Whaling Expedition vessel. 9ECL handled a message for him. The AQE was in a heavy ice pack in the antarctic, latitude 69 south, longtitude 178 east. Please keep an ear open, gang, for AQE and give him a lift if he has any traffic. His QRH is around 39 meters.

XDA, Mexico City, Mexico

So many amateurs have heard the short-wave transmitter signing XDA that a brief description of the transmitter should be interesting to recount here. The antenna is a cage affair about 105 feet long. It is



suspended from one of the towers shown in the photograph. The transmitter uses a single 204-A tube supplied with 3,000 volts of Kenotron-rectified a. c. The circuit is a coupled Hartley. A direct ground is used in place of the usual counterpoise. This transmitter is used mainly to handle about ten thousand words a day with XAM at Merida. XAM has no trouble in copying the signals from the small transmitter in daylight, but during the dark hours communication has never been entirely satisfactory.

Strays

Uxtry! New name for League proposed by Department of Commerce. In the mimeographed list of delegates attending the Fourth National Radio Conference, our Vice President Stewart is named as the representative of the American Radio Relation League.

Anyone know the QRA of NGG1 on short waves?

8CLV reports having worked O5K recently. Anyone know his QRA?

Glass push-plates for swinging doors make excellent insulators. They are of good length and have holes already drilled at either end.—de *7BK*.

Calls Heard

1HN, 92 Brookline Ave., Hartford, Conn.

rae5, rba1, rcb8, a2bc, a2cm, a2rj, a2yi, a3bm, a3bq, a3ef, a3kb, a3xo, a5ah, a5bg, a5da, b4rs, b4yz, bb7, bz1ab, bz1ac, bz1af, bz1ap, bz1aa, bzrgt, ch2ld, chae5, chba1, q2jt, d3sg, g2cc, g2lz, g2nm, g2nq, g2qb, g2wj, g2yq, g5pm, g6ox, g6td, g6yu, f8dp, f8ee, f8hu, f8jd, g8lx, f8rg, f8th, f8ww, f8yor, npb3, ilas, ilau, ilay, ilbo, iler, ilfp, ilwg, ilmt, ilno, mlb, mlk, m9a. Morocco: ain, z1ao, z1ax, z2ac, z2aq, z2xa, z3am, z4ac, z4am, z4ar, z4as, pr4je, pr4kt, oa3b, oa4z, oa6n, oa8a, car2, c2co, ssgc, s9ad.

8ZU, Dept. of Physics, Cornell University, Ithaca, N. Y.

6aaf, 6aek, 6ajj, 6ajm, 6amm, 6ano, 6ase, 6aug, 6awt, 6bcs, 6bek, 6bgc, 6bhz, 6bol, 6bpn, 6bq, 6cct, 6cgc, 6cou, 6cpf, 6cqa, 6cqe, 6ct, 6daa, 6dag, 6dbe, 6eb, 6fa, 6hm, 6ih, 6jg, 6ji, 6nw, 6pr, 6rf, 6rj, 6rn, 6sb, 6sz, 6tj, 6vc, 6vt, 7gs, 7ll, 7rl 7uj, 7yk, hu6buc, h6fx1, a2cm, a2cs, a2lo, a2tm, a2yi, a3ad, a3kb, a3yx, a5ae, z1ax, z2ac, z2ad, z2xa, z4ac, z4as, rba1, rcb8, rfb5, bz1ab, bz1an, bz1ap, bz1ia, bz5aa, f8dk, f8dp, f8ix, f8tok, f8yor, g2kf, g5dh, g5pm, g6ry, q2jt, q2lc, q2mk, i1bo, i1no, pr4je, pr4kt, pr4rl, pr4ur, ch2ld, k4lv, ber. Navy: nism, nisp, nosn, npm, nqg-2, nve, nwq. Misc: ain, aqe, gdvb, ev8, kfuh, rgc, sdk, seh, wkk.

S. F. M. Wilde, College House, Christchurch, New Zealand
40 meter band.

1ain, 1za, 2ahm, 2ais, 2ain, 2cz, 2gy, 2xaf, 4ft, 5ahn, 5ew, 5uk, 5va, 5zai, 5zl, 6adt, 6aff, 6agd, 6agk, 6aji, 6awt, 6bau, 6bgb, 6bhz, 6bpy, 6bq, 6buc, 6cgw, 6che, 6cto, 6dab, 6daf, 6fa, 6jp, 6tmi, 6tx, 6tz, 6uf, 6vr, 6xad, 6zac, 7ay, 7it, 7oz, 7uz, 8atx, 8bpl, 8eg, 8er, 8sf, 9ake, 9akf, 9bpt, 9cck, 9cd, 9cxx, 9ded, 9dng, 9ek, 9og, 9tc, 9uq, 9xn, 9zt, a2bb, a2cm, a2tm, a3bd, a3bq, a3ef, a4an, a7dx, c4go, c4gt, c5ct, f8ct, f8tk, g2bz, g2nm, iler, ilmt, mlaa, mlb, mlk, mlx, aga, lpz, kfuh, kio, napg, nrri, nedj, nkf, nno, npg, npm, npu, nsf, numm, wap, wiz.

yFWX, J. Henderson, Jr., San Eugenio 1156, Montevideo, Uruguay, S.A.

1aao, 1bad, 1cmx, 1kmx, 1sw, 1xam, 1yb, 8cau, 8gz, kfuh, nism, bz1ab, bz1ac, bz1ad, bz1ae, bz1af, bz1ai, bz1al, bz1am, bz1an, bz1ao, bz1av, bz1ax, bz1bc, bz1bd, bz1bf, bz1bg, bz1bp, bz1ia, bz2af, bz2sp, bzmt, bzrgt, ch1er, chigw, ch2chao, ch2ld, ch2re, ch2rm, z1ao, z1ax, z2ac, z2ae, z2bl, z2br, z2xd, z3am, f8tk, mlaa, mlk, oa3e, oa4l, oa4z.

J. H. Malkin, 25 First St., East Norwalk, Conn.
40 meters

1aa, 1afn, 1ald, 1amz, 1apu, 1ary, 1atg, 1avf, 1ayl, 1axn, 1azr, 1azw, 1bs, 1bgw, 1bhs, 1ch, 1cmx, 1cnf, 1ef, 1hi, 1kl, 1nt, 1pe, 1qb, 1sj, 1sw, 1xz, 1yc, 2ach, 2aef, 2agi, 2ajf, 2ami, 2bhm, 2bui, 2bxj, 2cbl, 2crb, 2cxy, 2gk, 2gy, 2ku, 2kx, 2ld, 2mm, 2sxj, 2wc, 2xbf, 3ad, 3ael, 3aes, 3bhv, 3bmz, 3br, 3ckl, 3jn, 3ju, 3lr, 3oh, 3zo, 4aae, 4aah, 4ahh, 4bu, 4dk, 4er, 4fl, 4fre, 4gw, 4io, 4jj, 4kj, 4kn, 4oy, 4pz, 4rm, 4rr, 4si, 4tr, 4tv, 4tx, 4uz, 4vd, 4wj, 5aav, 5ac, 5acf, 5acq, 5acz, 5ajj, 5akl, 5akp, 5apm, 5aqi, 5atp, 5atv, 5atx, 5aua, 5dg, 5en, 5gj, 5gq, 5jf, 5og, 5ph, 5pu, 5qk, 5uk, 5yd, 6ake, 6bcl, 6bjv, 6bvf, 6cbu, 6cdy, 6cfe, 6cig, 6css, 6dah, 6er, 6hv, 6vc, 6wa, 7it, 8aa, 8adh, 8aig, 8ajn, 8ak, 8akk, 8aks, 8alg, 8aub, 8avo, 8baf, 8bf, 8bha, 8bkx, 8boy, 8bqm, 8buk, 8bvy, 8cau, 8cav, 8caz, 8ccr, 8cjk, 8cjm, 8clc, 8cug, 8cwk, 8dac, 8dbm, 8dgj, 8dgp, 8djg, 8dk, 8dmx, 8doe, 8dpa, 8dpn, 8dqz, 8eg, 8fm, 8gz, 8ji, 8nj, 8og, 8ph, 8pk, 8pl, 8rv, 8se, 8tj, 8tw, 8tx, 8ut, 8vg, 8ze, 8zu, 8zz, 9adg, 9adk, 9ado, 9aed, 9aey, 9afx, 9aij, 9ail, 9aol, 9aot, 9asx, 9atq, 9azo, 9bby, 9bcd, 9bcn, 9bkr, 9bmd, 9bmk, 9bna, 9bnd, 9bnf, 9bnk, 9bol, 9bpb, 9bqa, 9brq, 9bsp, 9bvh, 9bwb, 9bwx, 9bxr, 9cbe, 9cbz, 9cej, 9civ, 9cn, 9csa, 9csl, 9cv, 9cwo, 9czz, 9dac, 9daj, 9dbg, 9dbw, 9deq, 9dez, 9dg, 9dib, 9dkc, 9dmj, 9dms, 9dng, 9dnx, 9dpj, 9dps, 9dte, 9dtm, 9duc, 9eas, 9dbp, 9eez, 9efs, 9ein, eiz, 9ejq, 9ejy, 9eky, 9elt, 9gh, 9hp, 9ix, 9kb, 9mn 9ng, 9nm, 9oo, 9ph, 9qd, 9tj, 9wo, c2fo, c2ax, c3ael, c3fc, c3qs, q2jt, g2wj, f8dp, pr4kt, uaj, nisp, nisr, nkf, wir, wiz, wqo, cm8kn, fw, jb, zkc.

1APL—92 Lowell Street, Springfield, Mass.

4aah, 4bu, 4ch, 4cu, 4do, 4fj, 4fl, 4fn, 4hl, 4ib, 4ll, 4oa, 4pz, 4rm, 4rr, 4sa, 4sb, 4si, 4tn, 4tv, 4tx, 4uk, 4ux, 4xe, 5ac, 5ck, 5en, 5he, 5jd, 5nw, 5qz, 5se, 5ug, 5uk, 5aab, 5aav, 5aci, 5acy, 5adz, 5afb, 5agq, 5akp, 5amd, 5ame, 5amh, 5ani, 5aph, 5ary, 5asd, 5asr, 5atf, 5atx, 6bq, 6ct, 6fu, 6hm, 6nx, 6sb, 6si, 6ua, 6uf, 6vr, 6vt, 6aaf, 6aak, 6ajm, 6ake, 6bcf, 6bhz, 6bmw, 6bur, 6cgw, 6che, 6cnd, 6css, 6dag, 6dah, 6dtg, 7rl, 7ya, 7aek, c2ac, c3en, c3kq, c3ye, m9a, m1aa, ber, z2ac, z2ae, a2bb, a2cs, a2ds, a2kg, a2rj, a2tn, a2yi, a3bd, a5ah, bz1ac, bz1an, bz5ab, hu6njl, hu6buc, pr4je, pr4jv, pr4sa, pr4ur, nisr, nqg-1, wvz, nkf, wir, wqn, nfv, nsf, nve, nism, ev-8, nwq, fw, nisp, nisr.

1YD, Norwich University, Northfield, Vermont

Bz, 1a, 1ab, 1ac, 1af, 1an, 1ar, 1at, 1av, 1ax, 1ia, rgt, sgc, rbg8, fb5, fc6, eb8, db2, ch5, ch2ld, ch2rm, pr4ja, pr4kb, pr4ks, pr4kt, pr4rl, pr4sa, pr4oi, pr4ur, q2jt, c1ar, c2ax, c3ael, c3ck, c3vt, c3xi, c3ye, c8zd, c4ae, c4fa, c4gt, m1aa, m1af, m1n, mix, m9a, i1bo, j1aa, f8tok, npomm, ber, ane, oa8e, oa4z, oa6n, a2js, a2rj, a3ef, z1ag, z1ac, z2ac, z3ao, z4ar.

2CTY, 36 Verandah Pl., Brooklyn, N. Y.
40 meters.

6aak, 6aaq, 6ac, 6afq, 6agk, 6aji, 6ajj, 6ajm, 6ake, 6akx, 6alf, 6amm, 6adv, 6apw, 6aqp, 6arx, 6ary, 6awt, 6ax, 6bad, 6ban, 6bas, 6bau, 6bbv, 6bcl, 6bek, 6bev, 6bgo, 6bhz, 6bjd, 6bjj, 6bjx, 6bkv, 6bmw, 6bni, 6bjr, 6bsc, 6buq, 6bur, 6bus, 6bve, 6bys, 6cah, 6ccl, 6cbj, 6cfe, 6cgo, 6cgw, 6chs, 6cia, 6cig, 6cix, 6clr, 6cls, 6emd, 6cnc, 6cnh, 6cns, 6cpf, 6cpu, 6cqa, 6crf, 6crx, 6csg, 6cso, 6css, 6csw, 6ct, 6cto, 6cuk, 6dab, 6dag, 6dam, 6dan, 6dat, 6hw, 6ji, 6jp, 6js, 6li, 6lj, 6ml, 6nl, 6no, 6qi, 6sb, 6sk, 6ts, 6tx, 6ur, 6ut, 6vc, 6vw, 6wt, 6yd, 7bo, 7gb, 7ku, 7ly, 7nt, 7nx, 7uj, a2cm, a2ds, a2ij, a2yi, a3bd, a3bq, a3ef, a3xq, z1ao, z1ax, z2ac, z2ae, z2xa, z4aa, z4ag, z4ak, z4al, z4ar, z4as, vmg, i1er, ch2ld, bz1ab, bz2sp, f8ca, Czecho Slovakia ok1, raf2, rba1, rcb8, urn, Panama 99x, g2kf, g2nm, g2sz, g5ar, g5at, g5bv, g5nn, g6ah, g6rm, g6tm, g6ym, m1aa, m1af, m1b, m1j, m1g, m1k, m1x, m1za, m9a, nisr, npg, npm, npu, nqn, nrri, nve, wap, wnp, q2by, q2lc, beber, dx8, cg6, jb, xam, xal.

2ASB, Frank R. Day, 36 Verandah Place, Brooklyn, N. Y.
From 15 to 90 meters.

6aak, 6ahp, 6aqj, 6ary, 6asm, 6bcl, 6bcp, 6bek, 6ber, 6bgv, 6bhx, 6bjd, 6bsf, 6bu, 6bur, 6bvs, 6cae, 6cev, 6cej, 6cqw, 6cqa, 6csw, 6das, 6dah, 6dn, 6jp, 6li, 6lp, 6rf, 6sb, 6tj, 6vc, 6zaf, 7dd, 7pp, 7nx, a2cm, a2yi, ber, c4cr, c4cu, c4gt, ev8, g2lz, g2sz, gslf, Lpz, m1aa, m1b, m1k, m9a, nab, nam-1, napg, nisr, npg, npl, pcuu, pow, r-af1, vbyc, xda, hu6db, 99x.

3ADZ, Philadelphia, Pa.—40 meters.

a2bk, a2cm, a2tm, a3ad, a3bq, a3ef, a5bg, a2bk, bd4, b4yz, bz3ab, ch2ld, f8wag, f8yor, g2fu, f8gt,

g2kf, g2lz, g2nm, g2sz, g5lf, g5qv, g6kk, glj, g6no, g6rm, 1ljw, mlaf, m9a, mlx, pr4kt, q2jt, rafl, rcb8, u6nw, u6vc, u6vr, 2lae, a1ao, z1ax, z2ac, z2ae, u6bip, u6bjd, u6cto, u6dah, u6dai, u6dax, u6dat, u6ji, u6nw, u6vc, u6vr, 2lae, a1ao, z1ao, z1ax, z2ac, z2ae, z2xa, z3am, z4ac, z4ag, z4av, z4ar, z4as, kfuh, nisp, rdw (20 m).

4RJ, Francis McCown, Park Terrace 3 Santurce, Porto Rico

1a1r, 1afl, 1aiu, 1aof, 1add, 1aao, 1aro, 1awb, 1ayn, 1app, 1axx, 1ap1, 1ahg, 1any, 1adw, 1a1r, 1abz, 1acd, 1acx, 1air, 1apz, 1azl, 1azr, 1axn, 1ajz, 1aa1, 1ajm, 1apu, 1atv, 1ak, 1acp, 1bzp, 1ba, 1boy, 1bdm, 1b1f, 1bz, 1bke, 1bjk, 1ba1, 1buo, 1bqq, 1bqu, 1bds, 1bv1, 1caw, 1cki, 1cmx, 1ch, 1cot, 1cbb, 1csx, 1coh, 1ckm, 1cq1, 1cpi, 1ckp, 1d1, 1er, 1ef, 1ga, 1hj, 1hn, 1k1, 1yb, 1si, 1xz, 1se, 1zw, 1uw, 11w, 1sz, 1qv, 1qo, 1qb, 1pb, 1xu, 1or, 1ky, 1xm, 1pi, 2be, 2bkr, 2ce1, 2cx1, 2ahk, 2buy, 2amj, 2cy, 2kf, 2akp, 2fo, 2cty, 2bw, 2ks, 2ag, 2crp, 2nj, 2cvu, 2kg, 2b1m, 2aes, 2aof, 2auh, 2kr, 21m, 2eds, 2av, 2bj, 21z, 2ctn, 2aaw, 2hy, 2ajw, 2ez, 2akz, 2bg, 2akk, 2kn, 2a1s, 2awf, 2xe, 2bmw, 2ke, 2aec, 2bp, 2sm, 2ff, 2agq, 2a1a, 2gy, 2dx, 2bec, 2acn, 2du, 2b1, 2tr, 2akv, 2ih, 2bvs, 2apv, 2cth, 2cnm, 2ali, 2aom, 2wc, 2clg, 2aiq, 2cbg, 2eo, 2mm, 2gx, 2nw, 2ku, 2mw, 2beo, 2bpb, 2cte, 2fc, 3as, 3hg, 3bof, 3aov, 3cel, 3ain, 3bg, 3ahp, 3ju, 3zo, 3av, 3bhv, 3bmo, 3fu, 3buv, 3ev, 3bmx, 3bel, 3bmt, 3aai, 3cjn, 3na, 3afq, 3en, 3afw, 3afo, 3jw, 3bo, 3acf, 3zi, 3gb, 3tr, 3jd, 3acr, 3bqp, 3tb, 3ri, 3pp, 3adb, 3auv, 3mv, 3jn, 3mo, 3bco, 3bfh, 4jr, 4bu, 4kz, 4xe, 4tn, 4cu, 4ai, 4aad, 411, 4fx, 4ah, 4ib, 4rm, 4ez, 4aae, 4si, 4f1, 4we, 4pz, 4kw, 4eq, 4oa, 4tx, 4aah, 4rr, 4wo, 5zai, 5asw, 5he, 5zk, 5ahp 5abi, 5oq, 5rg, 5atx, 5jf, 5afv, 5aip, 5ak1, 5acq, 5asv, 5aid, 5bg, 5ahn, 5awf, 5aua, 5akn, 5uk, 8bbw, 8boy, 8dpa, 8gz, 8zf, 8baf, 8awa, 8es, 8dqz, 8agq, 8eq, 8fb, 8bkm, 8jq, 8ben, 8dae, 8bhm, 8dgp, 8cau, 8cgr, 8ayy, 8aly, 8gi, 8bp1, 8ws, 8ces, 8eb, 8av, 8bwb, 8dnf, 8amd, 8cme, 8aym, 8aul, 8aun, 8xas, 8ced, 8cbr, 8brm, 8dmz, 8bcz, 8byn, 8buk, 8as, 8se, 8bgo, 8md, 8aks, 8dpz, 8dhx, 8cjb, 8cby, 8ks, 8p1, 8cdv, 8er, 81af, 8cvs, 8adg, 8ada, 8djp, 8mt, 8ane, 8bpv, 8ee, 8bvt, 8akk, 8dfo, 8ju, 8fj, 8eu, 8dno, 8bq, 8adh, 8bf, 8dfb, 8vrz, 8dpe, 8dem, 8ali, 8amt, 8cnx, 8si, 8zz, 8cv, 8dac, 8bth, 8dpj, 8cer, 9bz, 9bna, 9jz, 9apn, 9byw, 9dmj, 9cj, 9bex, 9cvc, 9cii, 9duo, 9ajv, 9bxg, 9bfg, 9beq, 9apm, 9ccm, 9b1b, 9bhz, 9djx, 9crm, 9aaw, 9eky, 9adk, 9ek, 9cgu, 9cwo, 9bwb, 9bpb, 9bwo, 9dez, 9dtk, 9dkc, 9d1n, 9ex, 9eaz, 9aol, 9hp, 9bdw, 9ix, 9aot, 9atq, 9dfq, 9cv1, 9cj, 9bol, 9cwn, 9cgu, 9chy, 9dj, 9dbz, 9mk, 9eak, 91a, 9axo, 9bfg, 91z, 9cs, 9bvh, 9ec, 9azr, 9egu, 9ajn, 91c, 9cv, 9cpo, 9bhi, 9dau, 9zk, 9cej, nkf, naw, nba, npm, npg, nsf, nisr, ntt, nao, ndf, nve, f8z, nfv, Com: wqo, wir, wiz, wqn, fw, agz. British: 2kf, 2nm, sod, 2sz, 51f, 61j, f8ca, f8dp, f8gp, f8yor, c2cg, 23ck, c3nf, c3ka, c3oh, ildo, npcuu, m9a.

4KD, U.S. Naval Radio Station, San Juan, Porto Rico
40 Meter Band.

1add, 1aiu, 1ajp, 1apz, 1aty, 1awe, 1bes, 1bvl, 1caw, 1cel, 1ckp, 1cmf, 1ef, 1hj, 1ka, 1oh, 1sw, 2akb, 2aky, 2ami, 2amq, 2apy, 2ax, 2bbx, 2bm, 2bql, 2cla, 2clg, 2ctm, 2cty, 2cyj, 2cxl, 2ff, 2gxi, 2hj, 2mm, 2xac, 3afq, 3au, 3bmz, 3bof, 3ckl, 3io, 3jw, 3ju, 3oh, 4aad, 4ccx, 4fa, 4fn, 4jy, 4oa, 4ok, 4pf, 4uz, 4we, 5aen, 5atx, 5he, 5qk, 6ls, 6ry, 8aj, 8avl, 8az, 8ben, 8bga, 8dau, 8cbi, 8cby, 8cbr, 8cbs, 8cdr, 8dko, 8dnf, 8dno, 8don, 8djp, 8dp, 8gp, 9dpj, 9ecl, 9gd, 9ky, 9zt, g2cc, g2kf, g2nm, g2od, g5dh, npb2, o3z, f1cm, f8dk, pr4ft, pr4ja, pr4je, pr4rl, pr4sa, nkf, nisr, nism, nisp, ncc, wiz, wir, wqo, wim, pccj, fw.

6CUW, D. Cason Mast, Box 1673, Bisbee, Ariz.
40 meters.

1yb, 1aao, 1alw, 2mu, 2qi, 2tm, 2uk, 2ahm, 2aky, 2bgi, 2cvu, 2cxl, 3ca, 3gh, 3lw, 3afq, 4av, 4cu, 4do. 4fl, 4fs, 4fw, 4ib, 4io, 4iv, 4kj, 4kt, 4lt, 4pz, 4rm, 4rr, 4sa, 4sb, 4si, 4tn, 4tx, 4we, 4wj, 4aae, 4aah, 4aap, 5gq, 5he, 5jd, 5ms, 5nq, 5nw, 5ov, 5qs, 5se, 5uk, 5va, 5sp, 5aav, 5acl, 5ado, 5adz, 5agn, 5agp, 5ahp, 5ail, 5akn, 5akp, 5akz, 5ame, 5amw, 5anh, 5arn, 5asd, 5asv, 5atx, 5aua, 5zai, 6ae, 6bq, 6dh, 6ea, 6gu, 6'h, 6ii, 6is, 6ml, 6mt, 6nx, 6oi, 6oj, 6qg, 6rm, 6sb, 6uf, 6ur, 6vt, 6wt, 6aao, 6aaf, 6adw, 6aff, 6agn, 6a'j, 6ajm, 6ake, 6aku, 6ano, 6api, 6aqp, 6ase, 6asm, 6auf, 6bhr, 6bhz, 6bsf, 6buc, 6bwy, 6cbu, 6cck, 6cey, 6cdn, 6cia, 6cin, 6cix, 6cmq, 6cou, 6cpf, 6dag, 6dam, 6dax, 6dbe, 6dbl, 6zac, 6zaf, 6zbe, 7ao, 7hb, 7it, 7ki, 7nl, 7rl, 7uj, 7aek, 7alk, 8bt, 8ada, 8agq, 8alo, 8ayy, 8bgo, 8bon, 8bwn, 8djp, 9fl, 9hp, 9ph, 9oo, 9ql, 9us, 9wo, 9zt, 9adr, 9aij, 9akc, 9akf, 9amu, 9ase, 9ayd, 9azq, 9bht, 9blf, 9bmd, 9bnf, 9bpb, 9bwo, 9bvh, 9bvz, 9cdf, 9cld, 9cfi, 9cpm, 9cpo, 9ctg, 9cvm, 9czz, 9dac, 9dbz, 9ddh, 9deq, 9dge, 9diq, 9dkc, 9dng, 9dpj, 9dqr, 9dqu, 9dxn, 9ear, 9ebp, 9ecc, 9eei, 9eez, 9efs, 9efy, 9eji, 9eky, mbx, m1k, m9a, m1aa, m1af, c2nf, c3oh, z2ac, z2xa, naw, nkf, npu, nism, nisp, wqo, ev8? 80 meters: 1pi, 2af, 3bf, 3tr, 4we, 5hn, 5wk, 5ann, 5apq, 5atu, 6pz, 6vg, 6wd, 6anw, 6bcs, 6bls, 6bsf, 6cek, 6cgp, 6cip, 6cvv, 7ar, 7uj, 8jq, 8ro, 8amd, 8aul, 8doi, 9ajw, 9bfg, 9bga, 9blb, 9bxg, 9ckh, 9coo, 9djx, 9dqg, 9dxn, 9dzr, 9eak, 9ecl, mbx.

8CCQ, 311 Jerome Avenue, Williamsport, Pa.

4aae, 4aai, 4af, 4aj, 4bx, 4cu, 4ee, 4eg, 4er, 4fb, 4fl, 4ja, 4jj, 4jn, 4jr, 4js, 4jv, 4kw, 4ll, 4mf, 4oi, 4ov, 4pi, 4rl, 4rm, 4ry, 4rz, 4sa, 4sb, 4sh, 4si, 4tv, 4tx, 5aaq, 4acz, 4adz, 5agn, 5ahw, 5alz, 5amw, 5aph. 5arb, 5ary, 5aua, 5auc, 5ac, 5co, 5ew, 5gi, 5gk, 5gq, 5he, 5in, 5jf, 5mq, 5ms, 5nj, 5nq, 5oq, 5ph, 6qs, 5rg, 5uk, 5up, 5wa, 5wy, 5yd, 6abg, 6agk, 6ake, 6ajj, 6amm, 6bab, 6beb, 6bev, 6bjd, 6bni, 6bnw, 6cah, 6bmw, 6cak, 6cdy, 6cgo, 6cgw, 6che, 6cto, 6crs, 6css, 6csw, 6cuk, 6dab, 6dah, 6dal, 6dam, 6ct, 6dh, 6ek, 6fz, 6hu, 6rw, 6ab, 6avc, 6zk, 7df, 7ij, 7lu, 7nh, 7nx, 7to, c1af, c1am, c1ar, c2be, c2cg, c2fo, c4bv, c4gt, c5ef, c5gt, m1aa, m1af, m1ax, m1b, m1k, m1n, m9a, i1af, i1au, i1at, i1er, i1gn, i1rt, g6rm, g2cc, f8ee, f8es, f8ct, f8tk, f8qq, f8yor, z1ao, z2ac, z2ae, z2xa, z4ar, z4al, a2bb, a2ds, a2ms, a2yi, a3bq, a2bz, a3sl, bz1ab, bz1ad, rah2, rcb8, q2mk, d7ec. India: dc7, India dcb, k21d, wap, wnp, fxl, br7, xal, nve, nisr, npu, sgc, rfb5.

Willis L. Nye, 1344 Bernal Avenue, Burlington, Calif.
40 meters.

1atv, 1caw, 1cal, 1aim, 1aa, 1xm, 1fx, 1bzt, 1si, 1gw, 1cq, 1bke, 1xz, 1hn, 1er, 1emx, 1are, 1anq, 1vc, 2ky, 2ac, 2qb, 2aof, 2ahn, 2cty, 2bc, 2bn, 2sz, 2bbx, 2pf, 2mu, 2kf, 3ld, 3ot, 3bnu, 4hm, 4tx, 4rm, 4pf, 4je, 4jr, 4aa, 5ls, 5aiy, 5ap, 5ave, 5ms, 5uk, 5ux, 5ox, 5aid, 5vk, 5ado, 5adn, 5nq, 5acf, 4id, 5ew, 5ake, 5apq, 5akz, 5oq, 5kz, 5uq, 5oq, 5ke, 5nq, 5sd, 5ac, 5ak, 5lg, 7nh, 7na, 7sl, 7bo, 7dd, 7tm, 7ao, 7ag', 7jf, 7gw, 7ki, 7it, 7ay, 7ao, 7mx, 8zu, 8ul, 8bdz, 8se, 8ada, 8ara, 8bsc, 8gc, 8bpl, 8ced, 8bwb, 8jq, 8buk, 8ajn, 8nx, 8qr, 8er, 8ave, 8bt, 8bnh, 8pk, 9cmn. 9eak, 9dac, 9eg, 9apn, 9bmt, 9bwi, 9azk, 9any, 9dpv, 9nl, 9dak, 9ea, 9czz, 9dqn, 9wn, 9dkc, 9wo, 9dkm, 9dkt, 9zt, 9zk, 9bpy, 9hp, 9beq, 9baq, 9qk, 9bnt, 9cvk, 9dtm, 9bzv, 9ecp, 9cvl, 9ear, 9bqa, 9dte, 9dht, 9wr, 9bwb, 9tj, 9akf, 9qn, 9eji, 9dbw, 9nk, 9dwn, 9aot, 9dur, 9aob, 9dol, 9bex, 9cpo, 9adk, 9cdw, 9aed, 9cua, 9uq, 9bht, 9bhz, 9deq, 9dtt, 9agl, 9dma, 9dv, pi1cw, pinpo, m9a, m9k, m1a, m1k, c4ax, c4ic, c8xi, c4gt, c5ef, c5oe, wiz, wuz, wgh, wql, wqn, wqo, wwv, npo, npu, nnp, nism, nve, nisr, nkf, npg, npu, db2.

8CWK, Detroit, Michigan
Heard on 35 to 50 meter band.

6ajm, 6akm, 6ake, 6arx, 6awt, 6bmw, 6cah, 6cgw, 6cnd, 6cnh, 6csw, 6dag, 6dai, 6jl, 6nw, 6nx, 6ql, 6rm, 6rn, 6sb, 6vc, 6vr, 6uf, 6zh, 7gs, 7ek, 7it, 7oy, 7uj. Can: 4fa, 4gt, 5hp, be-ber, q2jt, q2mk, m1aa, m1j, m1n, bz1ab, g2kf, f3ca, f8dk, f8hu, pr4kt, pr4oi, pr4rl, 4sa. z1ao, z2xa, z4av, a2yl, a5ah. Navy: nism, nisp, nisr, naw, numm, nve, npm, napg, hufx1, 6buc. Misc: f8z, ane, gbe, wap, wnp, xda, vdm, fw, ocml. Heard in daylight 20 meters: 5yd, 6cto, 6hm, 9bdw, pr4rl.

9DAU, MacDougal Bros., Nichols, Iowa

6aaf, 6aah, 6aao, 6adw, 6aec, 6ahp, 6ajm, 6ake, 6akm, 6akx, 6ank, 6ano, 6aqp, 6ase, 6avj, 6awt, 6bav. 6bcl, 6bf, 6bhl, 6bhz, 6bip, 6bjd, 6bjv, 6bjx, 6bmw, 6bny, 6bq, 6btm, 6buj, 6bur, 6bve, 6bys, 6bvy, 6cae, 6ccl, 6cco, 6cev, 6cfe, 6cfi, 6cgo, 6cgw, 6che, 6chl, 6cig, 6cnd, 6cns, 6cpe, 6cqa, 6cqe, 6css, 6csw, 6ct, 6cto, 6dag, 6dah, 7das, 6dat, 6dax, 6dbe, 6dh, 6dn, 6ea, 6ec, 6ew, 6fd, 6hu, 6ji, 6kb, 6lh, 6ms, 6nw, 6nx,

6of, 6oi, 6qu, 6rn, 6rw, 6si, 6tv, 6uf, 6vt, 6vc, 6vr, 6wt, 6zd, 7ek, 7fb, 7ki, 7ly, 7mf, 7us, 7xe, 7ya, a2by, a2ij, a2yi, a3bd, a3yx, a3xo, a5ah, a5bg, a7bj, a9dr, z1ao, z1ax, z2ac, z2ae, z3am, z4aa, z4ag, z4al, z4ar, z4as, z4av, m1aa, m1b, m1j, m1k, m9a, q2mk, pr4sa, pr4ja, beber, hu6oa, hu6aji, hu6buc, hu6zax, hu6zac, kfuh, fw, nisr, wqk, nism, wvc, lpz, vmg, naj, nve, napg, nisp, nesp, nrrl, npg, wgo, wgn, nkf, wir, wiz.

A. G. Hecker, Camp Street, Temora, N.S.W. Australia

a1ax, a1ak, z1aa, z1ao, z1ap, z1fq, z1af, z2ac, z2ab, z2aq, z2aw, z2gc, z2bc, z2xa, z2bl, z2av, z2br, z2bm, z2ae, z2bx, z2gj, z2au, z2bq, z2gt, z3aa, z3ck, z3am, z3al, z3ar, z3wl, z3ao, z3bl, z4ar, z4ag, z4aa, z4ak, z4al, z4as, phone 1ya, 4ya, c2kl, c3aa, c4gt, c4bd, c9ck, j1aa, phone j4aa, hu npm, hu kie, npu, pkx. upn, npo, npj, nrrl, nedj, numm, 1pl, 1ii. 1pr, 1em, 1wr, 1fq, 1rg, 1yb, 1te, 1aa, 1aep, 1cmp, 1bb, 1ht, 1aao, 1fx, 1cx, 1bs, 1ka, 1ha, 1px, 1ahg, 1aaj, 1cmx, 1bzc, 1er, 2agq, 2lu, 2agt, 2lz, 2li, 2zv, 2qi, 2ai, 2kr. 2buy, 2xaf, 2afp, 2bbx, 2cxw, 2cgj, 2gy, 2aq, 2re, 2ds, 2af, 3jw, 3wo, 3bva, 3jwa, 3kw, 3sl, 3ac, 3bw, 3ju, 3ef, 3sc, 3ot, 4gt, 4tm, 4rm, 4ate, 4fu, 4oa, 4eco 4si, 4rl, 4em, 5et, 5uk, 5aj, 5agl, 5zal, 5uq, 5kfu, 5atv, 5agn, 5azk, 5nj, r5fb, 5ew, 5agz, 5akz, 6dah, 6jl, 6ajl, 6km, 6awt, 6bhz, 6chs, 6cej, 6za, 6cgw, 6rw, 6bjx, 6ar, 6cso, 6et, 6cg, 6cto, 6bur, 6rl, 6bao, 6an, 6ag, 6ct, 6bmw, 6bsz, 6nx, 6ut, 6ank, 6bcf, 6jp, 6uar, 6ot, 6buc, 6xad, 6aff, 6crs, 6cub, 6bgo, 6com, 6agn, 6blh, 6fa, 6xbj, 6af, 6bgc, 6akz, 6asr, 6dao, 6li, 6esw, 6lj, 6bm. 6ba, 6bkv, 6aij, 6bq, 6cgo, 6bil, 6azk, 6vr, 6tz, 6zac, 6apk, 6aqp, 6cuk, 6zbe, 6dn, 6aoi, 6bjj, 6ahq, 6tx, 6ew, 6cmg, 6uc, 6qaq, 6dal, 6btm, 7ly, 7uz, 7eq, 7ya, 7ak, 7ay, 7it, 8ak, 8cna. 8bf, 8dns, 8alf, 8bnh, 8bce, 9il, 9ded, 9eli, 9ax, 9cld, 9ack, 9akf, 9ccg, 9cgn, 9bht, 9bby, 9bbj, 9cxx, 9uq, 9ado, 9xn, 9acl, 9dk, 9bn, 9duc, 9ek, 9uc, 9cca, 9zt, 9bpy, 9ck, 9dvr, 9bbh, 9dve, 9dng, kel, ket, klo, nea, mkf, wiz, npg, npl, p sa, chleg, ffnk, g2nm, g2lz, g2ha. Unknown: qra's: ber hna, ncf, ndf, nry, nis, nij, nve, nifj, foiz, 2gy, 5er, 2mo, pilhr, 3en.

3KB. A. Kissick, McFarland St., Brunswick, Victoria, Australia
40 meters.

1aep, 1anq, 1are, 1axa, 1eh, 1er, 1ka, 1pl, 2arb, 2adu, 2ahm, 2bee, 2cvj, 2cxl, 2lu, 2mu, 2zv, 3bva, 3xf, 4aao, 4am, 4bq, 4ft, 4iv, 4kn, 4ll, 4rl, 4rm, 4sa, 4sb, 4tv, 5acl, 5agn, 5akz, 5amk, 5arn, 5asv, 5at, 5atf, 5atv, 5bce, 5ew, 5he, 5hv, 5ms, 5nj, 5oq, 5se, 5uk, 5um, 5wi, 5zai, 6adw, 6aff, 6agk, 6aij, 6ajt, 6ajm, 6alv, 6amw, 6aqp, 6aum, 6awt, 6aww, 6bav, 6bbv, 6bde, 6bez, 6bfn, 6bgv, 6bhz, 6bjd, 6bjx, 6bmw, 6bon, 6buc, 6bur, 6bq, 6ccp, 6cct, 6cej, 6cfe, 6cgw, 6che, 6chh, 6chl, 1chs, 6clp, 6cmq, 6cnc, 6css, 6cst, 6csw, 6ct, 6cto, 6dab, 6dai, 6dah, 6dcf, 6dck, 6dh, 6ea, 6est, 6fa, 6fh, 6jp, 6js, 6kb, 6ml, 6nx, 6rw, 6sk, 6tvj, 6ua, 6vc, 6vr, 6xad, 6zd, 6zh, 7aek, 7de, 7lq, 7rl, 7uz, 8ae, 8aly, 8ayy, 8bau, 8bce, 8bnh, 8bt, 8eae, 8eg, 8eyi, 8don, 8pl, 8sf, 9ado, 9ai, 8bbh, 9bcx, 9beq, 9bez, 9bmx, 9bpt, 9bwb, 9ccs, 9cid, 9cvc, 9cxx, 9czz, 9dac, 9dct, 9dnq, 9dpx, 9eht, 9ejy, 9ek, 9eky, 9ff, 9uq, 9xn, 9xp, 9zd, 9zt. England: 2sz, c3aa, e4gt, m9a, j1aa, z1ao, z1ax, z2ac, z2ae, z2ax, z2bl, z2bx, z3am, z4aa, z4ag, z4ak, z4am, z4as, z4at. Misc: pr4ka, pilcw, pilhr, ane, fxl, jzy, kfuh, kdka, pof, vmg, wiz, wvy, zbm, zjd. Naval: nedj, nirx, nisp, nkf, npg, npm, npo, npu, nrrl, numm, nve.

b4RS, c/o Radio Club Belge De L'Est, 50 Rue Tranchee, Verviers, Belgium

1aa, 1aao, 1acl, 1ahl, 1aiu, 1alr, 1anq, 1aos, 1axa, 1ban, 1bg, 1bhm, 1byx, 1cax, 1ch, 1ckp, 1cmf, 1cmx, 1el, 1ez, 1hn, 1ka, 1kmx, 1lw, 1lwk, 1se, 1sl, 1te, 1uw, 1yb, 1za, 2afp, 2afn, 2agq, 2ahk, 2ahm, 2ai, 2apn, 2apv, 2bbx, 2bnb, 2bck, 2brb, 2bxx. 2cv, 2eva, 2cvj, 2cxl, 2gm, 2hh, 21pv, 2me, 2pd, 2va, 2zv, 3apv, 3auv, 3cbl, 3cei, 3ckj, 3ao, 4ei, 4fj, 4is, 4me, 4rm, 4ux, 5kc, 5zai, 6cgw, 8aly, 8blc, 8buk, 8bvj, 8eau, 8ccq, 8er, 8es, 8gz, 8tk, 8tx, 9aav, 9bpb, 9bwz, 9ejl, 8mm, 9xn, 9xu, napg, naw, nisr, nkf, nrrl, wap, wir, wiz, wnp, wql, wqo, pr4kt, pr4rl, pr4sa, m1b, bz1ab, bz1ac, bz2sp, a2cm, a3bd, a3bq, a3ju, z1yb, z2ac, z2ae, z2xa, z4ag, z4ak, z4al, z4ar, z1as, z4ao.

bP7, Ostend, Belgium (via Reseau Belge, Brussels).

1arh, 1aep, 1bg, 1cki, 1er, 1ckp, 1tr, 2ahm, 2crb, 2ff, 4ask, 3bva, 8er, 9aij.

bE2, Liege, Belgium (via Reseau Belge, Brussels)

1uw, 1rq, 1axa, 1yb, 1ef, 1cx, 1ach, 1bs, 1si, 1axn, 1bes, 1ka, 1ana, 1are, 1eh, 1wr. 2cxl, 2wr, 2bg, 2mm, 2bui, 2cth, 2pd, 2cig, 2cbr. 2ahm, 2nf, 2bbx, 2brb, 3lw, 3ck, 3jw, 3acf, 4lv, 4oi, 4ur, 4tv, 4rm, 4en, 4gm, 5oq, 5uq, 8dae, 8jq, 8bgn, 8awa, 9ok, 9eji, 9dw, 4ask, ntt.

bz 1AX, Joao V. Pareto, 180 Praia do Russell, Rio de Janerio, Brazil
30-45 meters

1ca, 1eh, 1yb, 1cx, 1ga, 2am, 2cc, 2cv, 2ds, 4we, 3jw, 7tk, 8bg, 8gz, 9el, 9ky, 1aac, 1act, 8can, rafl, rba1, ras7, rfa3, rfb5, rfg4, raa8, ral6, rah2, rae5. rcb8, rbg8, resr, rdb2, rdd7, rdd8, rde3, rdh5, rdm9, rea8, rff9, rga2, z1ao, z1ax, z2ab, z2ac, z2ae, z2xa, z2xp, ch2rm. ch2ld, yfwx, yjcp, g2od, g2nm, f8tk, fca7, oa4z, wafg3, bz1ab, bz1ac, bz1ad. bz1ae, bz1af, bz1ai, bz1ak, bz1al, bz1am, bz1an, bz1ao, bz1ap, bz1aq, bz1as, bz1av, bz1ay, bz1bb, bz1bc, bz1bd, bz1bg, bz1ia, bz2af, bz2sp, bzmt, bzrgt, bzsqe, fw, wiz, wqo, wap. nkf.

c3AEL, 85 Sixth Street, Kingston, Ontario
40 meters

4ai, 4bu. 4cu. 4cv, 4eg, 4er, 4fj, 4fl, 4io, 4jj, 4rl, 4rm, 4si, 4tx, 4we, 4xc, 5agn, 5ame, 5amf, 5aph, 5atv, 5auc, 5aut, 5ak, 5he, 5jf, 5nq, 5ox, 5qd, 5yb, 5yd, 6ajm, 6aro, 6bjd, 6cfe, 6css, 6cto, 6daf, 6dam, 6ml, 7ij. 7it, 7rl, 9abb. 9aij, 9aol, 9aot, 9aud, 9bez, 9bjk, 9bmx, 9bwx, 9co, 9cow, 9cki, 9cvn, 9dvb, 9dng, 9dmj, 9mn, 9ph, 9wo, 9xn. c4aa, c5ef, g2nm, g2sz, g5nm, f8ee, f8ue, f8yo. f8zt?i, m1aa, m1af, m1b, m1k, a2ac, a2cm. a2xa, z2bb, z4al, q2jt, raf2.

Louis Clements, 133 Montrose St., Winnipeg, Canada
40 meters.

1aep, 1ahl, 1ami, 1amf, 1anq, 1apa, 1axa, 1bes, 1biu, 1bqq, 1ckp, 1cmx, 1cxy, 1ga, 1si, 1or, 1xm, 1xu, 1wkq. 1yb, 2acs, 2ahm, 2akb, 2arh, 2bbx. 2box, 2bpb, 2bur. 2cpa, 2cth, 2cty, 2cxl, 2dx. 2fl, 2fo, 2gk, 2gy, 2idy, 2kz, 2mm, 2sz, 2wc, 2wh, 2zb, 2zw, 3afg, 3arm, 3ahp, 3auv, 3bg, 3bmc, 3bta, 3btv, 3hg. 3cel. 3jo, 3ju, 5jw, 3ld, 3zss, 4ask, 4ak, 3bg, 4bu, 4eu, 4do, 4eg. 4eo, 4fr. 4fl, 4gw, 4io, 4jr, 4kn, 4oz, 4oa, 4rm, 4tv, 4tx. 4ux, 5aab, 5aav, 5ac, 5agn, 5aid. 5ail, 5akn. 5aki. 5amd. 5ame, 5amw, 5ars. 5asv, 5arn, 5atr, 5atu. 5atx, 5aua, 5bg, 5fl, 5gk. 5hv, 5jf, 5lg, 5oq. 5uk, 6eam. 6aiq, 6aji, 6ajm, 6akn, 6aku, 6atu. 6asv, 6bmw, 6bpq, 6cc, 6cpf. 6epu, 6crs, 6esa, 6csw, 6cto, 6cuc, 6ct, 6dag, 6dao, 6ji, 6nw, 6uf, 6ut, 6vr, 7ak. 7hx, 7fe. 7ek, 7if, 7gb, 7ne. 7oy. 7pu, 7rl, 7uj, 8ade. 8ado, 8aee, 8aly, 8aub, 8aul, 8av, 8avo, 8ay, 8bbw, 8bce, 8hen, 8bf, 8bga, 8bgn, 8bkm, 8bnc, 8bnh, 8bsc, 9bvf, 8eau, 8caw. 8ced, 8cty, 8cyb, 8dai, 8dkr, 8ndf, 8dpn, 8eb, 8eg, 8egg, 8elt, 8eq, 8es, 8er, 8eyy, 8mc, 8pl, 8si, 8tw, 8tx, 8vt, 8wa, 8zu, 8zz, e1aa, e2al, e2bg, e3aa. e3ach, e3oh, e4aa, e4fv, e4gt, e5et, e5ef, e5go. e5hp, m1aa, m1b, m9a, g2cc. hu npu, fw, naj, nkf, nve, wap, wir, wiz, wnp, wqn, wqo, wvz, wgy (fone). 20 meters: 1aae, 1ch, 1cme, 2akb, 2auo, 2cxl, 2xi, 8avl, 8avn, 8caz, 8cbi, idme, 8eq, 8jq, 8pl, 8xx, wap, wir, m3v.

J. R. Melio, Radio Holland, Tandjong Priok, Dutch East Indies

1fx, 2bk, 6ake, nijr, whw, kudg, nisp, wva, nuqg, s2bb, a2ds, a4rm, z1ax, j1na, npcll, pse qsl attractive card waiting.

E. J. Erith, Winchfield, Albion Road, Sutton, Surrey, England
All 40 meters and 1 Tube.

1aac, 1aae, 1aal, 1aao, 1aap, 1aci, 1adg, 1aep, 1af, 1agq, 1agg. 1ahm, 1aiu, 1ajg, 1amf, 1ana, 1anq, 1are, 1arh, 1atj, 1awe, 1axa, 1azl, 1bes, 1bgc. 1bhm, 1bke, 1bvl, 1bzp, 1caw, 1cbp, 1ccx, 1ch, 1ckp, 1ck, 1cmf, 1cmp, 1cmx, 1cse, 1er, 1ef, 1fd. 1hj, 1hn, 1kr, 1lw. 1my, 1nt, 1or, 1pe, 1pl, 1qm, 1rr, 1se, 1si, 1sw, 1uw, 1wl, 1xam, 1xf, 1xm, 1yb, 1za, 2acs, 2afn, 2ago, 2ahm, 2aim, 2akb, 2aky, 2amj, 2apv, 2awf, 2ax, 2avn. 2azl, 2baf, 2bbx, 2bee, 2beo, 2bg, 2bgi, 2bm, 2brb,

2bum, 2bxg, 2bxj, 2cgi, 2cgj, 2ckj, 2clg, 2cmf, 2cpa, 2cqz, 2cse, 2cv, 2cvj, 2cvu, 2cxl, 2cxr, 2czr, 2if, 2fo, 2gk, 2gy, 2hj, 2jz, 2kr, 2kx, 2mm, 2nf, 2pd, 2rr, 2wr, 2zv, 3afq, 3aha, 3auv, 3bco, 3blp, 3bms, 3bta, 3bwj, 3cdv, 3cel, 3ckj, 3hg, 3jo, 3jw, 3lw, 3xav, 4as, 4ask, 4cu, 4eg, 4er, 4io, 4oa, 4rm, 4tv, 4we, 4xe, 5zai, 8ada, 8adg, 8adm, 8aj, 8ajf, 8aly, 8aul, 8avj, 8avl, 8awa, 8ben, 8brc, 8bth, 8buk, 8bwr, 8byn, 8cau, 8cwk, 8cyi, 8don, 8eq, 8es, 8fl, 8gz, 8jq, 8jy, 8pl, 8sf, 8zu, 9aot, 9bn, 9brg, 9cxx, 9dkc, 9xn, wap, wir, wiz, wnp, wqn, wqo, nkf, nism, nisp, nrrl, nsf, ntt, nve, pr4je, 4oi, 4rl, 4sa, 4ur. Canada: 1ar, 1ow, 2ax, 2be, 2bg, 2fo. Mexico: 1b. Brazil: 1ab, 1ac, 1af, 1an, 1ia, 2sp, 5aa, rgt. Argentine: af1, ba1, cbb, fg4, ih2. Australia: 2cm, 3bq. New Zealand: 2ac, 2ae, 4ac, 4ag. Java: ane. Mosul: 1dh. Bermuda: ber.

g6QB, L. H. Thomas, 33 Harpenden Road, West Norwood, London S.E. 27. England

1add, adg, 1aim, 1alp, 1alw, 1anq, 1ams, 1bes, 1bhm, 1bhs, 1blf, 1bvl, 1bz, 1cak, 1ch, 1ckp, 1cln, 1cmf, 1cmx, 1cre, 1ga, 1pl, 1rr, 1se, 1si, 1sz, 1xu, 1yb, 2aim, 2akb, 2apv, 2ax, 2bl, 2blm, 2bnz, 2buy, 2cgi, 2cgj, 2crb, 2crv, 2fo, 2gk, 2kg, 2ld, 2mm, 3bck, 3bct, 3blp, 3bmz, 3cdv, 3ckj, 3hg, 3xav, 4io, 4je, 4jv, 4tv, 4ur, 4we, 6cto, 8ade, 8adg, 8avj, 8awa, 8bgn, 8bth, 8ces, 8cwk, 8dfk, 8dfn, 8dsm, 8eb, 8es, 9ccm, 9dmj, 9eji, 9mn, ntt, nisp, nve, nell (one), nabc, a3bd, bz1ap, bz1ia, z2xa, z2ac, z4al, rfb5, ch2ld, c1ar.

J. C. Wilson, Northwood, Middlesex, England

1ck, 1er, 1ga, 1pl, 1si, 1uw, 1vb, 1add, 1ajp, 1ana, 1axn, 1byx, 1caw, 1ckp, 1cmf, 1cmx, 2gk, 2mm, 2zb, 2ahm, 2apv, 2bka, 2bum, 2buy, 2cpa, 2cvu, 2cxl, 3hg, 3jw, 3lr, 3zo, 3auv, 3bta, 3cel, 4ask, 4rl, 4sa, 4ur, 5yd, 5xad, 8adm, 8aly, 8brc, 8buk, 8bvj, 8bvt, 9xn, 9cxi, nkf, nsf, ntt, nve, wap, wgy, wir, wqo, wvz, wiz, nisp, nisr, bz1ab, bzrgt, c1ar, raf1, rba1, v8e, a2cm, a5bg, z1ax, c2ac, z2ae, z4ac, z4ag, z4al, z4ar, be ber.

f8CA, R. Audureau, rue Bretagne, Laval, Mayenne, France

1aac, 1aae, 1aao, 1aap, 1aau, 1ab, 1abp, 1aci, 1ack, 1ahg, 1aid, 1aiu, 1ala, 1ald, 1ali, 1air, 1an, 1aoz, 1are, 1arh, 1asg, 1asi, 1atg, 1auc, 1avf, 1awe, 1bad, 1bbx, 1bxl, 1bqi, 1bs, 1bt, 1bzp, 1caw, 1ch, 1ck, 1ckp, 1cmb, 1cmf, 1cmg, 1cmq, 1cmx, 1dhs, 1ef, 1ga, 1gb, 1gw, 1jr, 1ok, 1or, 1pl, 1qm, 1rf, 1rm, 1si, 1sw, 1ue, 1uw, 1vc, 1xm, 1xu, 1yb, 1za, 2aar, 2acs, 2aei, 2ago, 2ahm, 2aia, 2aim, 2aiu, 2akb, 2aky, 2ar, 2axf, 2bbc, 2bbx, 2be, 2bec, 2bir, 2bkr, 2bm, 2brb, 2bxj, 2ca, 2ceo, 2co, 2clg, 2crb, 2cte, 2cv, 2cvj, 2cur, 2cvs, 2cvu, 2cxl, 2czr, 2eo, 2ffa, 2fo, 2gk, 2hj, 2jz, 2kr, 2kx, 2kz, 2ld, 2nd, 2nw, 2rb, 2sp, 2sz, 2we, 2wr, 2xac, 2xm, 2zv, 2zx, 3ade, 3afq, 3ahp, 3as, 3be, 3bl, 2bmc, 3bx, 3ca, 3cdv, 3cel, 3en, 3gb, 3il, 3lw, 3pb, 3pw, 3yu, 4aap, 4bu, 4cu, 4du, 4jv, 4rr, 4sb, 4tv, 4ua, 4ux, 4za, 4agn, 5ah, 5atx, 5hq, 6dxa, 6ry, 8ada, 8adm, 8ago, 8akk, 8aul, 8awa, 8bq, 8bon, 8boy, 8buk, 8buy, 8byn, 8cau, 8ccr, 8cgr, 8don, 8es, 8gz, 8ks, 8rv, 8xp, 9adt, 9aic, 9aoy, 9afq, 9bby, 9ced, 9cmf, 9cur, 9deq, 9eji, c1ar, c1ei, c2fo, rcb5, pr4ur, cr4sa, bz1ab, bz1ac, bz1af, bz1an, bz1ai, z2ac, z2ae, z2xa, z4aa, z4as, z4av, a2tm, a2yi, a3ak, a3bd, a3bm.

C. W. Bailey (at Triesta, Italy) U.S.S. Scorpion c/o Postmaster, New York City

1aao, 1aci, 1amf, 1ana, 1ap, 1bes, 1boq, 1ccx, 1ch, 1ckp, 1cmf, 1cmx, 1ht, 11w, 1or, 1pl, 1rr, 1vc, 1yb, 1za, 2aim, 2ahk, 2ahm, 2a1a, 2apv, b2bx, 2bee, 2bir, 2bkr, 2b1, 2bm, 2bum, 2bw, 2cvj, 2cx1, 2fc, 2fo, 2gk, 2jz, 2we, 2zv, 3afg, 3aih, 3blp, 3hg, 3lw, 3zo, 4aoj, 4io, 4je, 4jr, 4kt, 4oa, 4oi, 4rl, 4rm, 4sa, 4ur, 5ac, 5atp, 8adm, 8awa, 4brc, 8es. Navy: naw, nel, nism, nisr, nkf, nrrl, nsf, nve, napr. Cuban: 21c, 2mk, 2uk. New Zealand: 2ac, 2ae. Norkegian: a4ax, ??? ylar. All cards qsl'd.

1ER, Ing Santangeli Mario S. Eufemia, 19 Milano, Italy

1aap, 1af1, 1aiu, 1ape, 1bad, 1ba1, 1bcg, 1bz, 1fj, 1gh, 1nel, 1qb, 1rf, 1si, 1ur, 1xan, 2afg, 2agt, 2aho, 2akb, 2aky, 2aiu, 2auo, 2bc, 2bck, 2bit, 2bs1, 2crb, 2ff, 2jq, 3abj, 3auv, 31r, 3wn, 3zm, 4aah, 4er, 41v, 4rm, 4rz, 4si, 5ip, 8aly, 8by, 8cvd, 8ek, 9adk, 9a1, 9dbw, 9dfj, 9se, 9yav, rga2, a3bd, a6ag, bz1ac, bz1ax, bz1ed, bz1ia, bz1ic, c1ak, c2fo, m1aa, z4av. Palestine: 6yx, pinuqg, ane, nkf, app, nirs, nsf, nve, nisp, emta, ghz, fw, wqo, wir, wap, wnp.

Richard E. Clarke, ss Yorba Linda, vicinity of Panama Canal

1ef, 1hi, 1hj, 1ja, 1oh, 1qm, 1rb, 1rr, 1se, 1si, 1sz, 1xu, 1za, 1aci, 1ahi, 1ahl, 1axn, 1ayg, 1bad, 1bho, 1bpb, 1bzp, 1cal, 1caw, 1ckp, 1cmf, 2bl, 2bw, 2eb, 2eo, 2ff, 2gk, 2hs, 2jw, 2kg, 2kr, 2mk, 2ph, 2uk, 2aky, 2auh, 2bkf, 2bsc, 2cei, 2cns, 2cqz, 2ctm, 2cty, 2cvj, 2cvu, 2cxl, 3jo, 3ll, 3lw, 3aep, 3auv, 3bct, 3bit, 3blp, 3bms, 3bwj, 3bwl, 3cdl, 3cel, 3ckl, 4av, 4bu, 4bw, 4ch, 4er, 4fl, 4fs, 4fu, 4io, 4iv, 4jv, 4ku, 4li, 4mi, 4ny, 4pz, 4rm, 4rr, 4sa, 4sb, 4tv, 4uk, 4ur, 4uz, 4we, 4aae, 4aah, 5bm, 5ew, 5gq, 5jd, 5jl, 5kw, 5nw, 5oq, 5ov, 5pi, 5sh, 5ux, 5yd, 5acz, 5aen, 5akn, 5akp, 5alz, 5ame, 5aph, 5apm, 5asd, 5asv, 5atk, 5atv, 6bq, 6hm, 6ih, 6kb, 6lr, 6nw, 6oi, 6qi, 6si, 6vc, 6vr, 6adw, 6agn, 6anp, 6api, 6bjx, 6bpn, hu6buc, 6end, 6con, 6cpf, 6csr, 6css, 6cwl, 6daa, 6dai, 6dag, 6zac, 7fb, 7hb, 7jm, 7ps, 7aek, 8bf, 8bt, 8eg, 8eq, 8ex, 8se, 8si, 8tx, 8uu, 8vx, 8ze, 8zu, 8ada, 8adg, 8apn, 8avk, 8bgm, 8bkh, 8bnh, 8bon, 8bpl, 8buk, 8bva, 8bww, 8byn, 8ccr, 8ced, 8clv, 8dea, 8dgp, 8djp, 9al, 9co, 9es, 9fl, 9gx, 9ix, 9mn, 9oo, 9qr, 9tj, 9wo, 9zd, 9aau, 9ach, 9adk, 9adr, 9aeb, 9aim, 9aio, 9alk, 9apn, 9bdw, 9beq, 9bht, 9biy, 9bjn, 9bmd, 9bna, 9bnf, 9bon, 9bpb, 9bqa, 9brk, 9brt, 9bsf, 9bva, 9bwx, 9cde, 9cfy, 9chi, 9civ, 9csa, 9css, 9ctg, 9ctr, 9cvn, 9cxx, 9dau, 9daz, 9dbw, 9dbz, 9ddh, 9deq, 9dks, 9dmj, 9dmz, 9dng, 9dof, 9dpj, 9dvi, 9eel, 9efs, 9efy, 9eji, 9yau, a2bc, a3ad, a3ak, a3ef, a5da, bz1ia, c1ar, c2be, c2fo, c3nf, f8dk, f8aix, f8tok, g2nm, g2qb, g2sz, m1aa, mib, mik, m1n, pr4sa, q2mk, ra4z, rcb8, rfb5, rfc6, z1ao, z1ax, z2ac, z2ae, z2aq, z2xa, z2br, z3af, z3am, z4ac, z4ag, z4ar, (zero1gw), zero2ld, ev8, fw, sgc, kfuh, nkf, npg, npm, npu, nism, nisp, nrdm.

L. Worthington, 92 Office Road, Merivale, Christchurch, New Zealand

1aac, 1aae, 1aaj, 1aao, 1aap, 1aay, 1abb, 1abd, 1abf, 1abr, 1abt, 1abx, 1aea, 1aet, 1aey, 1ahg, 1ahj, 1aht, 1ajg, 1ajo, 1ajt, 1ajy, 1ald, 1alk, 1alr, 1amn, 1ana, 1ang, 1anr, 1ant, 1are, 1arh, 1ari, 1ary, 1awa, 1awf, 1awr, 1awo, 1awp, 1awq, 1aww, 1axa, 1asm, 1axp, 1axz, 1azr, 1ban, 1bbc, 1bbe, 1bbi, 1bdx, 1bfb, 1bfq, 1bfy, 1bg, 1bgc, 1bgq, 1bgy, 1bie, 1bis, 1bjo, 1bjt, 1bkq, 1bkr, 1bkz, 1bq, 1bv, 1bz, 1caa, 1cab, 1cac, 1cat, 1cav, 1cay, 1cef, 1ccp, 1cco, 1ckq, 1cme, 1cmi, 1cmp, 1cmx, 1cog, 1coj, 1cox, 1crc, 1crd, 1cru, 1crx, 1et, 1ex, 1fa, 1fb, 1fd, 1ga, 1gg, 1gs, 1gcb, 1ii, 1ix, 1je, 1jc, 1gj, 11w, 1mi, 1mv, 1my, 1ow, 1pl, 1pq, 1py, 1qm, 1qy, 1re, 1rf, 1se, 1ts, -vf, 1wf, 1wl, 1wy, 1xj, 1xw, 1xz, 2aam, 2aan, 2abc, 2abd, 2abr, 2abs, 2abt, 2ach, 2adc, 2adj, 2adm, 2afh, 2afq, 2agb, 2agj, 2amm, 2amn, 2amo, 2ama, 2anm, 2anp, 2aoo, 2aow, 2awf, 2awh, 2axi, 2awm, 2axx, 2azy, 2bba, 2bbc, 2bbn, 2bbo, 2bgg, 2bgi, 2bgo, 2bkr, 2bkx, 2bob, 2bop, 2box, 2bqb, 2bqc, 2bqf, 2bqu, 2bgw, 2brz, 2bsc, 2bum, 2byk, 2cyu, 2oxv, 2wry, 3aa, 3ab, 3adb, 3ade, 3adq, 3adt, 3apv, 3aqr, 3aur, 3bdi, 3dxz, 3mf, 3ot, 3qt, 3sd, 3sf, 3sp, 3sq, 3wn, 3wx, 3yo, 3yx, 4ai, 4al, 4az, 4do, 4dq, 4eq, 4fd, 4fs, 4fz, 4fq, 4go, 4qw, 4io, 4ij, 5ba, 5bc, 5sd, 5sm, 5sp, 5uk, 5ym, 5xa, 5zai, 5zas, 5zax, 6aam, 6aao, 6afq, 6agk, 6aji, 6ami, 6amo, 6ape, 6apw, 6ase, 6asv, 6awt, 6bbw, 6bbx, 6bcp, 6bgc, 6bik, 6bim, 6bjj, 6bka, 6blw, 6bni, 6bny, 6bpf, 6bra, 6buh, 6bur, 6can, 6cc, 6cfs, 6cgo, 6cgw, 6cjb, 6cmi, 6cnl, 6cnn, 6crx, 6csr, 6css, 6ctc, 6ctn, 6cto, 6cym, 6cwi, 6cxx, 6dn, 6ea, 6ew, 6ji, 6of, 6oi, 6ox, 6pl, 6rn, 6ts, 6vc, 6vd, 6wl, 6wt, 6zh, 7aiv, 7apo, 7cy, 7df, 7dj, 7gb, 7ij, 7mg, 7mp, 7pd, 7so, 7sy, 7zq, 8abm, 8aly, 8amr, 8bbw, 8bff, 8cei, 8cyi, 8eww, 8dea, 8ede, 8gz, 8kc, 8mc, 8tt.

a3LM, B. J. Masters, 16 Sutherland Rd. Armadale Victoria, Australia

1am, 1emp, 1her, 1uw, 2ahm, 2agq, 2brb, 2xaf, 2wc, 2wr, 3abt, 2hm, 3jo, 3ot, 4io, 4rm, 4ak, 5aal, 5ael, 5ew, 5rg, 5ak, 5wi, 6ajl, 6ahp, 6alr, 6aff, 6awt, 6avi, 6bmw, 6buc, 6cgw, 6chc, 6cu, 6ew, 6js, 6ts, 6zac, 6xap, 8er, 8cr, 8gz, 9ahq, 9bce, 9bnf, 9czz, 9dwy, 9ded, 9dng, 9uq, 9xn, 9xns, 9zt, nrri, ane, npu, wiz, kel, kdka, pilhr, g2lz, g2sz, g2od, g2nm.

Communications

The Publishers of QST assume no responsibility for statements made herein by correspondents

Recognition for Our Traffic Manager

Navy Department,
Washington, D. C.

My dear Commander Maxim:—

Lieutenant F. H. Schnell, U.S.N.R.F., has been detached from temporary duty in the Navy Department where he has been serving in an advisory capacity upon return from his cruise to Australia with the U.S. Fleet. He has been ordered to his home in Hartford, Connecticut, to be released from active duty.

Lieutenant Schnell's services to the Navy have been invaluable. It is considered that largely through his efforts high-frequency radio is now definitely in the Navy, both ashore and afloat. It is expected the advantages which will accrue to the Navy and the Government through adoption of this method of communication will be very great.

Lieutenant Schnell has performed his duties to the entire satisfaction of the Navy Department and to the Commander-in-Chief, U. S. Fleet. I wish to extend to you and the American Radio Relay League the thanks of this Department for permitting Lieutenant Schnell to take this cruise which has enabled him to do such splendid work for us. It is a pleasure to inform you that Lieutenant Schnell has been recommended for promotion to the rank of Lieutenant Commander in the Reserve, as an indication of the Navy Department's keen appreciation of his conspicuously valuable services.

—*E. W. Eberle.*
Admiral, U. S. Navy,
Chief of Naval Operations.

Breaking Into the Game

737 Bryant Street,
Stroudsburg, Penna.

Editor *QST*:

I was very much interested in your article "Making a Brass Pounder" in the November issue of *QST*. There are a large number of B.C.L.'s who have made receiving sets and who would become hams if they knew just what to do and how to go about it. There is a lot of information being given, but in most cases it is too deep, at least that is the way I find it.

I think it would be a great thing if you had a section in *QST* for "rookies", giving them suggestions and instructions of a simple nature to get started with. In time this would be a complete manual for the beginner. Perhaps this has been done in the past before my time as an A.R.R.L. member. If so please excuse this note.

—*H. E. Brown.*

(Editor's Note: Letters of this type together with any suggestions or comments are always welcome. Anyone desiring to get started in the "ham game" should get in touch with our Mr. Handy, c/o A.R.R.L., whose main purpose in life is to help fellows of this type. He is preparing a handbook which will fully explain the "hows and whys" of the transmitter and will enable the beginner to get started quickly along the right lines. Upon completion the Handbook will be announced in *QST*. Watch for it.)

"ANE"

U. S. Naval Radio Station,
Los Banos, Laguna, P.I.

Editor, *QST:*

In the September issue of *QST* I note that under "strays" 7QD reports ANE, whose QRA he does not know. We have daily schedules with PKX who is at Malabar in the Dutch East Indies. He uses the call PKX on his 15,500 meter wave when working us. He uses ANA working with Holland, but when he works either of us on his 6,000 meter alternator he uses ANB as a call. Lately he has been working regular traffic with KIE at Honolulu or JAA occasionally, and on high frequencies and on these schedules he uses the ANE that 7QD heard. An inquiry as to what sort of apparatus he is using might bring an interesting reply, as we find the operators there very obliging to work with and their high frequency set is a marvel for tone and steadiness.

—*M. M. George, NPO.*

QSL Cards

1718 South 14th Street,
Lincoln, Nebraska.

Editor, *QST:*

Let me propose that all of our QSL cards be provided with a line similar to the following: "The greatest weakness of your signals seems to be....." The blank space to be filled in by some such comment as poor sending, rough QSB, shifting wave, swinging signal, poor spacing, dots too long, etc.

In looking over the whole thirty cards I received this fall since dropping to 40 meters I find that fifteen hams made complimentary

remarks such as VY FB, GUD QSB, etc.; fourteen did not commit themselves at all, and one lone OM had the goodness to tell me that my wave had a tendency to climb. Couldn't our QSL cards be made much more useful if they had a partially completed line with a blank space printed on the card such as I suggested above? The personal element would be partially eliminated and some of us hardened persons would be able to tell the truth. Listen in on 40 meters any nite and see if you couldn't suggest some badly needed improvement in the signals or sending of nearly half the stations you hear.

—*Louis F. Leuck, 9ANZ.*

Good Dope

Editor, *QST:*

I would like to make a suggestion which may help a lot of the O.R.S. fellows in handling traffic. I have a Parcel Post map as arranged by the Postal Department. This map, as you may know, has only the more important cities of the U.S. of each state marked on it. It is also cross ruled with horizontal and perpendicular lines. The squares thus formed are each numbered. In a book issued by the Government there is a complete list of all Post Offices in the U.S. and provinces. These offices are given a number that corresponds to a similar number found on the squares on the map. It is particularly easy to find the QRA of a station by referring to the book and then to the map. When I get a message to QSR I am able to tell the station I may give it to near what principal city its ultimate destination is.

In addition the DX in miles may be computed easily by the simple process of subtraction of numbers appearing at the top of the map on the perpendicular line above your QRA square from those above the station you have worked. I have also found it interesting to mark all squares worked with red ink. It will surprise you to see how these squares will cluster at different points of the compass.

—*R. W. Hill, 8BRO.*

Radio Power Transmission?

Boonville, N. Y.

Editor, *QST:*

In regard to loss of energy by induction from a radio transmitter into the power lines, Mr. H. M. Hucke, 6BUD-6CHF, in a recent issue of *QST* did very well as far as he went by putting chokes in all the leads to the transformer when trying to keep R.F. out of the lighting circuit. Here, some time ago, I thought that I might be wasting a lot of power into the lights in the barn since the drop wire from the house to the barn paralleled the antenna for some distance, so I cut off the drop wire, isolating it electrically from the house. When working the 50 watter overloaded I noticed that the barn lit up despite the fact that there was no wire between the light and the power line!

As so many of us are using low power and do not have enough of a wallop to light the lights (although the losses may be there just the same), why not use a small milliammeter across each light plug (with the current OFF, of course) to see what circuit, or circuits, are in resonance with the transmitter. Try it in every socket in the house and then you will have a better idea where the R. F. chokes should be placed.

—*Ray Schweinsberg, 8BMN.*

Please Heed This

Editor, *QST:*

It has been my lot to notice bug sending on various circuits, Western Union, Railroad and Postal, and also over radio. The bug was primarily designed to send out a more standardized class of signals (and to eliminate "fists".—Ed.), but the secondary matter which is the most important on the wire circuits is to replace the broken down nerves in a man's arm. Quite a few of the old-timers in radio and lots more on the wire are forced to use a bug because of "glass arm", commonly noticed by the operator's inability to grip the telegraph key knob.

Ever since I was forced to use a bug due to failure of my hand about twelve years ago I have found that to use the bug *that is adjusted to run no faster than you are used to sending by hand* is the best gait for any and all. The general rule with the Western Union is that the bug shall be so adjusted that it will make approximately eleven dots per second and the stationary contact or the vibrating side of the bug shall be so set to pass half the normal current. Place the bug in a circuit in series with a milliammeter and adjust the circuit so that 60 milliamperes will be flowing when the dash side of the bug is closed. When the dot lever is pressed there should be a current of 30 milliamperes through the circuit. If there is not the stationary contact on the vibrating side should be adjusted.

So far so good. This adjustment is suitable for more wires where the losses due to absorption are nil. When this adjustment is used on a radio set you will find it to be entirely too "light". There are two possible ways to overcome this to a fair degree. One is to throw the speed control weight way out to the end of the vibrating arm. It will be preferable to have *two* weights securely anchored to the arm. The bug should now pass 40 milliamperes through a 60-milliampere circuit. The final test is to

see whether or not the signals, as reported by a man 300 miles away, are clear and clean cut. The receiving operator should be a naturally slow receiver. You are now OK providing you do not make a lot of combinations.

The second means of placing firm signals on the air is to have a relay circuit with contacts large enough to pass the full amount of current on short dots, a thing that is difficult to achieve unless you are good at matching contact points with a contact file.

A good reminder: Don't try to use a fast bug and don't try to "push" a slow bug by jamming letters together, and above all listen to your own sending.

—*E. M. Doane.*

The Other Side

New York City

Editor, *QST:*

In your issue of November, on page 60, the writer read with much interest your article entitled "Eagle Eyes", signed by Mr. A. H. Morse, R.M., Radio Ltd. It is a simple matter for authors to blame their mistakes on publications, but in fairness to *Radio News* the writer trusts that you will give our side of the story.

Radio News contracted for a series of articles which were prepared for book form, and instead of sending us the usual manuscript, the author sent us the printed pages of the book itself, in their rough form. We enclose, herewith, the page from which the manuscript was set up, and from which you will see that the mistake did not originate with *Radio News.* Of course our proofreader should have known better than to run this, but before making rash statements, Mr. Morse should have looked at his manuscript.

—*H. Gernsback,*
Radio News.

Standard Waves

Communication for Jan. QST—

Cambridge, Mass.
Nov. 27, 1925.

Dear Editor:

The beginning of u1XM's Standard Frequency Transmissions in January will probably bring an avalanche of QRH?'s from stations working 1XM. Let me explain that our Standard Transmissions are measured at some distance from the transmitter, and special telephonic connections must be established between the Communications Laboratory where the Standard Frequency meter is kept and the radio station. Thus our answer to a QRH? over the air cannot be expected to have an accuracy better than as shown by an ordinarily good meter.

—*Killian V. R. Lansingh,*
Chairman Standard Frequency Committee.

THE EPOM RECTIFIER AND FILTER

(Continued from Page 43)

the same as is used in Western Electric transmitters. The Epom device is also made

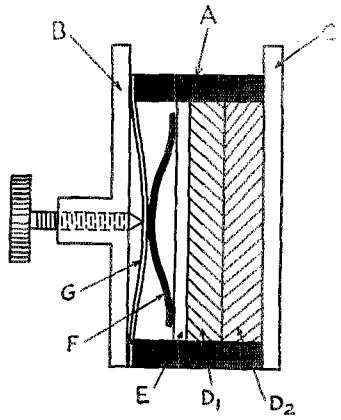


FIG. 4

FIG. 4 THE SPECIAL DETECTOR PLATE RHEOSTAT.

This rheostat is R2 in Fig. 2. Placed in series with a model 1 Weston voltmeter across a 110 volt line this rheostat enables smooth regulation of the voltmeter reading down to values as low as one-half volt. This represents a smooth operating range of better than 50 to 1, a very excellent performance.

A, Insulating shell.
B, Upper plate, forming one terminal and carrying compression screw.
C, Lower plate forming other terminal and having silver-plated contact surface facing resistance material.
D1 and D2, Discs of moulded resistance material.
F, Spring.
E, Silver-plated brass disc.
F, Spring.
G, Fairly stiff spring disc to "give the screw something to work against" and thereby remove slack.
The drawing is not to scale and illustrates the principle rather than the actual construction.

without the B terminal and the resistance R3. For transmission purpose one can as well omit R2, C4 and possibly L2 and C3.

EXPERIMENTER'S SECTION REPORT

(Continued from Page 40)

For large filter condensers the present unit would be used, with no more confusion than when we use yards and miles for calculating distances.

The microhenry is O. K. for size, but why keep the long name for that either? As to the names for these two units, let's take "Max" for one of them; a contraction of the name of our A.R.R.L. President, as Farad is of that of Michael Faraday. A similar contraction of the name of some prominent man of the Bureau of Standards who

has done work useful to us could be chosen for the other.

A page in *QST* should then be given to a brief explanation of the new units, and to a few of the most-used formulae of inductance, capacity and wavelength adapted to their use. This should be kept in as part of the paper for five or six issues, for the benefit of new readers. If the units were used regularly in *QST* articles, with an occasional note referring the reader to the page of explanation, a few months would see the good deed accomplished and "Micro Mike" laid to rest.

—*K. P. Griffith, 9EJQ.*

Strays

The gang are missing a lot of answers to their CQ's from foreign stations by not listening outside of the U.S. bands. Many foreigners can be found around 35 to 37 meters and 43 to 48 and 49 meters and also a little above our 85.6 wave. bW2 in common with a lot of other Europeans complains that his answers to American CQ's go unheeded, although he answers by the hour. Being a little off our bands the foreigners are out of our QRM and it is perfectly easy to copy them at great length with little or no QRM, once you have found them. i1ER can be heard almost every night "clanking" away on 36 meters, calling U.S. stations, but he does not connect nearly as often as he should. Tune around, OM. Fish for them.

When the Bowdoin put in to Sidney, Cape Breton, the hams staged a banquet for John Reinartz. About 40 of them gathered at the Boscobell Cafe where eats were served in grand style. The affair proved a success from start to finish. Ham talk floated through the cigar smoke on all wavelengths. Reinartz gave a blackboard talk after which some of the hams went down to the Bowdoin to see the big bottles (vacuum) that WNP carries. When they found that there were fourteen on board the rifle over Kewpie's bunk was all that saved the tubes!—c1CE.

What a Definite Policy Proved

It is the policy of the Daven Radio Corporation to manufacture precision products which permit of no deviation. Daven Resistors and Grid-Leaks are guaranteed within 10% of rated value — Sleeper says we do better.

Daven

M. B. SLEEPER, Inc.
TECHNICAL PUBLISHER
52 VANDERBILT AVE.
NEW YORK

Radio Engineering Magazine

Books of Technical Accuracy for Experimenters

July 14th,
1925.

Daven Radio Corp.,
158 Summitt Street,
Newark, N.J.

Dear Mr. Frasse:-

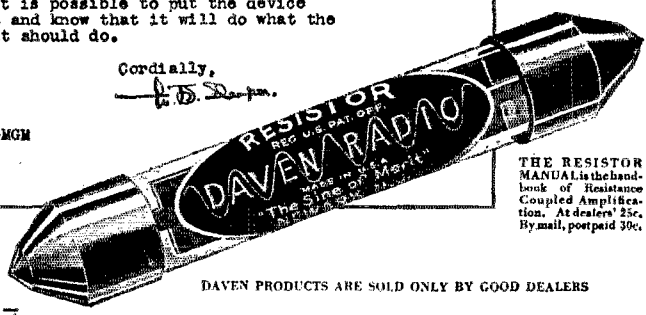
I gave myself a very pleasant surprise last evening. After reading Ghirardi's * story about the method you employ in the manufacture of gridleaks, I thought just for fun that I would check up on you. Accordingly, I measured about fifteen Daven gridleaks of various sizes and found, much to my surprise, that every one that I tested was within 5% of the rated value.

It is very encouraging to think that, slowly, we are getting production on some parts, at least, to a point of perfection where it is possible to put the device in a circuit and know that it will do what the label says it should do.

Cordially,

M.B. Sleeper-MGM

*In March, 1925 issue of Radio Engineering



THE RESISTOR MANUAL is the handbook of Resistance Coupled Amplification. At dealers' 25c. By mail, postpaid 30c.

DAVEN PRODUCTS ARE SOLD ONLY BY GOOD DEALERS

"CLIP THIS COUPON"

DAVEN RADIO CORPORATION,
158 Summit Street, Newark, New Jersey
Please send me the following on Resistance Coupled Amplification:
Check one. ☐ Resistor Manual. 30c is enclosed. ☐ Complete catalog (free).

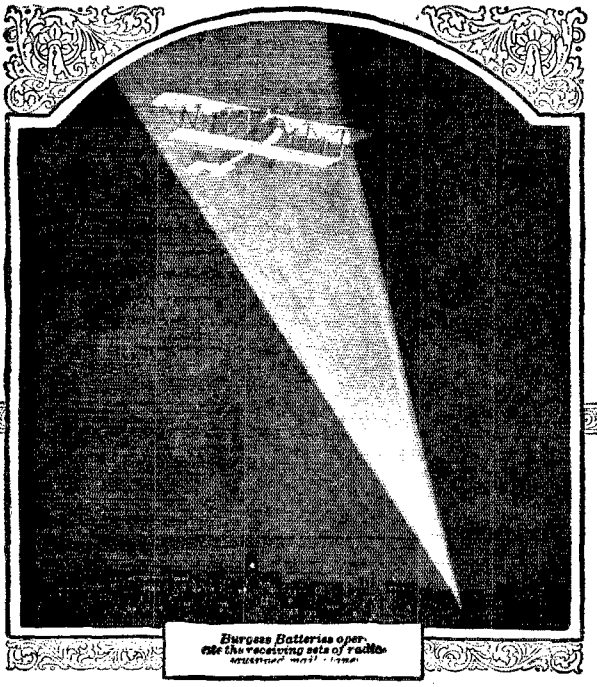
Name .....

Address .....

For dealers! Send your letterhead or card, or this coupon and we will have our nearest distributor communicate with you.

"The Sine of Merit"
DAVEN RADIO CORPORATION
Resistor Specialists
Newark Reg. U. Pat. Off. New Jersey

THE BIG LITTLE THINGS OF RADIO



An every-night adventure of Burgess Radio Batteries

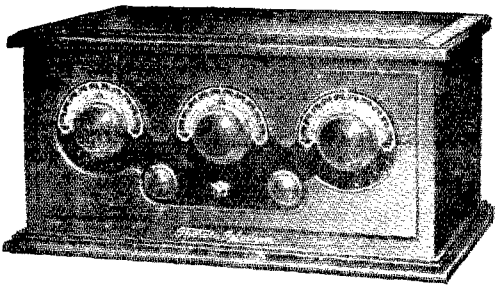
ONE of the reasons why you should always buy Burgess Radio Batteries is that the batteries used by air-mail pilots—battleships—explorers and the majority of recognized radio engineers—are evolved in the Burgess Laboratories and manufactured in the Burgess factory.

These batteries are identical with the batteries sold by your dealer and thousands of other good dealers everywhere.

Ask Any Radio Engineer

BURGESS BATTERY COMPANY
GENERAL SALES OFFICE: CHICAGO
Canadian Factories and Offices: Niagara Falls and Winnipeg

BURGESS RADIO BATTERIES



Must Outperform

The Most Positive Radio Statements You Have Ever Read

Thorola Islodyne receivers must outperform any other set you listen to, regardless of price, tube-power or circuit. Any Thorola merchant lets you challenge this in home or store.

Thorola outperforms with Thorola Low-Loss Doughnut Coils, the basis of the exclusive *Isolated Power* principle. Interference, excess static, maddening "pick-up" are *designed out* of this receiver. Full, undissipated power behind the one sharply selected station, wells up the volume, far extends range, and keeps out tone impurities.

Thorola outperforms *by several times the efficiency*, in many cases, on the difficult higher wave lengths. Thorola outperforms with truest "straight-line" characteristics. Thorola outperforms with lower internal resistance. That's Thorola design and construction—great steps ahead.

Creating and manufacturing our own products in our own great plant, far ahead in experience and technique, we are able to give you super-radio at the price of average receivers!

Take us at our word. You cannot know what radio should be — you do not know what magnificent radio you can afford — until you hear a Thorola Islodyne receiver.

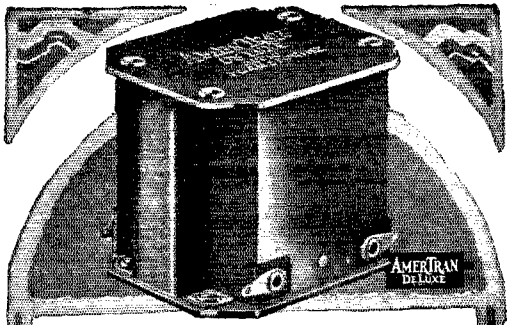
OUTSELLING
Several Times Over

Thorola Loud Speakers outsell *every other kind* — *even* 2 or 3 to 1 in many great radio centers. Thorola Speakers, foundation of Thorola reputation, express the superiority of the entire Thorola line.

REICHMANN COMPANY, 1725-39 W. 74th St., *CHICAGO*

5-tube Thorola Islodyne Receivers, Walnut Cabinet	$100	5-tube Thorola Islodyne Console	$225	Thorola Low-Loss Doughnut Coils (set of 3)	$12 Each $4
5-tube Thorola Islodyne Receivers, Thorocco Cabinet	$85	Thorola Loud Speaker Model 4	$25	Thorola Low-Loss Straight Line Frequency Condensers	$5.50 and $6
5-tube Thorola Islodyne Receivers, Mahogany Cabinet	$85	Thorola Jr. Loud Speaker	$15	Thorola Golden Audio Reproducing Transformer	$4.50

Thorola Islodyne



Volume with True Quality!

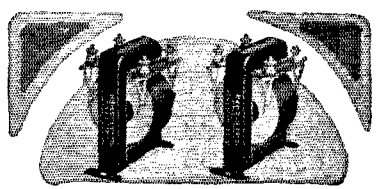
THE value of radio as an entertainer increases only with the realism and quality of reception. This requires good broadcasting—reception and amplification equal to, or better than, the broadcast range of audio frequencies—and a loudspeaker of uniform response over the same range. Heretofore one of the weak links in this chain has been the audio amplifier.

But it is now possible with AMERTRAN De Luxe audio transformers to obtain faithful, strong reproduction over a range of frequencies down to the lowest pitched audible sound. *This is nearly three octaves lower than that previously obtained.* The deep boom of the drum, the thrum of the base viol, and the thunder of the pipe organ are reproduced with startling realism—and at no sacrifice of the highest notes within the audible range. Once tried, the AMERTRAN De Luxe will be recognized as setting a new high standard of excellence in audio amplification.

AMERTRAN DeLuxe requires no special circuit other than the use of a large tube in the last stage to prevent overloading at the low frequencies bought out. It is made in two types.

Price, either type, $10.00

AMERICAN TRANSFORMER COMPANY
178 Emmet Street, Newark, N. J.
"Transformer builders for over twenty-four years"
SOLD ONLY AT AUTHORIZED AMERTRAN DEALERS



AMERTRAN Audio Transformers type AF6 (turn ratio 5) and AF7 (turn ratio 3½) have been substantially reduced in price. As before, they are today the leaders in their class. No changes have been made in the electrical characteristics since they were first sold. Either type now $5.00.

We have prepared a booklet describing these and other AmerTran products, together with recommendations for their use. We shall be glad to send you a copy upon request.

Be sure to see the other AmerTran ad on page 70

HERE IT IS!

What Every Amateur Has Been Waiting For!

The International Amateur Radio Call Book

Contains up-to-date lists of amateur calls—both official and unofficial, for the following countries:

Argentina, Australia, Belgium, Bermuda, Brazil, Canada, Chile, Costa Rica, Cuba, Denmark, England, Finland, France, Germany, Holland, Iceland, India, Ireland, Italy, Luxembourg, Madeira, Mexico, Morocco, Newfoundland, New Zealand, Panama, Paraguay, Philippine Islands, Rhodesia, Russia, Salvador, South Africa, Spain, Sweden, Switzerland and Uruguay. (U.S. calls not included).

3700 Calls in 36 Different Countries

Not only gives official and provisional calls, but tells you where to send QSL cards for unofficial unlisted calls for Belgium, Germany, France, Holland, Italy, etc.

Compiled and published by amateurs for amateurs.

Sent Prepaid to any country in the World for 50 cents in American funds or equivalent.

THE INTERNATIONAL CALL BOOK CO.
Drawer 205, Station "A" Hartford, Conn.

EAGLE

NEUTRODYNE

All That's Best in Radio

Eagle Performance is based on Quality Parts, Expert Workmanship, and Thorough Inspection.

Ask Your Dealer

EAGLE RADIO COMPANY NEWARK NEW JERSEY

EAGLE RADIO COMPANY
23 Boyden Place Newark, N. J.

Says **Dr. Lee de Forest—**

"Ray-O-Vac Batteries most nearly approach my standard of requirements"

INDUSTRIAL DEPARTMENT

DE FOREST PHONOFILMS, INC.
45 WEST 45TH STREET
NEW YORK

LEE DE FOREST, PRESIDENT — TELEPHONES: BRYANT 4685 4686

November 27th, 1925

Mr. G. Charter Harrison,
French Battery Company,
Madison, Wis.:

Dear Mr. Harrison:

Seeking the best that the market provided in a dry battery—one giving the most uniform and level voltage, combined with low internal resistance and greatest life—I have come to use the French Battery Company's products because they most nearly approach my standard of requirements.

I am using practically every type you manufacture in some phase of my laboratory and research work and in connection with my Phonofilm or talking motion picture amplifier and in radio reception experiments with the Audalion (my latest invention, incidentally), a new type and theory of loud speaker. Sincerely,

Lee de Forest

Lee de Forest: DCL

Lee de Forest, Ph. D., D. Sc.

Dr. de Forest is the *father of radio broadcasting*. All radio broadcasting apparatus is built upon his audion inventions. The audion or three-electrode vacuum tube made the universal use of radio practical. Since 1919 Dr. de Forest has been engaged in perfecting the phonofilm — photographing sound waves directly on motion picture film, or talking motion pictures. The voice-reproduction device of this instrument is shown in the photograph. Dr. de Forest is President of De Forest Phonofilms, Inc., New York City.

There are Ray-O-Vac dealers in every community. They also handle Ray-O-Lite flashlights and flashlight batteries (ideal Christmas gifts). If the stores where you ordinarily buy do not have Ray-O-Vac radio batteries, write or telephone us for the name of the nearest dealer or jobber who can supply you.

FRENCH BATTERY COMPANY
MADISON, WISCONSIN
Chicago Office: Conway Bldg.
Franklin 2240

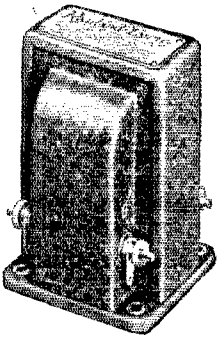
Ray-O-Vac "A" batteries recuperate during rest periods, lasting longer and giving excellent reception.
Ray-O-Vac "B" batteries in all standard sizes, both flat and upright.
Ray-O-Vac 4½ volt "C" batteries with 3 variable terminals give voltage adjustment of 1½, 3 and 4½ volts.

ALSO MAKERS OF RAY-O-LITE FLASHLIGHTS AND BATTERIES

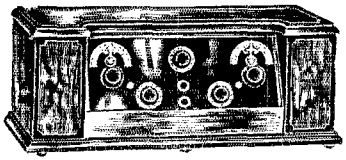
When a Finer Transformer Is Made It Will Bear This Name-Plate

Radio moves rapidly. Perhaps some time there may be seen a *better* transformer than what we *now* know as Rauland-Lyric. It may sell at $9, or $10, or $15, or $7. But the careful observer of the past year's developments will entertain not a moment's doubt of one thing: when the better transformer comes it will come beneath the famous Rauland-Lyric name-plate. Behind this as a pledge rests the entire organization and resources of the All-American Radio Corporation

Rauland-Lyric is easily obtainable from better-class dealers everywhere. The price is nine dollars. Descriptive circular with technical data may be had on request to All-American Radio Corporation, 4201 Belmont Avenue, Chicago



Rauland-Lyric tone quality is now available in a complete receiver: the new All-American Model R (a five-tube tuned-radio-frequency set) now being shown. If your preferred dealer does not display it, send to us for descriptive booklet



Crosley
Super-Tirdyn Special

The improved Super-Tirdyn panel is assembled in a new solid mahogany cabinet finished in duotone. This cabinet with its striking lines and simple detail decoration is of ample size to house all dry batteries required for dry cell tube operation.
$60.00

Performance
That Has No Peer In Any Field of Radio

Since the announcement of the present new Crosley models, Crosley sales have been leaping to sensational figures, literally taxing the production facilities of all Crosley plants.

This new leadership in sales is based on Crosley's new leadership in value; and this latter resolves itself into two simple propositions:

Crosley sets consistently deliver a performance that has no peer in any field of radio—and this matchless performance is offered at the lower prices that only the economies of tremendous production make possible!

On this page are shown four of the new Crosleys—the two famous Super Tirdyns and the two Special De Luxe models. Not only do they offer an effective beauty and accurate workmanship but they provide a performance that cannot be surpassed in the $23.50-$60 price range or many dollars above it!

Make your own comparison on the basis of selectivity, distance, clarity, and volume. Place the competing receivers side by side with lead-ins from the same antenna, and put them through their paces.

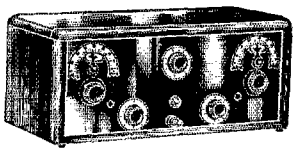
Forget the radical difference in price. Reach your conclusion solely on results. Then and only then will you understand why thousands upon thousands of radio buyers are singling these Crosleys out of the entire field—unwilling to pay more because a greater investment cannot provide greater enjoyment.

See the complete Crosley line at the nearest Crosley dealer's. Address Department 18 for his name and our illustrated catalogue.

THE CROSLEY RADIO CORPORATION
CINCINNATI, OHIO.
Cable Address: Listenin-Cincinnati

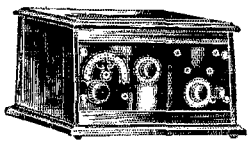
Owning and operating WLW, first remote control superpower broadcasting station.

Crosley manufactures receiving sets which are licensed under Armstrong U. S. patent No. 1,113,149 and priced from $9.75 to $60.00 without accessories. None of the prices quoted include batteries, tubes, headphones, etc. Add 10% to all prices west of the Rocky Mountains.



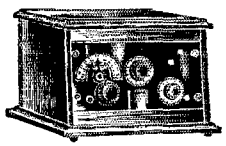
Crosley
Super-Tirdyn Regular

Incorporating the famous Tirdyn hook-up, this set brings in stations sharp, clear and mellow on the Musicone. The cabinet is of oil rubbed solid mahogany, exquisitely simple in design and beautifully finished. For sheer performance under all conditions the Super-Tirdyn cannot be surpassed. **$45.00**



Crosley
3-Tube 52 S. D.

In this improved model are introduced radical refinements that increase its general efficiency. Refinement of parts and improvements in design have made it a truly remarkable value considering its nominal price. Genuine Armstrong regeneration with the double circuit to reduce radiation to a minimum. Beautifully proportioned with attractive sloping panel. Cabinet holds all necessary dry cells. A genuine long range radio, easy to tune, easy to enjoy, and easy to pay for **$32.50**

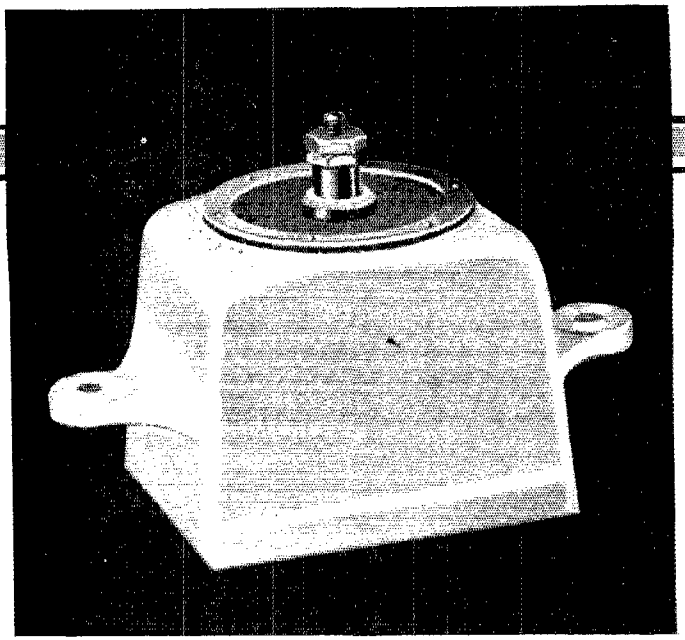


Crosley
2-Tube 51 S. D.

This superb long range set combines Armstrong regeneration and one stage of audio frequency amplification. The handsome mahogany finished cabinet, with sloping panel, holds all required dry batteries. Improvements include new worm type tickler, new vernier plate condenser, and a double circuit to minimize radiation. Unusual selectivity and distance, extreme accuracy of control. **$23.50**

CROSLEY·RADIO

BETTER · COSTS LESS



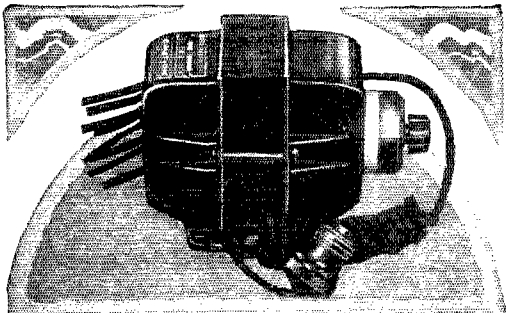
For Better Amateur Transmission!

The Dubilier Mica Electro-Static Condenser—type 663—is another step forward—towards that vital goal—perfect transmission—at all times—under all circumstances.

Dubilier condensers have always played a large part in the development of radio—better radio. And each new condenser—an improvement on one made before—is a contribution of value and importance to radio science.

Dubilier

CONDENSER AND RADIO CORPORATION



A Real Power Transformer

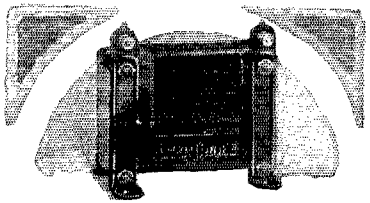
The modern home may now utilize its electric service for the operation of a Radio Receiver. Reception is greatly improved when efficient B and A eliminators are employed to use this steady power.

The AmerTran Power Transformer Type PF-45, 65 VA—60 cycles 110 volts primary, 450-8/4-8/4 secondary, is intended for use in converting the standard 110 volt, 60 cycle alternating house lighting current to a higher voltage for the plate and low voltages for filament supply. It can be depended upon to give good results when used in connection with the different tubes now available and is designed with the usual margin of safety. It is a real power transformer, in design, construction and usefulness.

The AmerTran Power Transformer Type PF-52 is another transformer of the AC Power Type similar to Type PF-45 except that it has a plate winding for 525 volts AC and a metal ground shield between the primary and secondary windings.

Price: TYPE PF-45 $15.00 ~ TYPE PF-52 $18.00

AMERICAN TRANSFORMER COMPANY
178 Emmet Street, Newark, N. J.
"Transformer builders for over twenty-four years"
SOLD ONLY AT AUTHORIZED AMERTRAN DEALERS.



The AmerChoke Type 854 is a choke coil or impedance of general utility designed primarily for use in filter circuits. It has a current capacity up to 60 milliamps. and a no load inductance of approximately 100 henrys at 60 cycles. Price $6.00 each.

We have prepared a booklet describing these and other AmerTran products, together with recommendations for their use. We shall be glad to send you a copy upon request.

Be sure to see the other AmerTran ad on page 62

Faradon

NOW

Faradon Excellence for Your Receiving Set in the

Faradon

MODEL T All-Metal-Mica Condensers

Usual capacities. Convenient terminals. Exceptional appearance. QUALITY AT LOW COST. Insist upon getting the MODEL T when you buy. Should your dealer not have them on hand write us direct. A descriptive folder will be forwarded if you mention QST.

"Fit out with Faradon"

Wireless Specialty Apparatus Co.
JAMAICA PLAIN, BOSTON, MASS., U. S. A.
ELECTROSTATIC CONDENSERS FOR ALL PURPOSES

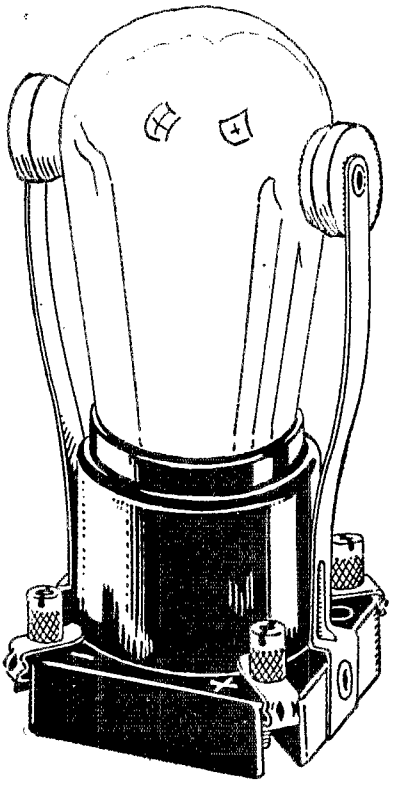
The KODEL MICROPHONE *Loud Speaker*

Two Models
$15
$20

THE loud speaker that has the whole country talking. An exact replica of the microphone used in broadcasting. Tremendous volume - - rich clear tone - - Handsomely finished in Roman Gold. At any radio dealer.

Write for descriptive literature

THE KODEL RADIO CORP.
508 E. Pearl St. Cincinnati, O.
Owners of Broadcasting Station W K R C



Great Inventions always simple!

It's said to be pretty much true that great inventions are always simple.

We'd hesitate about putting the "Silent Socket" in that class. Nevertheless, something that accomplishes its purpose where everything else fails is entitled to distinction, and that's what we found about the "Silent Socket".

The exasperation and ruinous results of "Microphonic" noises don't need to be explained to Q. S. T. readers,—but we know they will be interested in a remedy.

We tried every conceivable method of spring mountings and cushioning without being satisfied,—even to suspending tubes on strings.

It was noticed that Microphonic detectors could often be silenced by holding the tube firmly with the fingers. It was then only a step to a device with proper pressure and placement.

We hunted out extreme cases and the "Silent Socket" stopped every one,—even in sets that "built up" noises until reception was impossible.

The next step was patent protection,—and then production.

The "silent" includes a regular B-T Universal Socket. Price $1.25.

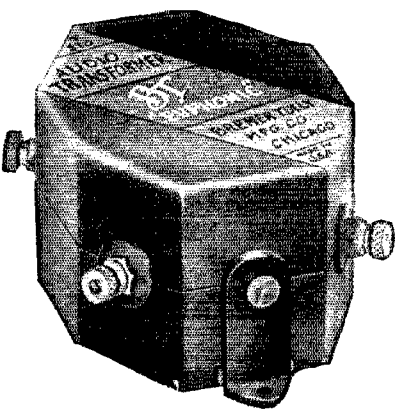
Put one on your detector,—and be surprised.

B-T Euphonic Audio Transformers

If Bremer-Tully had never done anything more than developing the Euphonic Audio Transformer there are plenty who would agree that that was enough.

We have never before had any product attain such instant popularity.

The Euphonic is a new conception in design. Plenty of iron, but not oversize,—a big increase in copper, and better iron distribution, all unite to give in our opinion better results than any other system of amplication,—and every user seems to agree. You will, too, when you hear the Euphonic or we're *poor guessers.*



Have You Read "BETTER TUNING"

Our booklet "Better Tuning" has a circulation like a regular magazine. 9th Edition postpaid 10c.

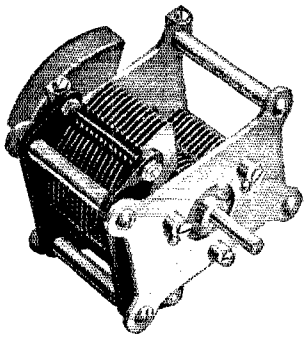
2.2 to 1------$5.00

4.7 to 1------ 5.75

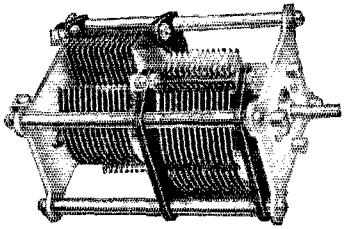
BREMER-TULLY MFG. CO.

532 S. Canal Street - - - Chicago, Illinois

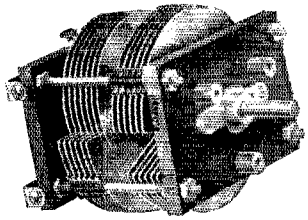
Do You Want to read The Truth about Variable Condensers?



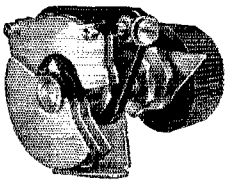
Type 334-F Variable Condenser



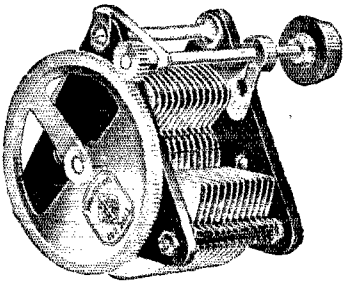
Type 374-F SLF Condenser



Type 248 Tandem Condenser



Type 368 Micro-Condenser



Type 247-H
Geared Variable Condenser

The question of what type of condenser to use is still uncertain in the minds of many set-builders and experimenters.

In order that the amateur may have reliable information to guide him in the selection of the proper condenser for his specific needs we have prepared a booklet which contains a complete discussion of all types of variable condensers. This booklet does not go into deep technical detail on the subject but it covers in a complete, yet comprehensive manner everything pertaining to "low-loss" condensers, laboratory condensers, straight line wavelength vs. straight line frequency condensers—in fact nothing is omitted that is of vital concern to everyone who is interested in radio construction and operation.

This booklet is not a prejudiced discussion of the merits of one particular type of condenser, because the General Radio Company manufactures many types of condensers, each designed to meet its own respective requirements.

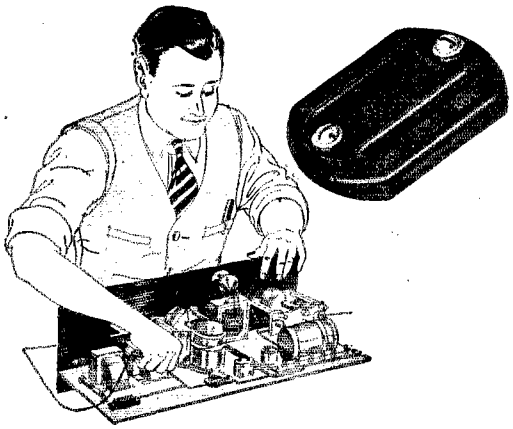
If you want Gospel and not gossip on the subject of variable condensers write for our FREE illustrated booklet "The Truth about Variable Condensers."

Address Dept. Q

GENERAL RADIO COMPANY

CAMBRIDGE 39, MASS.

GENERAL RADIO



Keeping dad's radio going

Many a son is the family radio expert, but few have as fine an opportunity to keep posted as the man who wrote the letter printed below. He is a radio mechanic with one of the biggest electrical supply firms in Washington, D. C.—and just about everything new in radio parts comes to him for a practical test.

He writes us:

"My father lives in the mountains of Pennsylvania and, of course, has a radio receiver to keep in touch with the business world.

"For some time he has had trouble tuning in stations, so when I went up to make him a visit I took along one of your .00025 mfd. Sangamo fixed condensers with grid leak terminals.

"I tested the set and found that the grid condenser had changed its capacity, due to dampness, as it had been kept near an open window. I installed the .00025 mfd. Sangamo fixed condenser and the set changed completely; tuning became easier, and quality of reception was improved 100 per cent."

"Yours very truly,

(Signed) E. L. Maschmeyer"

SANGAMO *Accurate* Radio Parts

SANGAMO
By-Pass Condensers now available.
1 mfd. $1.25
½ mfd. .90

Sangamo Electric Company

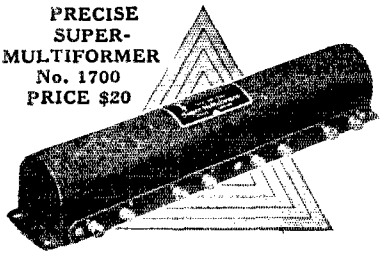
1421-5 *Springfield, Illinois*

RADIO DIVISION, 50 *Church Street, New York*

SALES OFFICES—PRINCIPAL CITIES

For Canada—Sangamo Electric Co. of Canada, Ltd., Toronto.
For Europe—British Sangamo Co., Ponders End, Middlesex, Eng.
For Far East—Ashida Engineering Co., Osaka, Japan

PRECISE SUPER-MULTIFORMER
No. 1700
PRICE $20



4 in 1

The Precise Super-Multiformer is a single unit consisting of four accurately matched radio frequency transformers which are shielded from each other and from the rest of the circuit by a brass case. James L. McLaughlin, specifies the Super-Multiformer for his new 8 tube One Control DeLuxe Receiver.

Have you heard the Precise Super-Sized No. 480 Audio Transformer? Its range of tones at tremendous volume will surprise you. Hear the Precise Syncrodenser—the original and only straight-line frequency condenser combining straight-line capacity on the higher wave-lengths, thus assuring more uniform station separation.

PRECISE MANUFACTURING CORPORATION

ROCHESTER NEW YORK

KNOW YOUR WAVE

The WIMCO Type A Wave Meter is accurate to ½ percent. Made to cover all amateur bands—get maximum results by being sure of your tuning. Used by the Army and Navy.

Send for Literature

The Wireless Mfg. Co.

Canton - - - Ohio

HERCULES AERIAL MAST

We pay freight

Mail the Coupon

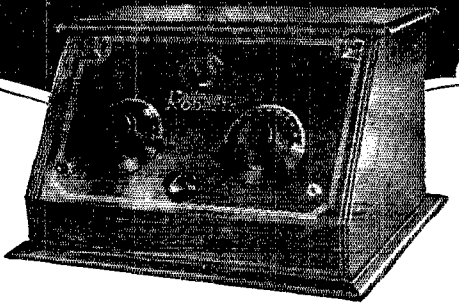
20 Ft. $10. 40 Ft. $25. 60 Ft. $45.
All Steel Construction
Complete with guy-wires etc.
Cleveland, Ohio

S. W. HULL CO. Dept. D 2048 East 79th St.
Please send free the full details about the "HERCULES" Aerial Mast.

NAME.....
STREET.....
CITY.....

MAIL NOW FOR FULL DETAILS

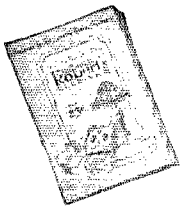
Easy to Build this 5 Tube Receiver



The creative genius that conceived the idea of this masterly five-tube receiver, and the engineering skill that brought the idea to reality, kept always in mind the limited mechanical ability of the inexperienced builders. The result is a plan of assembly so complete, so detailed, that anyone may construct the Hammarlund-Roberts in the course of an evening.

And, to the proud owner, his completed work becomes at once the measure of efficient receiver design. At a fraction of the cost of a ready-made set of nearly equal efficiency, he has an "engineered" radio receiver—a scientifically perfect mechanism in which every part synchronizes with the others.

The masterpiece of ten leading engineers—equal in performance to a standard eight-tube set—backed by some of the best known parts manufacturers in the field—this is the Hammarlund-Roberts. Today it is the one receiver talked about above all others.



Send for This Book

This instruction book is fully illustrated and gives complete directions. Write today.

25c

Associate Manufacturers

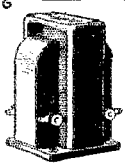
All-American Radio Corp.
Alden Manufacturing Co.
Radiall Company ("Amperites")
Carter Radio Co.
Union Radio Corp.
International Resistance Co., Inc. ("Durham Resistors")
Westinghouse Micarta
Hammarlund Mfg. Company, Inc.

Parts Complete, Less Cabinet, $62.30

HAMMARLUND-ROBERTS

1182-P Broadway New York City

Hammarlund Roberts



Roulette Lyric ALL-AMERICAN TRANSFORMER

These are some of the famous parts used in the Hammarlund-Roberts.

AMPERITE

DURHAM
UNION

Hammarlund

Carter

NA-ALD

Straight Frequency Line Tuning

Marks a new era in Radio progress—
Sweeping country like a tornado—
Fans welcome it with open arms—
Irresistible demand growing by leaps and bounds—

KARAS Started It—

and KARAS Is Carrying On!!

When we sprung the Karas Orthometric Condenser on a restless, hungry radio public—we knew we had started something. But we scarcely expected to be snowed under with such a literal avalanche of orders.

We inaugurated Straight Frequency Line Tuning at the psychological moment. Radio Fandom was waiting hungrily for something new. And here was something—not only new—but so perfectly simple—so thoroughly scientific—so downright sensible, that everyone wanted KARAS Orthometric Condensers at once.

Our scheduled production was like a drop in the bucket. Buyers pleaded—cajoled—even threatened. Our plans were doubled, trebled, quadrupled. But it all took time.

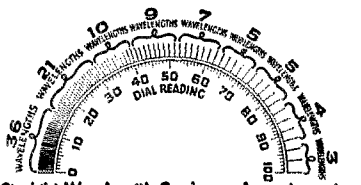
KARAS Orthometric Condensers could not be thrown together. It took months to train gangs to build them with the absolute *precision* KARAS demands. So tens of thousands had to wait or buy other makes, hurriedly assembled to supply the demand we had created.

NOW—after months of preparation we are able to produce enough KARAS Orthometric Condensers to take care of at least a fair share of the demand.

How KARAS Orthometric Condensers
Simplify the Tuning of Any Radio Set

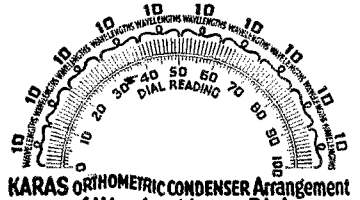
Ordinary Condenser Arrangement of Wavelengths

Ordinary straight capacity condensers crowd 70 of the 100 wavelengths into the first 30 points of the dial.



Straight Wavelength Condenser Arrangement

With straight-line-wavelength condensers 57 of the 100 wavelengths are crowded into the first 30 points on the dial.



KARAS Orthometric Condenser Arrangement of Wavelengths on Dial

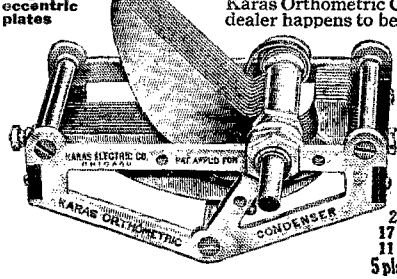
Karas Orthometric Condensers insure absolutely equal dial separation of all wavelengths, 200 to 600 meters.

U. S. Gov't. separates all stations 10 kilocycles apart. Old type condensers—straight line capacity and straight line wavelength—crowded the low wavelength stations into the first few degrees on the dial. Difficulty in tuning—confused heterodyning interference—garbling of programs—these were the results. KARAS Orthometrics give low wavelength stations the same equal separation as high ones. It is the last word in making ***real*** selectivity possible.

Karas Orthometrics are both theoretically and mechanically perfect. Made entirely of brass—plates patent leveled and securely bridged to insure permanent alignment. Every joint soldered. Grounded frame and rotor. Adjustable cone bearings. Spring copper pigtail. In short, so beautiful a job that one engineer, on seeing the condenser for the first time, smilingly inquired, "How many jewels?"

If your dealer hasn't secured a stock of Karas Condensers

Order on this Coupon!



Note the long eccentric plates

Most good dealers everywhere, sell Karas Orthometric Condensers. If your dealer happens to be one who hasn't secured them, we will supply you direct on our 30-day Money-Back Guarantee. Just fill in and mail this coupon at once. Send no money. Pay your postman on delivery.

Sizes and Prices—
23 plate, .0005 Mfd., $7.00
17 plate, .00037 Mfd., 6.75
11 plate, .00025 Mfd., 6.50
5 plate, .0000972 Mfd., 6.50

KARAS ELECTRIC COMPANY
4055 North Rockwell Street, Chicago, Ill.
For more than 20 years makers of PRECISION Electrical Apparatus.

Karas Electric Co.,
4055 N. Rockwell St., Chicago

Please send me.....Karas Orthometric Condensers, size.....at $.....each. I will pay the postman the list price, plus postage, on delivery. It is understood that I have the privilege of returning these condensers any time within 30 days if they do not prove entirely satisfactory, and you will refund my money at once.

Name.....

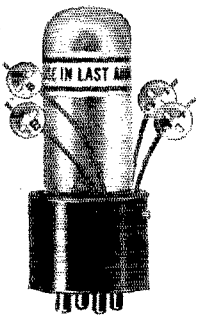
Address.....

Dealer's Name.....

If you send cash with order, we'll send package postpaid

Better Tones!

—with dry cells and UX120 than with storage batteries

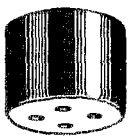


Note: The UX 120 is a new three volt dry battery power tube. Used for audio frequency amplification, this tube will produce better quality and greater loud speaker volume than regular storage Battery tubes.

Any set owner can easily install a UX 120 tube in his set in a few minutes by using the new Na-Ald Number 120 Connectorald. It is a simple, efficient means of introducing the necessary additional "B" and "C" voltage required for this tube into the plate and grid circuit **without rewiring the set.** As easy to use as an adapter.

Just slip the Connectorald onto the UX 120 tube and put the tube in the socket. Connect the batteries—and—well, that's all there is to it. Except to enjoy a quality and volume you would not have believed possible. No need to fuss with charging batteries. The simplicity, economy and freedom from attention characteristic of dry cells is now combined with the real volume and quality previously obtainable only with storage battery tubes.

The No. 120 Connectorald is suitable for all sockets—metal neck as well as insulated. For sale at radio, electrical and hardware stores. Price $1.25.



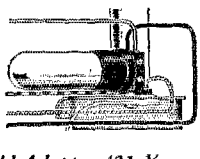
Na-ald Adapters

Na-Ald Adapter 419-X

With this adapter the Na-Ald de Luxe Socket will take the new UX 199 small base tube. Price 419-X 35 cents.

Na-Ald 420 Connectorald

No. 420 equipped with cables, enables owners of Radiola Super-Het to get the great increase in volume and clarity the new UX-120 tube develops. Price, 420, $1.25.



Na-Ald Adapter 421-X

No. 421-X makes possible the shift from WD-11 to UX tubes. Especially designed to enable owners of Radiola III, and III-A to enjoy the improved operation the new tubes provide, Price 75c.

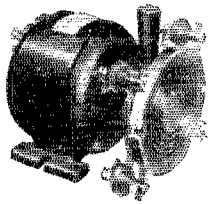
All Na-Ald products are for sale at radio, electrical and hardware stores everywhere. Send for complete data on adapters for new tubes.

ALDEN MANUFACTURING COMPANY
Also Makers of the Famous Na-Ald Sockets and Dials
Dept. R2 *Springfield, Mass.*

Alden Processed
NA-ALD
Sockets and Dials

You Need This

ADVANCE "SYNC" RECTIFIER



for Farther and Smoother Transmission!

(Ask other A. R. R. L. Men)

Thousands in the American Radio Relay League have improved their transmission with the new Advance "Sync" Rectifier. Gives clearer tone and better volume. Rectifies alternating current at 500 to 3000 volts to direct current for the plates of your transmitting tubes. Puts more energy into the antenna and counterpoise on account of actual copper-to-copper contact in rectification. Very efficient on short waves. Requires no attention—always ready. More in use than any other rectifier made.

Revolving disk is moulded bakelite six inches in diameter. Nickel plated brush holders with adjustable gauze copper brush support and brush holders perfectly insulated.

Price $15.00 **For rectifying wheel with complete brush assembly and mounting ring to fit your own synchronous motor. (Note: Motor must be ⅓ H.P., with ½ in. shaft and 1800 R.P.M.)**

Rectifier with Westinghouse ⅓ h. p. Synchronous Motor—$40.

We Pay All Transportation Charges in U. S. A.

ADVANCE ELECTRIC COMPANY
1260-1262 West Second St., Los Angeles, Calif.

R. C. A. TRANSMITTING APPARATUS

UP-1016 Power Transformer 750 watts, 1,500 volts. Filament winding for 4 Fifties	$12.50 Ea.
UP-1656 Filament Transformer 75 watts, supplies current for 4 Five watters	4.00 Ea.
UP-1658 Filament transformer 150 watts, Supplies current for 2 Fifty watters	5.00 Ea.
UL-1008 Oscillation Transformer	5.00 Ea.

All items Guaranteed new and perfect

STATE RADIO COMPANY
286 Columbia Rd., Dorchester, Mass.
(See Ham Ads.)

BLUEBIRD RADIO TUBES

—are powerful—sensitive for distance, give clear volume and long service.

GUARANTEED

to work in Radio Frequency, Neutrodyne, Super Heterodyne and Reflex.

WITH BAKELITE BASE

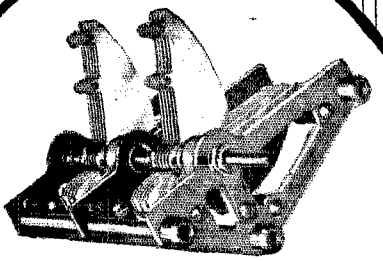
Type 200
Type 201A
Type 212
Type 299
Type 299A with standard base

$2.00

Type 202 5 watt Transmitter $3.00

When ordering Mention Types
Shipped Parcel Post C. O. D.

BLUEBIRD TUBE CO.
200 Broadway Dept. S, New York



Made under Hogan Patent No. 1,014,002
Jan. 9, 1912

NO MORE INTERFERENCE

THE most vexing problem you have to face with your radio set is INTERFERENCE.

U. S. Tool Engineers have perfected a Straight line Frequency Condenser that distributes the stations uniformly over your dial and makes possible a degree of selectivity you never thought possible.

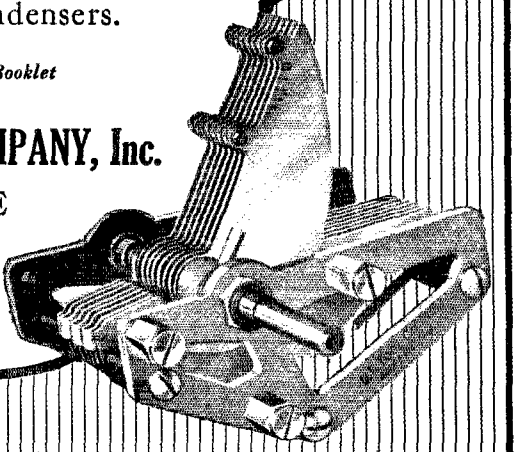
No more crowding — minimum interference when you use U. S. Tool Straight Line Frequency Condensers.

Write for Booklet

U. S. TOOL COMPANY, Inc.

AMPERE

New Jersey



Send for this RADIO BOOK FREE

1926 Catalog of RADIO BARGAINS Save 1/3 to 1/2

The World's Largest Exclusive Radio Mail Order House Will Send You This Wonderful Book FREE

64 illustrated pages containing thousands of bargains in radio sets, semi-finished sets and radio kits of all styles, sizes and approved circuits. **5-tube sets as low as $29.50.** Beautiful models of the very latest designs and types. Elaborate console models with loud speakers built right in cabinets of genuine mahogany and walnut. **All sets guaranteed.** Coast to coast receiving range. Also contains everything in radio supplies, including batteries, chargers, loud *speakers, transformers, condensers, rheostats and any other parts* you may want for improving your set or building a new one. Guaranteed saving to you of 1/3 to 1/2.

AMERICAN RADYNOLA 5 TUBE SET

The Biggest 5-Tube Value on the Market

Positively the world's greatest 5-tube radio bargains. **Regular $75.00 value.** Our large quantity production enables us to sell this set for **only $29.50,** fully built and wired in beautiful mahogany cabinet of latest design with sloping Bakelite panel of *Satin finish,* handsomely etched and engraved as illustrated. Constructed of the finest low-loss condensers, coils and sockets. Bakelite baseboard panel and dials. **Price for set only.** **$29.50** Transportation charges extra, shipping weight 25 lbs.

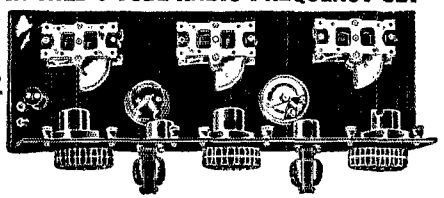
This set with all accessories, including the famous **American Bell loud speaker** with adjustable unit, 2-45 volt "B" batteries, one guaranteed 100 Ampere Hour, storage "A" battery, cable for battery connection, 5-201A tubes, Aerial and ground equipment, and everything complete ready to set up and operate. Nothing else to buy. **Price** **$59.75** Transportation charges extra. Shipping weight 100 lbs.

Order Direct from This Page! Save About One-Half!

Order direct from this page. Save 1/3 to 1/2. Our guarantee protects you. Money cheerfully refunded if you are not satisfied. Write your order and prices plainly. Send post office money order or bank draft for full amount to insure safety. Refer to any bank or commercial agency regarding our reliability.

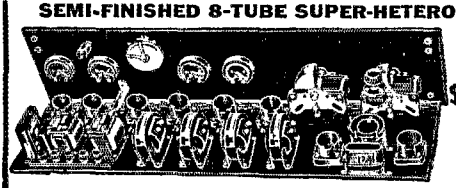
SEMI-FINISHED 5-TUBE RADIO FREQUENCY SET

$18.75



This special offer is astounding the radio world. **Coast to coast reception on loud speaker.** Low loss condensers and sockets. Highest quality transformers. Bakelite rheostats. All wiring concealed under Bakelite baseboard. 7x18 panel—fits into any standard 7 x 18 cabinet. Complete instructions for wiring. **Guaranteed saving to you of $50.00. Price of set all mounted, $18.75.** Cabinet of same model as American Radynola pictured above $5.65 extra.

SEMI-FINISHED 8-TUBE SUPER-HETERODYNE



$43.75

World's Famous 8-tube superheterodyne. Fully mounted on panel and baseboard. Comes **completely assembled** ready to wire and operate. We have testimonials from thousands of builders of this set. Some have received foreign stations on loop aerial. Unsurpassed in volume and tone quality. Low-loss straight line frequency condensers, vernier dials, finest quality rheostats. Matched Columbia long waved transformers. Requires only three screws for attaching panel and baseboard and set is ready to operate. 7x30 panel. **Price of set only $43.75.**

Requires following accessories to complete this set: 7x30 cabinet, 8-201A tubes for storage battery operation or No. 199 tubes for dry cell operation. 100 Ampere hour storage battery, 2-45 V "B" batteries, loud speaker, center tapped loop aerial. All these items are listed in our catalog **at a tremendous saving.**

Complete Parts for Best 45 Kilocycle Super-Heterodyne Genuine Remler Parts $49.50

You must have our catalog no matter what set or kit you want. Our line is complete and includes all popular sets, such as Superheterodyne, Neutrodyne, Ultradyne, Reinartz, Regenerative, Radio Frequency, Browning-Drake, Super-Heterodyne Reflex and all other latest circuits. Kits, sets and parts manufactured by all well known manufacturers such as Frost, Howard, Baldwin, Brandes, Western Electric, Columbia and others.

Our semi-finished sets come with all parts mounted on panel and baseboard ready for wiring. Do not fail to send for our catalog. Remember—we are the largest exclusive radio mail order dealers in the world and carry the best of everything in radio. We save you 1/3 to 1/2 on the following kits. Detailed descriptions appear in our catalog.

Catalog includes list of broadcasting stations, general radio information and facts about our free service division. Write for it today.

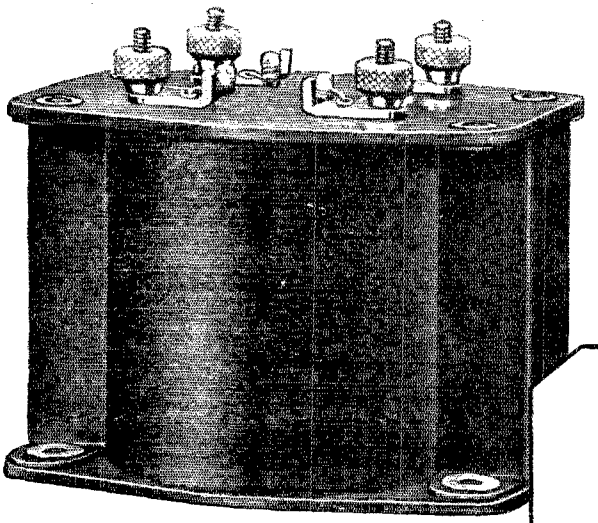
NEUTRODYNE
Genuine licensed Neutrodyne kit of parts, come fully assembled on the panel and baseboard with complete instructions, ready to wire. Price, **$29.75**

COCKADAY
3-tube Cockaday kit of parts, fully assembled on panel and baseboard, ready to wire Price, **$15.85**

LOW LOSS SHORT WAVE
3-tube set—25 to 100 meters, Fully assembled on panel and baseboard, ready to wire. Price, **$19.80**

HARKNESS
2-tube reflex kit of parts, fully assembled on panel and baseboard, ready to wire Complete instructions. Price, **$16.95**

RANDOLPH RADIO CORPORATION
159 N. Union Ave. Dept. 227 Chicago, Illinois



No. 3—A Transformer Ratio 4 to 1 Primary reactance, 125,600 ohms at 1000 cycles. Low core losses, thin laminations. Compact dimensions for sub panel or base board mounting. 2¾" long, 1-15/16" wide, 2-3/16" high Shell type shielding.

PRICE $4.50

TRANSFORMERS

of uniform amplification

Not only does the charted performance of the Stromberg-Carlson transformer show a comparatively high amplification on low frequencies but it also gives uniform amplification on the intermediate and the higher frequencies. This uniform voltage amplification throughout the widest possible range of musical frequencies is in marked contrast to other makes tested which are efficient over only comparatively narrow bands of frequencies or which produce distortion on the high or low frequencies due to weakness in amplification.

The Stromberg-Carlson Audio frequency transformer makes the nearest practical approach to distortionless performance.

Prices are for the U. S. east of the Rockies

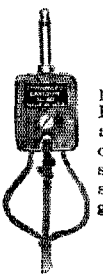
Stromberg-Carlson Telephone Mfg. Co.

Rochester, N. Y,

No. 3 — A Head Set

No. 3 — A Head Set Permanently sensitive. Magnets exert 2½ lbs. pull. Hard Rubber Ear Caps. Die Cast Aluminum Case, Nickeled Head Band with Swivel and Slide Adjustment. 11,000 ohms total impedance.

PRICE $5.50



No. 60 — Radio Plug

The most convenient plug known in Radio. Fits any radio jack and takes any type of conductor without soldering. Extra insulation guards against short circuits.

PRICE $.60

Radio Jacks

Require no "take-up" washers. Indispensable for quick connections with either detector or amplifier circuits. Three designs to meet various requirements of radio circuits.

PRICE
$.75—.50—1.00

Stromberg-Carlson

To Our Readers Who Are Not A. R. R. L. Members

Wouldn't you like to become a member of the American Radio Relay League? We need you in this big organization of radio amateurs, the only amateur association that does things. From your reading of *QST* you have gained a knowledge of the nature of the League and what it does, and you have read its purposes as set forth on page 6 of every issue. We would like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio, and incidentally you will have the membership edition of *QST* delivered at your door each month. A convenient application form is printed below—clip it out and mail it today.

.....1925

American Radio Relay League,
Hartford, Conn.

Being genuinely interested in Amateur Radio, I hereby apply for membership in the American Radio Relay League, and enclose $2 ($2.50 in foreign countries) in payment of one year's dues. This entitles me to receive *QST* for the same period. Please begin my subscription with the .....issue. Mail my Certificate of Membership and send *QST* to the following name and address.

.....

.....

.....

Station call, if any .....

Grade Operator's license, if any .....

Radio Clubs of which a member .....

Do you know a friend who is also interested in Amateur Radio, whose name you might give us so we may write him about the League? .....

..... Thanks!

A. R. R. L. Members -- What about your friends?

You must have a friend or two who ought to be members of our A.R.R.L., but aren't. Will you give us their names, so that we may write to them and tell them about the League and bring them in with the rest of us? The A.R.R.L. needs every eligible radio enthusiast within its ranks, and you will be doing your part to help bring this about by recommending some friends to us. Many thanks.

.....1925

American Radio Relay League,
Hartford, Conn.

I wish to propose

Mr. ..... of.....

Mr. ..... of.....
Street & No. Place State

for membership in the A.R.R.L. I believe they would make good members. Please tell them the story.

.....

.....

HAM-ADS

IMPORTANT NOTICE! NEW RATES ADVANCED CLOSING DATE

Effective with May QST, the HAM-AD Advertising Rates are TEN CENTS A WORD. Name and address to be counted, each initial counting as one word. These rates are shown on QST Rate Card No. 6, in force with the May issue.

The closing date for HAM-ADS is now THE TWENTY-FIFTH OF THE SECOND MONTH PRECEDING DATE OF ISSUE. For example, all HAM-ADS for the June issue must be in this office not later than April 25.

Hereafter no HAM-AD will be accorded any particular or special position.

Rates for the QRA Section remain the same; 50c straight. See heading of that section for details.

MOTORS—New G. E. ¼ HP $12.50, ½ HP $28.50, 1 HP $45. GENERATORS—Radio Transmission 500V $28.50. Battery Chargers—Farm Lighting generators all sizes, Lathes, Drill Presses, Air Pumps other Garage and Shop equipment. Wholesale Prices. New Catalog. MOTOR SPECIALTIES CO., Crafton, Penna.

TELEGRAPHY—Morse and Wireless—taught at home in half usual time and at trifling cost. Omnigraph Automatic Transmitter will send on Sounder or Buzzer unlimited messages, any speed, just as expert operator would. Adopted by U. S. Govt. and used by leading Universities, Colleges, Technical and Telegraph Schools throughout U. S. Catalog free. Omnigraph Mfg. Co., 13M Hudson St., New York.

$2.95 ———— OUT AT LAST!

"The Hawley." An alkalki un-acid rechargeable "B" storage Battery of 22½ volts. Not an unassembled battery but ready to use—no extra parts to buy. Uses the largest sized tested Alkaline elements (Edison). Heavy *closed top glass cells. Chemical electrolyte* included and shipped separate. Any detector or amplifying voltage easily had. Special offer. 4-22½ volts (90 volts) $10.00; 112½ volts $12.50; 135 volts $14.75; 157½ volts $16.80. For those wishing to put their own together buy the knock-down kits. Put up in all voltages at still greater savings in price. The only battery of its kind sold on a *30 days trial* with complete guaranteed satisfaction or your money returned in full without any ifs, ands, or buts. Further guaranteed 2 years. Order direct—send no money. Simply pay expressman its cost plus the small carrying charges. Patent pending. Same day shipments. Write for my guarantee testimonials and literature. It's free and it's interesting. Complete sample cell 35c prepaid. B. Q. Smith, 31 Washington Ave., Danbury, Conn.

MAKE $120 WEEKLY IN SPARE TIME. SELL what the public wants—long distance radio receiving sets. Two sales weekly pays $120 profit. No big investment no canvassing. Sharpe of Colorado made $955 in one month. Representatives wanted at once. This plan is sweeping the country—write today before your county is gone. OZARKA, 853 Washington B'vd., Chicago.

PRINT YOUR OWN RADIO CALL cards, stationery, circulars, *etc. Press, $8.85, Larger, $12.00—$35.00; Rotary* $150.00. Print for others, big profit. Easy rules sent. Write for catalog presses, type, paper, supplies. Press Co., B-95, Meriden, Conn.

EVERYTHING in RECEIVING apparatus. Over 2 pounds data, catalog, etc., prepaid anywhere—25c. Discount to "hams." Kladag Radio Laboratories, Kent, Ohio—If you can't find it anywhere else, ask us as we have the largest stock of highgrade parts between N. Y. and Chicago.

SELL Jewell Trio, Jewell 1000 Voltmeter, General Radio Laboratory Condenser, Audibility Meter, Wave meter, 550 volt Emerson Motorgenerator. 9AAL, 4602a Delmar, St. Louis, Mo. Telephone, Main 326.

CLEAR AS A WINTER'S NIGHT. RECEPTION KEEN AND SNAPPY AS THE CRUNCHING SNOW—IF YOUR PLATE POWER SUPPLY IS AN EDISON B (THE SML KIND). NO JOINTS. PURE NICKEL CONNECTORS ELECTRICALLY WELDED FOR ABSOLUTE QUIET. GIVE YOUR SET A CHANCE WITH ONE OF THESE. 54 VOLT $8.25, 100 VOLTS $15.00. OTHER SIZES. OAK CABINET. LARGEST ELEMENTS REAL EDISON SOLUTION. 1 Big 2000 MILIAMP HOUR B FOR THE MULTITUBE SET, 105 VOLTS $24.00. CELL PARTS 17c, DRILLED 19c. ASSEMBLED CELLS 24c. QUANTITY DISCOUNTS. EDISON A ELEMENTS 5c, WELDED PAIRS 7½c. A NEW SUPERCELL 4000 MILIAMP HOUR 40c. SAMPLE 50c. ANNEALED TEST TUBES ¾"—3c, 1"—4c. SHOCKPROOF JARS 1 x 6—4c, 1¼ x 6½—5c. PUREST SOFT .032 NICKEL 1c ft. .034 (HEAVY) 1¼c ft. RUBBER SEPARATORS ½c/ REAL EDISON ELECTROLYTE (THAT'S NO LYE) LITHIUM COMPOUND $1.25 MAKES 5 LBS. WILLARD COLLOID—A REAL B CHARGER 50 VOLTS $2.00, JUMBO $3.00. 100 VOLT FULLWAVE $4.00, JUMBO FULLWAVE $6.00. BRING YOUR AERIAL UP TO QST SPECIFICATIONS WITH NO. 12 SOLID COPPER ENAMEL AERIAL WIRE, 75c 100 FT. PYREX INSULATORS. A NEW QST LEAD-IN BOWL TYPE PYREX NOW $1.50. ANYTHING YOU NEED. NOT PRICED TO SELL BUT TO SERVE. FRANK M. J. MURPHY, 4837 Rockwood Road, CLEVELAND, OHIO.

REAL BARGAINS—UP—1016 $38.00 R. C. A. 750 watt Power Transformers, $12.50—UP—1656 Filament Transformers 75 watts, runs 4 five watters, $4.00—up-1658 Filament Transformers, 150 watts, runs 2 fifties $5.00—UL-1008 Oscillation Transformers, $5.00—UP-414 Microphone Transformers, $3.75—UV 712 Amplifying Transformer, Audio Frequency, $2.50—UC-1831 Variable 4000v Transmitting Condensers, $1.50—UC-1803 Antenna Coupling Condensers, $1.50—F-F Battery Chargers, 110v 60 cyc. 6 amp. rate, $9.00—G. E. 110v AC Motor 1/32 HP, 7000 RPM, $3.50—Amrad No. 2796 Lightning Switches, $1.50—Amrad No. 2834 Send-Receive Switches, $5.00—Amrad No. 3650 Variometers, $1.50—Circuit Breakers, adjustable around 10 amps, $2.50—Amrad type F $25.00 Long Wave Tuners, 2000-20,000 meters, $8.00—Send for discount sheet and keep in touch with bargains. All items sent post-paid up to 4 Lbs. STATE RADIO CO. 286 Columbia Road, Dorchester, Mass.

EDISON ELEMENTS LARGE SIZE WITH CLAMPED ON CONNECTOR 5c PER PAIR. ALL OTHER PARTS CARRIED IN STOCK. 300 AMPERE EDISON A. BATTERIES, PERFECT CONDITION $35.00 GET PRICE LIST. ROMCO STORAGE BATTERY CO., 146 W. 68TH ST., NEW YORK CITY.

WANT 50—WATTERS, 250—WATTERS, "BUGS", OMNIGRAPHS. CURTIS—GRIFFITH, FORT WORTH.

200-20000 METER RECEIVER including Radiotron $25.00. Two step amplifier $15.00. Smith, 4416 Market St., Philadelphia, Penn.

ONE LITTLE IRON MAN between you and a UC 1015 condenser. Utility Radio, 58 North Sixth, Newark, N. J.

FOR SALE—Navy Holtzer Cabot dynamotors 10/500 output $25. General Electric Navy 24/500 volt dynamotors $45. All generators guaranteed new. Western Electric Navy Submarine Chaser CW936 outfits complete with tubes wired for CW-ICW. Phone brand new first $200 takes it. Navy long wave receivers type CN240 range 1000-10000 meters $70. United States Army Signal Corps

receivers 50-200 meters, original cases $75. 8 tube Superheterodyne receiver 100-600 meters beautiful outfit $125. Esco motor generator outfit 60 cycle drive—100 volts 1 kilowatt output $200. Western Electric tubes from ¼ KW to 5 watt tubes. RCA 204 tube brand new $92.00. All kinds of Navy precision wave meters at $75. Weston meters 20% off list. Grebe CR13 brand new $50. Also CR6—150-1000 meters. List price $200—original case $85. All types Navy receivers—All kinds of transmitting supplies. Advise your requirements. Save money. 2AGD, 1515 Eastern Parkway, Brooklyn, New York.

AERIAL wire No. 12 copper enamel wire eighty-five cents per hundred feet. 8DBC.

FIVE watter set for sale $14.00. Francis Martin, Deal, N. J.

WE SPECIALIZE IN SHORT WAVE TRANSMITTERS: commercial and amateur—telegraph, phone or re-broadcast. Let us quote you on your requirements. We also carry a stock of General Radio, Pyrex, Cardwell, Acme, Weston, Jewell, Thordarson—10% discount, panels engraved. Best of service. W. P. Hilliard & Co., Radio Engineers, Arcade Bldg., Joliet, Ill.

"TELEFUNKEN 200 WATT POWER TUBES $60.—Filament 14 volts, 4 amperes; plate 3000 volts. Arthur H. Beyer, 106 Morningside Drive, New York City."

UL 1008 R. C. A. O. T. $8. UV203 absolutely new. Never used, $25. Pair Amrad 4000-1 "S" tubes and sockets, very good condition, $15. H. Block, 1 Oak St., Ypsilanti, Mich.

ACME INDUCTANCE—fine condition—$5.00. 9DOA.

WANT TO MEMORIZE THE WIRELESS CODE? The Corydon Snyder Code Method, Patented, is quickest. Send 25c coin, stamps or M. O. to C. G. Snyder, 1423 Elmdale Ave., Chicago, Illinois.

SALE—Parts, tubes, motor generators for five and fifty watters. Send stamp for list. Rhodes, Butler, Missouri.

TRANSMITTING and RECEIVING accessories. Send for BARGAIN SHEET. A. A. Dombrowski, 4341 S. Campbell Av., Chicago, Ill.

$5.00 NEW United States Government Aviators, Automobile, Motorcycle and Racing Leather Helmet with headphones and microphones, cost $25.00. Postage free. Limited supply; other Government Radio Bargains. Send stamp for list. WEIL'S CURIOSITY SHOP, 20 South 2nd St., Philadelphia, Pa.

WANTED—1 kw spark transformer. Other parts. Lease. 27 Neil, Niles, Ohio.

HELIX clips, best imported, no danger, can adjust with 1500 volts on hard rubber insulation 35c, 3 for $1.00 postpaid. Geo. Schulz, Calumet, Michigan.

TRANSFORMERS unmounted 110 volt, 60 cycle, 250 volt, 50 milliampere Secondary $1.75. 50 Henries choke $1.75. Audio Transformers 5 and 3 ratio—new—try one. $1.25. Leitch, South Park Drive, West Orange, N. J.

"150—WATT SET COMPLETE. YOUR OFFER? WRITE—James Thomas, Quakertown, Penna."

ONE GREBE 8 complete with two step new batteries, tubes, Magnavox speaker, priced for quick sale, $125. L. L. Sutherland, Smithfield, Illinois.

OMNIGRAPHS, ELIMINATORS, VIBROPLEXES, BOUGHT, SOLD. RYAN RADIO CO., HANNIBAL, MO.

RESOLVED: I will buy a UC1015 condenser for my goesouter. ($1 each). Utility Radio, 58 North Sixth, Newark, N. J.

TWO slightly used 250 watters—$50 each. 1 new 50 watter—$15. Radio Corporation tubes. 1 new Kellogg broadcasting Microphone—$55. Station WEMC, Berrien Springs, Michigan.

NOW YOU HAVE MADE ALL YOUR RESOLUTIONS FOR THE NEW YEAR LOOK AROUND. THERE MAY POSSIBLY BE OTHERS YOU CAN MAKE. ONE, MAY WE SUGGEST, CAN BE TO USE ONLY THE BEST IN RADIO EQUIPMENT IN YOUR STATION THIS YEAR. ENSALL RADIO LAB., EQUIPMENT IS BUILT OF THE HIGHEST QUALITY PARTS. THAT IS WHY ALL OUR RECEIVERS ARE CAPABLE OF A CONSISTENT DX RANGE OF APPROXIMATELY 5,000 MILES (NIGHT). WE HAVE REPORTS SHOWING THAT NEARLY EVERY COUNTRY IN THE WORLD HAS BEEN COPIED ON ONE OF OUR SHORT WAVE RECEIVERS. WE USE AND RECOMMEND SUCH EQUIPMENT AS BUILT BY GENERAL RADIO, FORMICA INSULATION CO., DUBILIER AND FARADON IN THE TRANSMITTING LINE WE SUPPLY ESCO, MOTOR GENERATORS, THORDARSON TRANSFORMERS, ACME EQUIPMENT, POWER TUBES, POWER CONTROL PANELS, INDUCTANCES, ETC., WE BUILD TO ORDER, RECEIVERS, TRANSMITTERS, WAVEMETERS, INDUCTANCES FOR ANY WAVELENGTH. IF YOU HAVE THE PARTS ON HAND SEND US A LINEUP. OUR QUOTATIONS WILL FOLLOW. ALL EQUIPMENT IS TESTED. SPECIAL EQUIPMENT BUILT TO ORDER. FOR THE HAM CATERING TO THE BROADCAST FAN, WE CAN ASSIST WITH THOSE SUPER-HETERODYNES. and ANY OTHER RECEIVER. WE REWIRE ANY TYPE SUPER-HETERODYNE AND "THEY WORK". 5 WATT TRANSMITTERS FOR THE BEGINNER LIST AS LOW AS $25.00. QUOTATIONS ON OTHER TRANSMITTERS, ETC., ON REQUEST. FOR THE BEST IN AMATEUR RADIO DROP US A LINE. QUOTATIONS GLADLY FURNISHED ON ANY WORK. JUST GET QSO. THOS. ENSALL, (ENSALL RADIO LAB.,) 1208 GRANDVIEW AVE. WARREN, OHIO. ("Designers of High Grade Amateur and Broadcast Equipment").

DODGE RADIO SHORTKUT KILLS HESITATION
In Reading Transmitted Code. Now
Combined with Appendix explaining
points which have puzzled few, also
HELPFUL HINTS for BETTER KEY WORK
By 8DRI-KUF and VALUE MULTIPLIED
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SAMPLE REPORTS OF STUDENTS
1BXA East Milton, Mass. Speed was 15
Now 25. Total practice 3 hours.
2CPQ Brooklyn, N. Y. Method helped very
much. Qualified in three days.
3UU Norfolk, Va. Knew Code—could not
receive. In one week passed O. K.
4QY Fort Myers, Fla. Had my license but
doubled receiving speed in 5 hours.
5RT Tulsa, Okla. Speed was 5—after
brief practice could do fifteen.
Reports from 200 student ops on request.
Helpful Hints and Appendix $1.50
DODGE RADIO SHORTKUT. MAMARONECK, N. Y.

1MFD. WESTERN ELECTRIC CONDENSER for B eliminator. 500 volt new $1.00. 3 for $2.50 prepaid. Geo. Schulz, Calumet, Michigan.

TRADE ACME TRANSFORMER FOR OMNIGRAPH. EVERETT BAIREY, 424-9TH AVENUE, N., FARGO, N. D.

DOLLAR ASSORTMENTS Last month included Rheostats, Potentiometers, Sockets, Tools, Grid Leaks, Condensers, Wire, Lugs, Screws and many others. We're makin 'em better each month. Include postage two pounds. R. P. Barrows, 4-6 Columbia Road, Portland, Maine.

THORDARSON 650-VOLT POWER FILAMENT TRANSFORMERS for 5-WATTERS $6.90. CURTIS-GRIFFITH, FORT WORTH.

HAMS—Those VT2 Navy 5 watt transmitting tubes you always want are now in stock. Money back guarantee. Price $4.75 postpaid. Neubauer, 1220 Pine St., Philadelphia, Penn.

NEW 20-80 meter Reinartz Receiver. Radiotron included. First money order for $20 takes it. Postpaid. Harry Clifton, Route 1, Burbank, California.

TRANSMITTING and receiving parts. Write for sacrifice list. Carl Anderson, Third St., Marietta, Ohio.

PURE ALUMINUM and lead rectifier elements, holes drilled with brass screws and nuts per pair 1/16", 1"x6" 13c.

1 x 6, 15c, 1¼ x 6, 17c, 1½ x 6, 19c, single elements half price. Sheet aluminum 1/16", $1.00, ⅛", $1.90. Lead $1.00 square foot all prepaid. GEO. SCHULZ, Calumet, Michigan.

THREE phase motor $25. Radio phone generator, $10. Bartholomew, 715 Bath St., Santa Barbara, California.

TRANSFORMERS from Western Electric 7-A amplifier $15. Three 216A tubes for same $5. each, and 518-W loudspeaker $15. Whole works $40. Everything guaranteed. A. M. Elliott, Bayside, L. I. N. Y.

FOR SALE—Motor Generator, Emerson 500 volt 200 watt, Good condition, $40.00. Albert H. Buch, Tawas City, Michigan.

BROADCAST STATION ENGINEERS—We can supply high quality line amplifiers, tubes of all kinds, Western *Electric and Kellogg microphones filter condensers*, special transformers and chokes, remote control equipment, re-broadcast transmitters and receivers. Any special apparatus. All equipment unconditionally guaranteed. Write your requirements. W. P. Hilliard & Company, Radio Engineers, Arcade Bldg., Joliet, Illinois.

ACH HIMMEL ! ! ! Economical QSL cards—**STAMPED** —See AD December QST—9DOA.

FOR SALE: MEYER'S TUBES $1.95. 2FH.

STOP THE HIGH FREQ. LEAKS with our sulphur and mica UC 1015 condenser $1 each. Utility Radio, 58 North Sixth Street, Newark, N. J.

TUBE BARGAINS: Tubes never been used and in original crates. Tested before shipment. Cash, plus Express Charges (8 lbs.) and Insurance. UV204A 250 watters $90., UV203A 50 watters $36., UV210 7½ watters $7.50. Two stage A. F. Amplifier in case with 201As $19. Anthony McKillip, 134 Northampton Ave., Springfield, Mass.

SELL 500 volt mg, 110 AC drive, $35. 9DYT.

FOR SALE—One R. C. A. power transformer, 825 watt 1100 volt $10. One large panel mounting ammeter 0-100 ampere 8 inches wide, fine for power supply $4. One generator field rheostat $5. Jack Woodard, Douglas, Georgia.

GOVERNMENT merchandise at special prices. Tubes British Osram type C, manufactured by British GE Company. New in original cartons. The finest for resistance coupled. Intermediate and audio amplification consumes six volts ⅝ ampere, very good and clear 75c each. Ballast tubes made by W. E. and G. E. new in original cartons. Wonderful resistance will pass 11/4 ampere at six volts 50c each, or three for $1.00. Radio spark transmitters 75 watt portable Army Airplanes wavelength 100-300 meters price $3.00 each. C. W. 936 outfit complete, brand new, including tubes $150.00. Airplane transmitter and receiver type S. C. R. 68, new $25.00. Head sets Connecticut and Century $1.00. Pair Edison elements for B-Battery perfect. Largest type 3c pair. *Send money order. Modern Radio Company*, 1903 North 18th St., Philadelphia, Pennsylvania.

THERMO valve 5 watters $2.50, or six for $13. They're fb, too, OM. Spencer Radio Company, 1302 Division Street, Sulphur, Oklahoma.

GOLDBUG Bunnell speed key $7.50; 350/12 volt DC dynamotor, $5.00; UV204 old type, $65.00; UV206 1 K. W. tube, $100.00; ¼" bakelite panels, cut to size, 2c square inch; UT1643 magnetic modulator, 25c; UT1357 magnetic modulator, 50c; pancake oscillation transformers, $1.50; Metro phonograph units, new, $1.00; twenty watt Westinghouse transmitter, less accessories and antenna ammeter, $12.50; W. M. Derrick, 58 North Sixth Street, Newark, N. J.

ROICE 5-WATT DX BABIES $3.15 postpaid. CURTIS-GRIFFITH, FORT WORTH.

CHEMICAL rectifier users, are you satisfied with your results? Try 1CIC's solution material and see the difference. Purest chemical only, no borax, 50c. Trial package enough for four jars. 123 Blue Hills Parkway, Milton, Mass.

RADIO HAMS—EXPERIMENTERS—SCHOOLS and COLLEGES, Some wonderful buys on miscellaneous transmitting and receiving apparatus, while they last. Federal No. 311-W 150 watt Filament Lighting Transformers $5.00; Radio Corp. No. UT 1367, large type, Magnetic Modulators $4.75; Radio Corp, No. UP 1016 750 watt CW Power Transformers $12.95; Radio Corp No. UC 1803 Faradon Transmitting Blocking or Coupling Condensers $1.95; Radio Corp No. UC 1015 Transmitting Condensers $2.25; Radio Corp No. UC 488 1 MFD 750 volt Filter Condensers $0.95; Acme 500 watt Spark Transformers, Mounted $6.95; Acme 500 watt Spark Transformers, Unmounted $3.95; Thordarson Type R-S-I KW Spark Transformers $9.95; Radio Corp No. UV 1714 RF Transformers, range 200-500, 500-5000 meters $2.95. Terms, Money order or certified check 25% in advance, balance C. O. D. When stock exhausted remittances immediately refunded. This merchandise all new and guaranteed mechanically and electrically. Only a limited number. *Mail your order today.* F. D. PITTS COMPANY, 219 Columbus Avenue, Boston, Mass.

ZIED BUILT EDISON ELEMENT STORAGE Bs ARE BUILT FOR SERVICE ,ENDURANCE AND CONVENIENCE. NOTHING CHEAP EXCEPT THE PRICE. NUFF SED. ASSEMBLED AND WIRED IN OAK RACK, LID, WELDED ELEMENTS, ENGRAVED HARD RUBBER PANEL WITH CHARGE—RECEIVE SWITCH, SEALING OIL AND REAL CAUSTIC POTASH. 100 VOLT TYPE "A", $11.00 COMPLETE. 140 VOLT TYPE 3-G, $18.00. 100 VOLT HEAVY DUTY TYPE 5-G, $19.50. 140 VOLT, $26.00. TYPE "A" ELEMENTS ELECTRICALLY WELDED ON A NICKEL STRIP CONNECTORS 5c PER PAIR. TYPE 3-G, 6c. TYPE 5-G, 9c. NO. 20 PURE NICKEL WIRE 1c PER FT. NO. 18, 1½c. ¾x6" TUBES, 3c. 1x6", 4c. REAL CAUSTIC POTASH FOR MAKING 5 LBS. ELECTROLYTE, 85c. PERFORATED SEPARATORS. 1/3c. PERFORATED SHEETS 8½"x5¾" 5c EACH. 78 CELL COMPACT TYPE RACK WITH ¾x6" TUBES, $4.00. PRICES ARE F. O. B. PHILA. NOTE NEW ADDRESS. J. ZIED, 904 NORTH 5th ST., PHILA. PA.

EDGEWISE wound copper ribbon, the only really satisfactory antenna inductance .350" wide; 3¼" outside diameter 10c turn; 4¼" 13c turn; 5¼" 15c turn; 6¼" 17c turn; 7¼" 20c turn, prepaid any number turns in one piece; Geo. Schulz, Calumet, Michigan.

HAMS: Get our Samples and Prices on Printed Call Cards made to order as YOU want them. 9APY, HINDS & Edgarton 19 S. Wells St., Chicago, Ill.

ARRL SWEATER EMBLEMS SHOULD BE WORN BY ALL MEMBERS. They are 5"x8", yellow and black felt wool. Only $1. ERIC ROBINSON, JEFFERSON ROAD, WEBSTER GROVES, MO.

JUST because my ELECTRICALLY WELDED Edison elements give satisfaction in "B" batteries don't think that all batteries using Edison elements will give the same results. I use good, large size elements and weld two pure nickel wires on each negative element and one weld on the positive element. Sure, it costs more to do it this way, but it is the only way to keep the battery from becoming noisy. Genuine Edison elements, welded connections, complete with separators 8 cents per pair postpaid. Paul Mills, Woodburn, Oregon.

$2.00 EACH. Send and Receive Switches in case (British) type SES 42. Bought $10,000, worth United States Government Aircraft Department Radio Transmitting, Receiving Sets and Parts. Get our new and latest *reduced price list. Send stamp for list. Mail orders* answered all over the world. WEIL'S CURIOSITY SHOP, 20 South 2nd St., Philadelphia, Pa.

MOTOR Generator Bargains. Western Electric 110-229 V. Alternating Generator 1500 Volts 600 Watts $135.00. Robbins & Myers 220 V. 60 cycle three phase generator 750 V. 400 Watts $60.00 Esco 110-220 V. Generator 850 V. 100 Watts. $30.00 Robbins & Myers 110 V. 60 cycle single phase generator 750 V. 250 W. $65.00. Esco 220 V. 60 cycle 3 phase 1750 generator 400 V. 100 W. $25.00 220 V. Direct current generator 1000 V. 500 W. $65.00. 1500 V. 500 W. $75.00. All above machines are ring oiled and include field rheostat. Also many others including several 3000 and 4000 Volt machines. Write us for prices on anything in motors, generators and motor generators stating kind of current, voltage, etc. QUEEN CITY ELECTRIC CO. 1734 W. GRAND AV. CHICAGO, ILL.

8 BATTERIES assembled in cabinets with charger. 50 volt $8.00. 100 volt $12.00. Transmitting battery 375 volts $30. for fivers. F. O. B. Detroit, Wm. Woodroe. 1417 Clairmont, Ave., Detroit, Michigan, 8DAC.

QSL CARDS, etc. Samples for stamp. Erwin Martens, Gresham, Nebraska.

AN IMPORTANT ANNOUNCEMENT: WE ARE NOW DOING BUSINESS UNDER A NEW NAME. LARGER STOCKS AND IMPROVED FACILITIES MEAN BETTER SERVICE. EVERYTHING FOR THE HAM" IS OUR MOTTO. ALL STANDARD TRANSMITTING PARTS CARRIED IN STOCK. EVERYTHING FOR THAT SHORT WAVE SET. No. 12 "DYNEX" SOLID COPPER ENAMELED WIRE 1c FT. No. 10 (FOR HEAVY DUTY). 1-½c FT. PYREX CLASS TRANSMITTING INSULATORS. TRANSMITTING SIZE $1.50. RECEIVING SIZE 45c. PYREX-GAROD GLASS SOCKETS $1.50. 1/16" LEAD AND ALUMINUM, PER SQ. FT. 90c. "DYNEX" KEM ELEMENTS, 1" x 4" 6c. 1" x 6", 7c. 1-½" x 6", 8c. ALLEN-BRADLEY RADIOSTATS, $6.50. TYPE E-210, $4.00. "S" TUBES, $10.00. A FULL LINE OF CARDWELL, NATIONAL, ACME, RCA, JEWELL, THORDARSON, ETC., PARTS CARRIED IN STOCK. IF YOU HAVE NOT RECEIVED A COPY OF OUR NEW CATALOGUE WRITE AND WE WILL BE PLEASED TO SEND A COPY. IT IS YOURS FOR THE ASKING. "DYNEX for DX." NICHOLSON ELECTRIC CO. (FORMERLY 8BIN, E. J. NICHOLSON,) 1407 FIRST NORTH ST., SYRACUSE, N. Y.

SURPLUS MATERIAL from my station for sale. All new unless otherwise stated. Paragon ten watt transmitter, with 1 ampere meter, $10; Thordarson eighty watt eight volt filament transformer, $6; Thordarson three hundred watt twelve volt filament transformer, $8; Thordarson sixty watt filament-plate transformer for one five watter, no midtap, $10; Acme 75 watt ten volt filament transformer, $6; Amrad porcelain mounted lightning switch, $1.50; Electrose 5 inch leadin bushing, 50c; Acme OT, $4; RCA UC 1819 mercury condenser, $1; RCA UC1831 mercury transmitting condenser, $1.50; UV712 nine to one audio transformer, $3; WD11 tubes, slightly used, $1.25. Wm. M. Derrick, 2AHO, 58 North Sixth St., Newark, N. J.

FOR SALE—3 Repaired UV203 tubes $9.00 each, 2 new UV204 tubes $65.00 each, RC Variable Condenser UC1831 $1.50, Roller Smith 0-15 amps. Radiation Meter $4.75 Jewell Voltmeter 0-500 $6.00, Federal Hand Microphone $3.50, Federal Desk Microphone $5.00, RC Chopper wheel $2.00, Western Elect. Power Amplifier 7A Tubes and Speaker, cost $162.00 sell $45.00. Have various makes receiving sets to trade on short wave transmitting apparatus. Radio WTAP Cambridge Radio & Electric Co. Cambridge, Ill.

OM, have you ordered your ISOLANTITE SOCKETS yet? Fit 5 Watters, X Types and 201-A's, lowest of low loss and only 60c here. Glass Sockets for 5 Watters and 201-A's and for 199's only 40c either type. Those Walbert Univernier Condensers .000356MFD have lower losses than the laboratory standards, solid rotors and stators, glass enclosed only $2.95 here. The Univernier dial has a ratio of 12-1 and is the berries for sharp tuning on the low waves, $1.25. NATIONAL TRANSMITTING CONDENSERS .00015MFD COMPLETE WITH VELVET VERNIER DIAL SELLS HERE FOR $7.00. SCHNELL USED NATIONALS ON NRRL, REAL EQUIPMENT. And why have a low loss transmitter with a "mud" antenna system? Pyrex transmitting insulators $1.50; receiving size 45c; and Findlay 6" Standoffs, 45c are the stuff with No. 12 Enameled wire at 75c per hundred feet. You'd BETTER SEND FOR OUR HAM CATALOGUE TOO, it contains transmitter tips, transformer and choke coil design etc. Its free. THE HAM SHOP 501 Ruston, Louisiana.

AFTER SANTA CLAUS COMES: No. 4000-A "S" TUBES $7.50; JEWELL 0-15 AC VOLTMETERS $6.95; 0-500 MILLIAMMETERS $6.95. THORDARSON POWER TRANSFORMERS 550 each side $9.95; SPECIAL POWER-FILAMENT 250 WATT 550 each side $10.50. NEW UX-210 7.5-WATTER $8.95. ALUMINUM square foot 85c; LEAD square foot 85c. "HAM-LIST" 3c. CURTIS-GRIFFITH, 5IF, 1109 EIGHTH AVENUE, FORT WORTH, TEXAS.

EXPERIMENTERS—British genuine TWO GRID TUBES $3.00 each with holder. J. L. Grant, 308 Dominion Bank Bldg., Toronto, Canada.

GENERAL Electric dynamotor 1500 volts 375 watts used as generator $26., cost $48. 2ALP, New York.

INPUT and Intermediate Transformers for Superhet. $1.00 per set of four. Charles Kaps, 306 Engineers Bldg., Cleveland, O.

SILICON Transformer Steel cut to order .014", 10 lbs. 25 cents, 5 lbs. 30 cents, less than 5 lbs. 35 cents, 4 cubic inches to the lb. .007" for radio frequency transformers, 50c cubic inch, postage extra. At least ½ cash with order—balance C. O. D. Geo. Schulz, Calumet, Michigan.

RELIABLE WAVEMETERS in cabinets, rugged, accurate and dependable. 20-50 meter $9.00, 75-200 $8.00, 20-200 $14.00, postpaid with curve charts. Accuracy GUARANTEED within 1%. Also Crosley Tridyn Special demonstrator, can't be told from new, fully guaranteed. $40.00. Edward Bromley, Jr., Whitewater, Wis. 9CSM.

WHO IS BETTER EQUIPPED TO SERVE THE HAM FRATERNITY THAN THE ONLY HAM STORE IN THE FIFTH DISTRICT? GET ACQUAINTED WITH US, IT WILL BENEFIT US BOTH. TRANSMITTING CONDENSERS? SURE. WE CARRY BOTH SIZES IN THE CARDWELL MAKE, .00045 and .00025 $15.00 AND $10.00. WE CAN SHIP YOU ONE, TEN, OR A HUNDRED UC490 1 MFD. 1750 VOLT FILTER CONDENSERS AT $2.50 EACH. OUR CHEMICALLY PURE ALUMINUM HAS THE UNQUALIFIED INDORSEMENT OF EVERY ONE WHO HAS TRIED IT. ITS PURE, AND FORMS WITHOUT ANY TROUBLE WHATEVER. IT SELLS FOR .90c A SQUARE FOOT AND SHEET LEAD PRICE IS .75c PER SQUARE FOOT. AND AMRAD S TUBES FOR 1000 VOLTS? YEA BO. THAT'S THE BERRIES. IF YOU COULD EVER USE A PAIR OF THESE JUST ONCE, GOOD NIGHT. THE DIME BANK WOULD GET THE AXE AND WE WOULD GET THE ORDER. THEY SELL FOR $10.00 EACH AND SOCKETS ARE .85c. WRITE US FOR OUR NEW PRICE LIST? AND FIND OUT WHAT WE HAVE TO OFFER YOU. TWO CENTS WILL DO THE TRICK, AND ENABLE YOU TO GET WHAT YOU NEED, WHEN YOU NEED IT. AND WHEN YOU ORDER, HAVE A HEART OM'S AND ADD A LITTLE JACK FOR POSTAGE. WE CANNOT PAY IT ALL. FORT WORTH RADIO SUPPLY CO. FORT WORTH, TEXAS.

THE NEW HAMALOG IS OUT, THE FINEST ASSORTMENT OF AMATEUR TRANSMITTING AND RECEIVING PARTS TO BE HAD, BESIDES VALUABLE DOPE ON CONSTRUCTION, OPERATION, AND CARE OF AMATEUR APPARATUS. DISCOUNTS TO BONA FIDE RADIO DEALERS. Lots of new listings, such as Pyrex 7" insulators $1.50. 12" $3.50, Pyrex lead-in bowls $1.50; Findlay 6¾" stand off insulators 50c; The old standby, 20" Sure Fire porcelains $1.00; No. 12 enameled wire $6.90 per 1000', 75c per 100'; No. 14 enameled $5.00 per 1000', 55c per 100'; Edgewise wound copper strip, excellent quality, 4" inside diameter 10c per turn, 6", 12c per turn; Best clips made for flat strip, 20c; Complete inductances, like RCA, only $7.50; RENT AN OMNIGRAPH, EITHER 15 OR 5 DIAL, AT VERY LITTLE COST. SEND FOR THE TERMS; Plenty S tubes in stock $10.00, sockets 90c; Bremer-Tully short wave plug-in Ham tuner $8.00. B-T condenser, 7 plate $4.25; Erla 1000 cycle Ham audio transformers $6.50; 1/16" rectifier aluminum 75c per square foot, lead 90c; UC-490 1 mfd. 1750 volt filter condensers $2.50; UC-1014 3000 volt .002 mfd. grid and plate condensers $2.50; UP-1719 5 watt grid leaks $1.10, Ward-Leonard 5,000 ohm grid leaks for big tubes $2.45; STILL A GOOD SUPPLY OF UC-1831 4000 VOLT MERCURY VARIABLE TRANSMITTING CONDENSER ONLY $1.80, formerly $9.00; Cardwell transmitting condenser, 8000 volt .00045 mfd. $15.00; National variable transmitting condenser .00025 mfd., with 4" National vernier dial, $11.50, a real buy; SPECIAL, Signal key and sounder sets, can be used to make a high voltage break relay, at less than a key alone, only $1.50; NEW UX-210 7½ watt RADIOTRON, $9.00, UX-216-B RECTRON (KENOTRON), $7.50, UV-203 RADIOTRON $30.00. UV-203-A RADIOTRON $38.00. UV-217 KENOTRON $26.50; 50 watt sockets $2.50, Garod pyrex sockets $1.50; General Radio 247-W wavemeters, 150-500 or 200-600 meters $10.00, ½ and ¼ wave coils $3.00 extra; Thordarson filament transformers, 80 watt

$7.00, 150 watt $10.00, 300 watt $15.00, plate transformers, 100 watt $13.00, 450 watt $18.00, 900 watt $30.00, special plate and filament transformer for one 5 watter, $7.50 All popular sizes of Acme chokes; Ballantines Radio Telephony for Amateurs, $2.00; Jewell meters, thermo-ammeters $12.00, milliammeters and AC voltmeters $7.50; 284-W microphones $3.75; magnet w.re from No. 10 to 30 DCC; R-48 Signal keys $2.80, R-62 keys, ⅛" contacts $3.50; General Radio No. 260 supporting insulators 25c, get a box of 10; Transformer iron 11c per pound plus cutting charge, any size straight pieces. Include money for postage, please, or we'll ship C O D if you wish. Order from a real Ham store for service, and get the HAMALOG the only real Ham catalog, FREE. E. F. JOHNSON, 9ALD, Waseca, Minn.

Q R A SECTION

50c straight, with copy in following form only: CALL—NAME—ADDRESS. Any other form takes regular HAM-AD rates.

1AAO—H. H. Cooley, 460 Ward St., Newton Centre, Mass.

1AOA—St. George's School Radio Club, H. Churchill Op. Second Beach Rd., Newport, Rhode Island.

2CHK—Harold Sachs, 161 West 75th St., New York City.

2IR—James Goldman, 56 East 184th St., Bronx, New York City.

2IS—Donald Fischer, 133 Lawrence Ave., Hasbrouck Heights, New Jersey.

3ABX—Vance E. Murr, 215 South Front St., Harrisburg, Pennsylvania.

3OF—Albert C. Edwards, 2332 N. Woodstock St., Philadelphia, Pennsylvania.

3PF—W. P. Brown, Sycamore Road, Manoa, Delaware Co., Pennsylvania.

4OB—Guy Carter, 507 W. Duval St., Jacksonville, Florida.

4TK—Robert H. Reid, 507 W. Duval St., Jacksonville, Florida.

5SP—W. O. Ansley, Jr. P. O. Box 602, Abilene, Texas.

8AJX—Ray C. Spence, Western Electric Co., 104 North 3rd St., Columbus, Ohio.

8DDL—E. Willis Stratton, 96 Aberdeen St., Rochester, N. Y.

8SE—H. C. Block, 1 Oak Street, Ypsilanti, Michigan.

8SG—Richard H. Howe, Denison University, Granville, Ohio.

9CFN—C. G. Train, 110 N. Washington St., Lindsborg, Kansas.

9US—Vernon A. Kamin, 2039 So. 8th Ave., Maywood, Illinois.

The following stations belong to members of the A.R.R.L. Headquarters gang. Mail for them should be addressed care A.R.R.L., Hartford, Conn.

1XAQ	R. S. Kruse	1KP	F. C. Beekley
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1DQ	John M. Clayton	1ES	A. A. Hebert

"These Eveready Batteries are the correct size for your set. With average use they will last you a year or longer"

"You have been one of the many who use 'B' batteries that are too small in capacity for their receivers. That makes you buy 'B' batteries twice as often as necessary. Fit the right size Evereadys to your set and add a 'C' battery,* if you haven't one, and you'll get maximum service at minimum cost."

The life of your Eveready "B" Battery depends on its capacity in relation to your set and how much you listen in. We know, through investigation, that the average year-round use of a set is two hours a day. Taking that average we have proved over and over on sets of one to three tubes the No. 772 Eveready "B" Battery used with a "C" battery will last a year or longer.

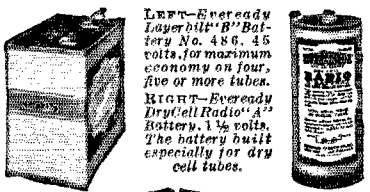
On sets of four or five tubes, the larger heavy duty Eveready batteries used with a "C" battery will last eight months or more.

The secret of "B" battery satisfaction and economy is—

With sets of from 1 to 3 tubes, use Eveready No. 772.
With sets of 4 or more tubes, use either of the Heavy Duty Batteries, No. 770 or the even longer-lived Eveready Layerbilt No. 486.

We have prepared a new booklet, "Choosing and Using the Right Radio Batteries," which we will be glad to send you upon request. This booklet also tells about the proper battery equipment for use with the new power tubes.

Manufactured and guaranteed by
NATIONAL CARBON CO., INC.
New York San Francisco
Canadian National Carbon Co., Limited, Toronto, Ontario



LEFT—*Eveready Layerbilt "B" Battery No. 486. 45 volts, for maximum economy on four, five or more tubes.*
RIGHT—*Eveready DryCell Radio "A" Battery. 1½ volts. The battery built especially for dry cell tubes.*

EVEREADY
Radio Batteries
—they last longer

EVEREADY HOUR
EVERY TUESDAY AT 9 P.M.
Eastern Standard Time
For real radio enjoyment, tune in the "Eveready Group." Broadcast through stations—

WEAF—*New York*
WJAR—*Providence*
WEEI—*Boston*
WTAG—*Worcester*
WFI—*Philadelphia*
WGR—*Buffalo*
WCAE—*Pittsburgh*
WSAI—*Cincinnati*
WWJ—*Detroit*
WOC—*Davenport*
WCCO { *Minneapolis* / *St. Paul*
KSD—*St. Louis*

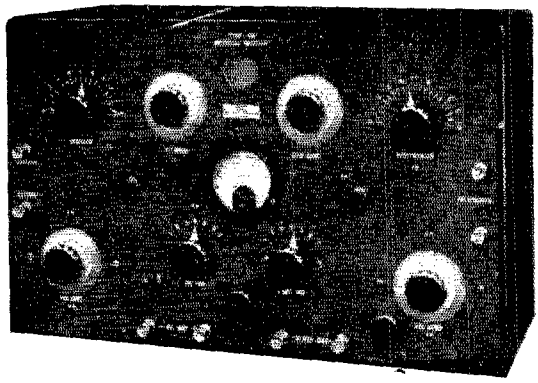
*NOTE: In addition to the increased life which an Eveready "C" Battery gives to your "B" batteries, it will add a quality of reception unobtainable without it.

—FOR YOUR CONVENIENCE—

QST'S INDEX OF ADVERTISERS

IN THIS ISSUE

ALWAYS MENTION QST WHEN WRITING TO ADVERTISERS



Special Close-out Sale

Kennedy Type - 110 Universal Receivers

ONLY $94.00

Your last chance to get one of these Kennedy Type-110 Universal Receivers you've always wanted—at less than a third of the original cost! You know the reputation of the Kennedy 110—famous among radio authorities all over the world for its supreme quality and workmanship. Radio engineers and university scientists agree—government tests have proved—that this is a most thoroughly efficient receiver up to 25,000 meters.

No finer Receiver than the Kennedy 110 Universal has ever been built. Scientific laboratories, universities, radio engineers and many amateurs gladly paid the original price for it because it has always been a standard by which others were judged—its record never has been equalled. With it amateurs all over the United States are receiving regularly European long wave stations—as well as long wave time signals and other interesting transmission beyond the reach of other sets, to say nothing of regular broadcasting, which is also within its range. Never has any other self-contained factory-built set been available to the amateur which performs with high efficiency over the extreme wavelength range of this set.

The few instruments offered in this special sale are all that are left of the regular production. They are being sacrificed because all of Kennedy's facilities are now concentrated on BCL sets, and this set naturally does not appeal to those whose only interest is in broadcast reception. Only the real dyed-in-the-wool radio amateur who **knows** radio can fully appreciate these instruments, and it is to him that this last chance is offered.

Understand, these are not cheaper models built to sell at a price. They are the identical receivers that were built to sell at $285.00 and the remaining few are offered at $94.00—less than ⅓ of their former price far less than their cost of production. Remember, quick action is necessary. This offer is so low—the value so great—the remaining sets are so few—that they cannot last long.

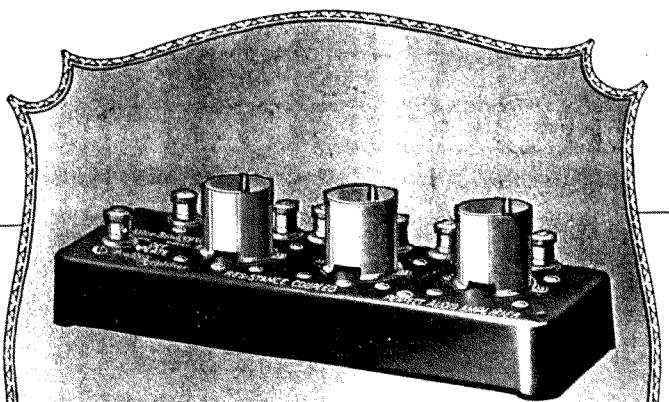
Orders will be filled as they are received. Send direct to the factory, with 10% remittance, balance when you receive the instrument. Order now—later may be too late.

The Colin B. Kennedy Co.

2017 Locust St. St. Louis, Mo.

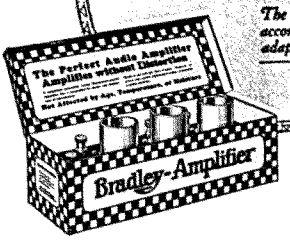
K E N N E D Y

The Royalty K *of Radio*



The Bradley-Amplifier is equipped with sockets that will accommodate the new UX tubes as well as the old tubes. No adapters are required for using any type of UX tube.

Retail Price in U. S. A. - $15.00
Retail Price in Canada - $21.00



Surprise Your Friends

With The Improved Tone Quality of Your Set

IT IS NOT ENOUGH that a good radio receiver is selective or is able to bring in distant stations. Quality of reproduction is now considered as important as selectivity and sensitivity.

Fortunately, the tone quality of your radio set can be quickly improved and perfected without disturbing the existing wiring of the set. All that is necessary is to replace your present audio-transformer amplifier with a Bradley-Amplifier. This compact unit employs no transformers and amplifies all tone frequencies with faithfulness and clarity, and without distortion.

It is a mark of distinction to have a radio receiver of fine tone quality and you will surprise your friends with the remarkable improvement in your set that follows the use of a Bradley-Amplifier. It is as easy to install as a B-Battery and usually can be installed within the receiver cabinet.

Be sure to try one, tonight.

Ask Your Nearest Radio Dealer for a

Bradley-Amplifier

Resistance-Coupled
PERFECT AUDIO AMPLIFIER

The Heart of the Bradley-Amplifier

TUCKED away within the polished bakelite base of the Bradley-Amplifier are six inconspicuous, solid molded resistance units known as Bradleyunits.

The Bradleyunit is the heart of the Bradley-Amplifier because it alone can amplify the incoming tone frequencies without distortion. It replaces the ordinary bulky audio-frequency transformer and eliminates the most frequent cause of distortion in a radio receiver. The Bradleyunit cannot deteriorate or change with age.

ALLEN-BRADLEY CO.
277 Greenfield Ave.
Milwaukee, Wisconsin

Please send me, by return mail, literature on the new Bradley-Amplifier.

Name.....

Address.....

.....

give your radio set more power

with one new Radiotron

Radiotron UX-112

DRIVE a car uphill beyond its power—and the motor knocks. Drive a radio set beyond its power—and the last tube chokes. But change one single tube in the set—and you have the power you need for *greater volume* and *finer tone.*

The new RCA power tubes add about fifty per cent greater efficiency to any radio set. They cost but $2.50, and need only an inexpensive adapter and a little extra current. Change the tube of the last audio stage to a new power tube, as any dealer will show you—and in ten minutes you have a new set.

RADIOTRON UX-112

The new storage battery power Radiotron UX-112 may be used in sets that use Radiotron UV-201-A. $6.50

RADIOTRON UX-120

The new dry battery power Radiotron UX-120 may be used in sets that use Radiotron UV-199. $2.50

Radiotron UX-120

You would not use any but a Mazda lamp in your lighting circuit. Why use any but an RCA Radiotron in your radio set? They are made by the same skilled workers, backed by the same research laboratories. But the Radiotron is far more delicate to make.

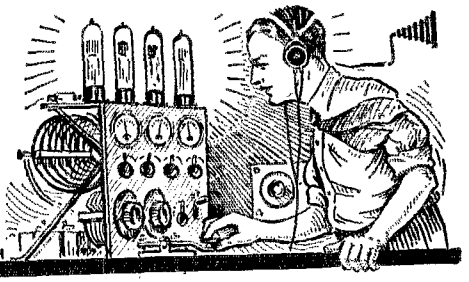
RADIO CORPORATION OF AMERICA
NEW YORK . CHICAGO . SAN FRANCISCO

RCA Radiotron

MADE BY THE MAKERS OF RADIOLAS

The Traffic Department

F. H. Schnell, Traffic Manager
1711 Park St., Hartford, Conn.



The Mid-Summer Short Wave Tests

By F. E. Handy

USING enthusiasm as an indication, the mid-summer tests were a glorious success! Everyone who participated deserves credit for his efforts. Thousands of stations were on the air. Hundreds of detailed logs were received at A.R.R.L. Headquarters reporting the consistent stations and comparing their audibility, both from minute to minute, and from four-hour period to four-hour period. Much valuable data was collected on summer transmission at 40 and 20 meters, but little of any value was sent in regarding five meter work, though we did everything possible to bolster up the five meter tests by Headquarters' support and though there were a score of high-powered 5 meter transmitters operating during the tests. Nearly twice as many reports of 40 meter reception were received as came in on the 20 meter work.

Restricted Period Stations

Some transmitters were selected to transmit during a "restricted" period. It was desired to have a few good and powerful transmitters that could be absolutely depended on to keep the schedules throughout the 48 hour period of each test, to give the observers a fair chance to do their part. A free-for-all period was also provided so that everyone who wished could take part and so that the best stations could have a chance to get the credit due them. Preliminary announcement of the tests was made in both June and July 1925 *QST* and a mimeographed letter was sent to a number of foreign amateurs so that everyone could take part.

The 40, 20 and 5 meter tests were held the last two week-ends in July and the first week-end in August in the sequence mentioned. Stations who definitely accepted restricted period assignments were: 1BCC-MOAGY, 1CAK-XAXZD, 1CCX-CCXMG, 2ADN-LXCMJ, 2AQD-ORK, 2BO-DVBO, 2XAF-2XAH-2XI-2XK-GENAC, 3APV-MFNBA, 3KW-NEWJ, 4SA-ORUMX-TXMRO, 6CGO-KOGOM, 6OGW-TENOR, 8BLC-NBNYB, 8CAU-CINCY, 8GZ-MANGO, 9BDN-QCDPT, 9CVR-PFZLX, 9DED-UDRGM, 9EHT-DIGET, 9UQ-COLAF, 9ZT, c2CG-ARMON, c4BF-COXMJ, g2KW-WRBKW, q2LR-LOMAS. Many reports were received on restricted period stations and some of the most valuable receiving work was done by operators of restricted period stations in the intermediate times when the transmitters were not in operation.

Outstanding Transmitting Stations

An examination of the logs that were received show which stations were most generally reported by the observers from four-hour period to four-hour period and to whom all credit is due for making the tests a success by their participation. 9UQ and 8GZ were easily the "star" stations of both the 40 and 20 meter tests. 2XAF, 6CGO, 6CGW, 9EK, 8CAU, 1CCX, 1CAK, 9XH, 9DMJ, 8LF, 2BW and 8BRB were reported from all over the world during the 40 meter tests. 4SA, 4OA, 4RL, 2XI, 2MU, 9CXX, 5ZAI, 1XAM, 8DME, 9RZ, 9EHT, 6BUR, 9RZ, 9ZT, 6BJX, 2BGI, 2SZ, 2BHN, 3APV and 1PY were reported similarly during the 20 meter tests.

The Best Logs

Following the tests, the mails brought in a great quantity of reports. In spite of the detailed account of the simple procedure that if followed would have given us the information wanted, only about 20% of the logs received were of any good in comparing the signal strength of certain stations from hour to hour over a daylight and dark period. At most of the "restricted period" stations, two and three operators kept a continuous watch, operating the station on schedule and making an accurate log of what was heard throughout the 48 hour period of each test. At 2BW seven operators held forth, sending the code word, "MOTTO" long after the act became monotonous to them. We understand that after a sleepless 48-hour vigil they purchased 5 pounds of steak and had a "rare" feed, after which they slept a week (at least they wanted to sleep that long).

A few of the reporting observers took special pains to make their results worth-while. The use of an audibility meter in a few instances, and practise carried out before the tests in comparing signals with a local audibility standard in other cases, helped in making some logs particularly valuable. At 9UQ the test work was carried out in connection with this work at Iowa State College and some excellent logs were turned in. We especially thank those of the observers who took pains to arrange all the reports on each station in chronological order, which much simplified our work at Headquarters on some logs.

The following men sent in the most valuable 40 meter logs:

4SA. R. Bartholomew, Porto Rico.
5ACD. Bryan Cole, Edmond, Okla.
9EHT. N. Douglas, Lawrence, Mass.
9UQ. Eugene Fritschel, Ames, Iowa.
—— L. K. Garland, Apollo, Pa.
8LF. J. R. Hall, Pittsburgh, Pa.
3CFX. J. C. Harper, St. Michaels, Md.
9EK. W. H. Hoffman, Madison, Wis.
1PP. F. D. Merrill, Northwood, N. H.
4JR. R. S. Morris, Gastonia, N. C.
—— Robert Osenham, Capetown, South Africa.
8CAU. W. C. Osterbrock, Cincinnati, Ohio.
O-A4M. S. C. Pleass, Johannesburg, South Africa.
9EGG. C. R. Rogness, Kenneth, Minn.
2MU. Wm. Schick, Brooklyn, N. Y.
—— R. J. Scott, Christchurch, N. Z.
4RL. A. E. Soldana, Porto Rico.
8LF. W. K. Thomas, Pittsburgh, Pa.
2BW. A. L. Walsh, Woodcliff-on-Hudson, N. Y.
4FM. E G.. Watts, Jr., Miami, Florida.
4NJ. T .B. Wetmore, Arden, North Carolina.
—— R. W. Woodward, Hartford, Conn.
9UQ. A. G. Woolfries, Ames, Iowa.

Other good logs came from 1AAP, 1AGW, 1AHG, 1ALP, 1AOF, 1AIR, 1AJO, 1AUJ, 1BAT, 1BC, 1BGI, 1BIS, 1BVL, 1CAK, 1PL, 1PP, 1PY, 1VF, 1BUO, 2ABW, 2ADO, 2AQD, 2AGQ, 2AOB, 2AUO, 2AT, 2BEE, 2BGI, 2BW, 2CYV, 2CTH, 2GX, 2SZ, 2XI, 2MU, 3UY, 3UX, 4JD, 4OA, 4RR, 4SH, 5AC, 5ANP, 5HC, 5LG, 5RS, 5VV, 6AGN, 6AIH, 6AJZ, 6BCL, 6BGE, 6BJX, 6BUM, 6BUR, 6CGO, 6CHS, 6CUO, 6DVY, 6CWP, 6GI, 6ZE, 7ACI, 8AAH, 8ADK, 8AFS, 8AGQ, 8BCE, 8BGN, 8BKM, 8BLP, 8SR, 8DCF, 8CKM, 8CDV, 8CPE, 8CEO, 8DAE, 8DME, 8GZ, 8LF, 8RV, 9AEY, 9AGL, 9AMX, 9AIV, 9ACW, 9APN, 9ATT, 9AIJ, 9BTZ, 9RKR, 9BIQ, 9BMV, 9BPT, 9BIB, 9CKH, 9CDV, 9CXX, 9CTO, 9DAU, 9DEX, 9DDP, 9DDU, 9DIY, 9DUM, 9DED, 9CYL, 9AVL, 9EIL, 9EIZ, 9HP, 9SE, 9OM, 9QD, 9UA, 9WO, z2GJ, zCB8, c3AZ, c3BL, c4GT, c1ED, c2CG,

C. E. Mortons, Sydney, N.S.W.; T. H. Vignoles, Uruguay, M. L. D.; A. W. Thomson, Victoria, Australia; D. Cuthbert, Onebunga, N. Z.; W. D. Horiman, Sussex, England; C. Houmant, Brussels, Belgium; J. W. Chapman, Anvik, Alaska; A. A. Kirkwood, Bath, Maine; C. Olson, Stony City, Iowa; F. T. McAllister, Maquaketa, Iowa; C. S. Frietschel, Clinton, Iowa; K. Rottgardt, Dahlem, Berlin, Germany; John Hollywood, Red Bank, N. J.; G. E. Kinsey, Seattle, Wash.; D. J. Gue, Alberta, Canada; L. E. Green, Pretoria, South Africa; W. A. Reeves, Seattle, Washington.

The following men sent in the most valuable 20 meter logs:

9EK-XH. C. F. Burgess Lab., Madison, Wis.
—— H. T. Dairymple, Akron, Ohio.
9EHT. N. Douglas, Lawrence, Kans.
6BCG. W. H. Friedley, Honolulu, T. H.
9UQ. Fritschel & Woolfries, Ames, Iowa.
—— Hewitt Grotewohl, Hartley, Iowa.
6TQ. K. A. Cantin, Honolulu, T. H.
q2LR. Jose Lara, Habana, Cuba.
4JR. R. S. Morris, Gastonia, N. C.
6SH. Myhre & Richardson, Honolulu, T. H.
6NL. Ray B. Rietow, Honolulu, T. H.
—— R. J. Scott, Christchurch, N. Z.
8LF. W. K. Thomas & J. R. Hall, Pittsburgh, Pa.
9ATT. Claude B. Vail, Jacksonville, Ill.
6DB. O. E. Wall, Honolulu, T. H.
2AUO. R. G. Wolf, Spring Valley, N. Y.

Other good logs came from 1ALP, 1AMS, 1BIS, 1CAK, 1CCX, 2BGI, 2BHN, 2PP, 2XAF, 3APV, 3CA, 3CF, 4OA, 4RR, 5ACD, 5LG, 5OX, 6AAQ, 6AFF, 6AGK, 6ALF, 6AWO, 6BCG, 6BEM, 6BJX, 6BUR, 6BX, 6CGO, 6CLP, 6DB, 6EB, 6GI, 6HU, 6SH, 8AYO, 8BKM, 8BWM, 8CDT, 8DHU, 8DME, 8GZ, 8LF, 9AEY, 9AKR, 9APE, 9BBH, 9BDW, 9BIB, 9CCS, 9CCY, 9CDV, 9CIP, 9CXX, 9CXH, 9DKA, 9EGG, 9EHT, 9EIZ, 9UA, 9WO, 9YAV, 1ER, m5RS, g5LS, rCB8, g2KF, g6JV, BER, g2BAW, c3BL, q2LR, c2CG, d7EC, R. J. Denny, Surrey, England; F. N. Corbin, Jr., Argo, Ill.

The work of examining the logs that were sent in and of making definite conclusions from the data received was quite complicated, in view of the large number of factors entering the problem under consideration. Many observers sent in lists of "calls heard"; few observers took pains to make their data complete.

In examining transmission of radio signals to prove or disprove the existance of or to find out something about reflecting and refracting media the results are confused by the minute-to-minute fading of signals. Ionization effects vary with weather conditions, temperature, pressure, and sunlight. Antennas have more or less directional effects depending on their physical dimensions. The field about the antennas of transmitting stations varies as some function of the distance. The strength of horizontal and vertical components of radio waves, the variation of these components with wavelength, distance and time-of-day also may be considered of some importance by the investigator.

There were plenty of observers but the average observer lacked good standards of audibility and good audibility meters. Receiving antennas and regenerative receivers do not give a response directly proportional to the signal field intensity. Also the general faulty interpretation of sound intensities by the human ear makes results uncertain and comparisons inaccurate. We have mentioned the large number of factors that bear directly on radio transmission phenomena. Probably the quick minute-to-minute fading was the biggest factor in making our technical results very "general" results. Over each half-hour period the audibility of many of the stations under observation varied from a large value to "nothing at all." Unfortunately no one had either data or recording instruments making it possible to integrate curves of signal strength during each period to obtain a "mean" value to use.

Three or four good transmitting stations with a score of well-equipped observers and operators who will persistently make some daily signal-strength measurements over a fairly long period of time, can no doubt add some very valuable and specific information on the subject of short-wave transmission. Any experimenters who are properly equipped to run some co-ordinated tests are invited to write A.R.R.L. Headquarters at Hartford. We shall be glad to put them in touch with others interested in advancing the knowledge of the art so that the good work that has been started may go on.

The Mid-summer tests definitely showed the changes that have taken place in amateur radio during the past few years. Radio is no longer a strictly winter sport. Everyone who took part can take satisfaction in the knowledge that something was added to the general information that is known about short-wave work.

REVIEWING OUR TRAFFIC SITUATION

By Fred Catel, 9DTK

DURING the past month, some changes have taken place in the amateur field. We have tried to handle traffic on all wave bands with but fair success. 20 meters is not yet useful for handling short distance traffic. Fair success has been reached on the 40 meter band, but owing to fading and the inability to handle traffic with stations within a 100 miles radius, we have gone back to 80 meters which seems to be the logical traffic handling wavelength. Both near and distant stations can be readily worked on this wave. The 175 meter band is still useful but only a small part of our traffic is handled on that band which is best suited for local and moderate distance work.

Most stations used to close for the summer but this was not the case the past summer. More traffic was handled this last summer than in some cooler months of other years. The reason is obvious. The short wave bands and the expeditions in the Arctic and Pacific may explain. I also think that the several new methods of securing traffic had something to do with it.

A review of some methods for obtaining traffic might be appropriate. In early spring, there was established the Tourist Free message service which has been briefly explained in *QST*, but which was so successful that it should be mentioned so hams everywhere will make a solemn resolve to give it a try next year. When this becomes established as firmly as our other activities, we will have larger traffic totals in summer than in winter. The general public will become better acquainted with the work the hams are doing and it is a foregone conclusion that a public well served will back the project that helps them, thus strengthening our position.

Most communities have a free tourist camp located nearby. These camps are established by various cities that are glad to extend every hospitality to visitors. Interested amateurs can readily get permission to post a sign reading, "Messages may be filed here for free transmission to any part of the U. S. A. and Canada in cooperation with the A.R.R.L. Please place your message in the receptical below." This sign used at the Milwaukee Camps brought good results, about 500 messages being filed there the past summer.

In a town of any size, message blanks can usually be obtained free by going to a prominent business house and offering the advertising space on the back of the message blanks that are wanted. This method was used at Milwaukee. The grandfather of a family returning from a tour of the West suddenly died. Relatives at Milwaukee knew that the family would camp at certain cities on their way home, but did not know at just which city they would camp, on a certain night, so I happened to be called upon for help to aid in locating this family. We went over the route and addressed radiograms in care of these tourist camps, along this route and he was located in a camp at Las Vegas, N. M. Now this is an instance of service that could not have been obtained any other way. Another instance of service rendered by amateurs; a man lay dying at his home in Racine, Wisc., and kept calling for a son who had been away from home for many years and a telegram addressed to his last known address was returned saying no such person there. This man's son-in-law called me and asked if the amateurs could aid in locating the lost son, they thought he was still in Minneapolis but had moved to a different locality. This being a different situation, a different method had to be used. A radiogram was addressed to any amateur in Minneapolis and was put on the air. This radiogram asked the amateur in Minneapolis to have his local broad-

casting station broadcast the message. The Milwaukee Broadcasting station (WHAD) was also prevailed upon to broadcast the message, the result is unknown, but the fact remains that the amateurs did everything in their power to locate this missing son, and that the amateurs must have a fairly good reputation or these people would never have come to them. Then there is the service rendereed during storms and other extraordinary happenings. During the recent cyclone in Indiana, the amateurs were the only ones to keep in touch with the devastated area. At Cave City, when Collins was imprisoned in the cave, the only means of contact with the outside world was thru the amateur. The earthquake in California; an amateur was the first to communicate with the outside world and get help and numerous other instances of help and service the amateurs give free to the general public.

Another service is what is known as the Free hospital and hotel service. Messages are handled free for guests at hotels and inmates at hospitals. Here again, a service which resulted in much good can be cited. 9ATO learned of a case where a young lad who was visiting this city, was suddenly struck down with a communicable disease and quarantined in a hospital. He secured the boys' home address and became QSO with a station in this town and thereafter until the boy was discharged from the hospital kept the family informed daily as to the condition of the boy and also kept the boy informed as to how things were at home.

We could keep citing cases like this for pages and pages and still there would be many cases of service which will remain unknown. I hope this has made clear to many the valuable service the traffic handling amateurs are contributing to the welfare of the general public.

THE TRAFFIC TROPHY

9SE simply walked away with high honors this month and on top of it all, handled practically all his messages in one week. The radio show traffic did the trick for him, but he certainly had to pound brass in any event. 847 messages these days — all boni-fide ones, certainly is a flock of them and to show our keen appreciation of this fine piece of work, we take pleasure in presenting 9SE with the starred rectangle—the highest award in the Traffic Department.

D. A. Bancroft — 9SE
7324 Aldrich Ave.,
Minneapolis, Minn.
Dakota Division
Messages:
Orig: 4; Del'd: 13; Relayed: 830; Total: 847

That doesn't seem quite enough so we will place him at the head of the Brass Pounders' League so you'll be sure to know it was 9SE who copped this month.

Brass Pounders' League

Call	Orig.	Del'd	Relayed	Total
9SE	4	13	830	847
1YB	146	43	152	341
6BJX	146	47	143	337
8EU	122	11	170	303
8DFO	172	—	12	184
8ZU	64	34	86	184
9BFG	18	23	141	182
9DWH	55	22	84	161
1GA	2	9	141	152
8DPL	15	7	124	146
1YC	22	33	81	136
6BUC	110	25	—	135
2CTY	38	42	39	119
9BKV	1	5	99	105
8GZ	14	26	64	104
4JR	10	18	74	102

9DTK turned in 502 messages, 9EK, 238 and 9BIB 103, but we do not understand why they didn't show the count for Originated, Delivered and Relayed. 9DTK and 8EU are going after this trophy—one or the other is determined to win it as shown by the increase in traffic each month. Whether 9SE can hold his lead for two more months—well, 9DTK and 8EU are going to have a say in it. 1YB looks like a strong contender and no one can predict relative position of these stations until the figures are turned in for next month.

We are not going to ask you to send us your message file each month. We trust you know how to count your messages, but in the event there becomes a close race for the Trophy, we may have to ask you to "show us" your messages. When you hold a message longer than 48 hours, even though it be but a few minutes over 48 hours, be honest with yourself and let it count only as one message. You should have mailed it and thus you are entitled to a count of two.

Remember this: Only messages containing the CITY and STATION of origin, a SUFFICIENT ADDRESS to insure DELIVERY, the TEXT and the SIGNATURE shall be counted. The date and number are important and shall be included whenever possible—it always makes a message look better with a date and number. When you are in doubt about your correct traffic total, we will count messages for you if you will send them in.

CLUB ACTIVITIES

RADIO Club of the California Institute has resumed activities for the year with a splendid program. A 50 watt station is on the air with nine operators to pound the key. Schedules everywhere are open to all, especially other college radio stations.

Santa Clara County Amateur Radio Association, QRA Box 861, San Jose, is on the air with the call 6SV—traffic and visitors welcome.

Yonkers Radio Club, under guidance of 2CIL and 2ADM are teaching hams how to operate—we need some more of this instruction in other clubs.

Sioux Falls Radio Club begins another season with a larger enrollment and regular organized experiments are being carried out. A transmitter and receiver is being constructed and code classes are held every meeting. Good work!

February 12 and 13 are the dates of the state convention of South Dakota. Coyote Radio Club of Vermillon is putting on the show and amateurs from the surrounding territory are most welcome. Let's see you there, OM.

P. W. Dann visited clubs in his section recently, getting around to the Western Amateur Radio Association of Oakland, San Francisco Radio Club, and the Santa Clara Amateur Radio Association (formerly San Jose Radio Club). This is a fine way for the DM to make contact and we'd like to see more of it.

Radio Club of Brooklyn holds the tenth annual meeting January 23, 1926. The affair will be a radio masque and dance and prizes will be given for the best costumes. Tickets are one fifty and are for sale at 2UD, 2PF or 2BRB. Looks like a hot time in store for those who attend.

Citizens Radio Club, of Omaha has been assisting Vigilance Committees in running down all manner of QRM. Very little of it is due to amateur transmitters. The local power company has been equipped to locate power leaks. FB!

Washington Radio Club is at the peak since 3AB started his famous lectures on mercury arc rectifiers —and may we say relays. 8AGD and 8DRY were recent visitors. We think 3AB believe no M.A.R. is complete with at least three relays.

INDIANA—Indianapolis Radio Club—During the month, quite a few auctions have been held these being a common thing in the club routine. A few words of explanation here may be helpful to other clubs. At various times, apparatus of no further value to the owner, is brought in to be sold at club auctions—10% of the proceeds are turned into the club treasury if the apparatus is sold for the owner; or all the proceeds if the apparatus has been donated. 9ASJ sold part of his junk to get a fresh start. 9PB, the second member of the club to go to Florida, sold part of his junk before he started.

The club is very fortunate in having Mr. Angus, 9CYQ, as a member (Vice-president) because in traveling over the country, he is often able to pick up bargains in apparatus and a great deal of helpful and

interesting dope to bring to the club. The following members drove down to Franklin one evening where they greatly enjoyed a visit with 9TG: 9CYQ, 9AUP, 9BIW, 9BVZ brothers, 9EJI, 9AQU, and 9CUR. Some members also went to South Bend Nov. 23d and joined in the hamfest held there by the Old Timer's Radio Club. They report being royally entertained. In order to enlist the enlightened BCL's into our ranks, the club is starting a code school. A room will be obtained where all who are interested can meet every week for plenty of good code practice from an omnigraph.

SOUTH BEND—"Old Timer's Radio Club" meets every Tuesday. 9OG is President for the fourth year and Mr. Kahn is Vice President. 9BHH is secretary and 9DXI is treasurer.

FORT WAYNE—Fort Wayne gang are up and at it. At the last meeting, they agreed to support the Broadcast Listeners Association which was organized to help clear up some of the qrm on the Broadcast wavelengths. The hams working on their own "hook" have cleared up some of the trouble.

OHIO—Norwalk Amateur Radio Association is having a membership slump due to most of the members being away at school. Their station 8DDQ is an ORS and is on the air every night for traffic.

Van Wert Radio Club held a banquet at the home of 8MQ, had several contests, much music and a talk by 8BX.

Mahoning Valley Amateur Radio Club has obtained a clubhouse at McKinley Heights, midway between Warren and Youngstown where a club station will be erected.

Traffic Briefs

DR. DUNN, 2CLA and Hudson Division Director was a visitor at A.R.R.L. Headquarters November 2nd. He told us of the tremendous success of his Hudson Division A.R.R.L. Meetings. If they keep growing in size he may have to get space in the New Madison Square Gardens. Wow! Wouldn't it be great to see that place packed with hams?

Another visitor during the month was ADM Angus of Indiana. We always welcome our visitors and take pride in showing them about the new shack.

Wayland Groves, 5NW, suggests that some of the OBS speed up when they transmit the broadcasts—he is out for 20 per or better. It is all right if they can shoot it at 20 w. p. m. if it is clean cut——— and in the same mail we find 2BRB asking for more speed in traffic handling. Which reminds us—are we slowing down in our operation? 2BRB says there are less than a dozen stations which can take traffic at 20 w. p. m. single. 2BRB says, "speed, pep and accuracy" is his motto. Yes, we agree, but what about some of those fellows who continually pound away at 10 w. p. m. double when you tell them not to QSZ? Are we going to leave them behind? Guess we'll have to unless they can step on 'er a bit.

8GZ comes along and tells us that he has handled over 600 words with z2AC sending single without a single repeat. The T. M. knows the answer, having met both of these chaps and having worked both of them—they are operators with a capital O. "Windy" will take with anybody any speed—z2AC may not be quite as speedy, but he is accurate. I've listened to both of them on NRRL and worked both of them dozens of times—I think they are two of our best.

DELIVER ALL MESSAGES PROMPTLY, please!

Messages held longer than 48 hours will be thrown out of the traffic totals—you lose one message for each one held longer than 48 hours. Get rid of them—don't let them hang on the hook. Mail them when you can't do anything else. Some of the Brass Pounders lost some through such carelessness this month. Nobody to blame but yourself, OM. Read the Seventh Edition of the Rules and Regulations. If you haven't a copy, drop us a card and we'll mail them to you.

Henry Reid, 4KU, resigned as manager of the Southeastern Division. He did much to make the division a headliner. A. D. Trum, 5AJP, 217 Catoma Street, Montgomery, Alabama and former ADM succeeds him. The gang elected him by a good margin.

M. E. McCreery, 6LJ, has resigned as manager of the Southern Section of the Pacific Division. Mac made the division what it is today and he deserves a vote of thanks from the whole Pacific Division. His successor will be announced next month.

A.R.R.L. Representatives in the Army-Amateur communication system have been appointed as follows: P. K. Baldwin, 1ZW, 899 Boylston St., Boston, Mass., E. M. Glaser, 2BRB, 845 E. 13th St., Brooklyn, N. Y., J. Morris, 4IO, 58 Frederica St., Atlanta, Ga., H. C. Storck, 8BYN, 694 Carpenter St., Columbus, Ohio, P. H. Quimby, 9DXY, Route 6, Omaha, Nebr. We want ten times as many applications for Army-Amateur communication as we have. Where is your card, OM? Don't wait any longer—we need you NOW! Send it to A.R.R.L. Headquarters and we'll put it in the hands of the right man.

In becoming the leading Brass Pounder for the month, 9SE must have used up a lot of "wrist oil" as practically all of his messages were cleared in one week. It was a good job OM! Congrats, and may your tubes hold out two more months. It isn't going to be easy sailing with 8EU's determination to cop the prize.

Do you want a handy chart for your station? Send five cents in cash to the Government Printing Office, Washington, D. C. and ask for Miscellaneous Publication number 67. You will then receive the best kilocycle-meter conversion chart we have seen for the money. Why don't we use kilocycles? Those opposed please send in your kicks to the T. M. Those in favor of using meters keep quiet! Hi.

Yes sir, every amateur heard or worked by NRRL will get a card—just give me time to address them. Haven't got my land legs back as yet.

What is the matter that we haven't had more enrollments in the Naval Reserve? Have some of you got cold feet because of the speed of some of the Naval operators? Ask Willis, 6TS, what he knows about the high speed watch on the U.S.S. California and ask him how long he stood the watch. If you think you can pound it with some of the Naval operators, that is if you really are good enough, why don't you make application for the Naval Reserve?

I don't believe many hams read Traffic Briefs and I am going to test it. The average QSL card takes up about 18 square inches. In my office I have 20,000 square inches of bare wall which I would like to paper with QSL cards. That means I must have over 1,000 cards. If you read these briefs, just send me your card with the words "I DO"—nothing else and I'll tell you how much space the cards cover. I'll also tell you which card I think is the prettiest one received. How long will it take me to cover the wall space and what district will have the biggest show? We're off for the wall paper!

TRAFFIC SUMMARY BY STATES

ATLANTIC DIVISION

State or Division	A.D.M.	Originated	Delivered	Relayed	Total
Md.	G. L. Deichmann, Jr.	15	15	41	71
Del.	No report	—	—	—	—
D. of C.	A. R. Goodall	—	—	—	71
So. N. J.	H. W. Densham	23	12	18	64
W. N. Y.	C. S. Taylor	37	18	150	205
W. Pa.	P. E. Wiggin	47	18	162	242
E. Pa.	J. F Rau	127	40	388	622
		249	103	759	1275

CENTRAL DIVISION

Ohio	C. E. Nichols	330	120	644	1274
Ind.	O. J. Angus	99	58	379	805
Mich.	C. E. Darr	—	—	—	334
Ill.		124	70	197	745
Ky.	J. C. Anderson	—	—	—	53
Wisc.	C. N. Crapo	—	—	—	1538
		553	243	1220	4949

DELTA DIVISION					
Ark.	Dr. L. M. Hunter	10	4	40	54
Tenn.	L. K. Rush	47	—	37	84
La.	C. A. Fristag	6	17	27	57
Miss.	J. W. Gullette	26	5	88	119
		89	26	192	314
DAKOTA DIVISION					
Minn.	C. L. Barker	74	59	1062	1225
No. Dak.	M. L. Monson	No report			
So. Dak.	M. J. Junkins	35	40	225	320
		109	99	1287	1545
HUDSON DIVISION					
N. Y. City	F. H. Mardon	—	—	—	691
E. N. Y.	H. H. Ammenheuser	358	289	641	1288
No. N. J.	A. G. Wester, Jr.	42	25	331	398
		400	314	972	2377
MIDWEST DIVISION					
Kans.	C. M. Lewis	41	40	202	273
Iowa	D. E. Watts	63	55	248	374
Mo.	L. B. Laizure	77	41	306	504
Nebr.	H. A. Nielson	39	30	237	337
		220	166	993	1488
NEW ENGLAND DIVISION					
Conn.	H. E. Nichols	—	—	—	346
Maine	A. F. Wheeldon	—	—	—	—
W. Mass.		88	55	221	364
E. Mass.	Gladys Hannah	117	103	487	707
Vt.	Chas. T. Kerr	164	65	236	465
N. H.	C. P. Sawyer	13	2	22	37
R. I.	D. B. Fancher	—	—	—	274
		382	225	956	2193
NORTHWESTERN DIVISION					
Wash.	Otto Johnson	—	—	—	301
Ore.	Paul R. Hoppe	16	10	1	27
Idaho	K. S. Norquest	—	—	26	26
Mont.	A. R. Willson	20	14	28	62
Alaska	No report	—	—	—	—
		36	24	49	416
PACIFIC DIVISION					
So. Section		195	253	612	1060
No. Section	P. W. Dann	52	54	160	573
Nevada	O. B. Newcombe	—	—	—	18
Hawaiian	K. A. Cantin	142	45	1	188
		389	352	773	1839
ROANOKE DIVISION					
W. Va.	C. S. Hoffman	34	7	64	105
Va.	J. F. Wohlford	41	290	9	340
N. Caro.	R. S. Morris	46	196	47	290
		121	493	120	735
ROCKY MOUNTAIN DIVISION					
Utah	Art Johnson	41	25	86	152
Colo.	C. R. Stedman	148	61	390	593
Wyo.	N. R. Hood	—	—	—	50
		189	86	476	695
SOUTHEASTERN DIVISION					
So. Car.	A. Dupre	37	20	133	190
WEST GULF DIVISION					
No. Tex.	W. B. Forrest, Jr.	7	4	70	81
So. Tex.	E. A. Sahm	3	—	3	49
Okla.	K. M. Ehret	27	19	98	363
		37	23	171	493

TOTAL FOR THE COUNTRY

Originated	Delivered	Relayed	Total
2811	2174	8117	18409

OFFICIAL BROADCASTING STATIONS

Changes and Additions

(Local Standard Time)

Call	p.m. 10,30	p.m. 7,00	p.m. 12,30	Days of Transmission Days of Week
1BFT	....	....	39	Sat. Sun.
1OC	75	75	....	Sat. Sun.
2CTH**	....	....	....	Tues. Thurs.
2CTH*	....	....	....	Tues. Thurs.
2CTH****	....	....	....	Tues. Thurs.
3BVD		78		Wed. Sun.
3LG		39		Fri.
5ADA	....	42.8	....	Sat.
6BUC	40			Sat.
6BUR***				
8DME	80	80		Fri.
8ZU	38		38	Sat.
8ZU		38		Mon. Wed. Fri.
9ABK		40		Tues. Thurs.
9ABK			40	Sun.
9AYK		41.4	41.4	Tues. Thurs.
9DOA	85	85	38	Sun. Fri
9DXY		82		Wed.
9DXY	82			Sat.
9BE			37.5	Wed. Sat. Sun.
WOAX	....	....	240	Tues. Fri.

***6.30 and 10.30 p. m.
**38 meters at 8 p. m.
*20 meters at 2 p. m.
****20 meters at 6 p. m.

DIVISIONAL REPORTS

THE ATLANTIC DIVISION
E. B. Duvall, Mgr.

THE Division Manager makes no comment this month other than to express his regret in the continued lateness of the reports from Western Penna. and New York. New Jersey also falls back into this habit this month with a late report. If this practice continues the Division Manager is going to take some immediate and drastic steps to eliminate the trouble, either by cancelling without further warning some important appointments or throw up the sponge himself. These are no idle threats. It is no pleasure to wait day after day beyond the closing date for these reports, holding up the complete report of the Division for one or two reports to come in. The clerical work attached to the issuance of ORS, OBS and other appointments, together with the general correspondence is of considerable volume, and this work is naturally held up when reports are due, Therefore, it must be evident to all that late reports are holding up the progress of the entire Division. It is certainly clear that the Division Manager is not getting the full cooperation from the various traffic officials. Changes have been recently made in the Division personnel with a view to improve these conditions, but to date no remarkable improvement is noticeable in some sections of the Division. As far as traffic activity is concerned, the Atlantic Division has taken the lead of late and it should be the interest of all to help keep the Division on top. If the Official Relay Stations are to blame and are not reporting on time, to their respective traffic officers, then the officers in question should take steps to eliminate the trouble by insisting on reports mailed on time or cancel appointments wholesale.

Assistant Division Managers and District Superintendents have been repeatedly warned and this is positively the last warning of this nature. Reports follow in order of their arrival at this office.

DELAWARE — No report.

MARYLAND — ADM, 3HG — 3BUR is being completely remodeled. 3VI is doing excellent work on 80. 3GT is getting out well on short waves and will have a 50 moating shortly. 3WA sports a 50 and kicks out in great style. 3BMO is putting out more DC sigs on 82 meters. 3RF is working fairly consistently. 3OP has a fifty watter going. 3CGC has had hard luck with his tubes. 3LG-3BVD has been on now and then. 3LG has been keeping regular OBS schedules. 3APV has been heard in N. Z. on 20 and 40 meters. He is keeping a sked with G2NB. 3DW-3EM is still silent due to work on the shack and antenna. (The DM is trying to find a free Saturday afternoon and Sunday to work on the antenna).

Traffic: 3RF, 17; 3LG, 15; 3GT, 4; 3WA, 2; 3APV, 33.

EASTERN PENNA.—ADM, 3FM—3AEN and 3ZM relaying on 40 and 80 meters consistently. 3BNU continues to do good DX work.

Dist. No. 2—3AUV has been very active with Naval Traffic and his record beating 50 watter passed out after 2 years of DX work. 8EU plans a mercury arc rectifier for pure DC plate supply and is a real traffic getter. He sure has his lamps on the traffic trophy. 8CCQ is at 8XE. 8WH is off the air. 8AVK is a new station on 40 meters. 8CFT made another spurt and handled 47 with important traffic to NKF. 8BIR is on the job, batted out a few but sez the QRU fever is bad. The Bucknell station is still on the rocks but 8CFF and 8BIR are trying to salvage it.

The 3d, 5th and 6th districts of Eastern Penna.

will undoubtedly be combined under one District Superintendent, 8BQ. ORS in these districts please report to H. M. Walleze at 717 W. 7th St., Hazelton, Penna. 3AHR is QRW at school. 3BQP tuning up for 40 and 80 meters. 3HD reports a schedule of watches on Monday, Thursday and Sunday from 7 to 8 p.m. and 12 midnight to 2 a.m. 3LW is QRW at U. of P. 3AWT clears the hook in less than 48 hours. Eckenrode, C. M. of Wilksbarre resigns. Dreisback of Allentown has dropped out and Snyder, 3CJN, is appointed CM of Allentown. ORS kindly note.

Traffic: 3HD, 5; 3BCT, 5; 3AHR, 3; 3BQP, 24; 3FS, 3; 3LW, 1; 3AWT, 11; 3AUV, 91; 3BNU, 7; 3AVL, 11; 3MQ, 7; 3LK, 11; 3BLC, 12; 3BVV, 8; 3PY, 8; 3ZM, 7; 3AEN, 1; 3EU, 307; 3BFE, 7; 3BQ, 35; 3CFT, 47; 3BIR, 11.

SOUTHERN NEW JERSEY—ADM, 3EH—The old reliable 3XAN and 3ZI are the only ORS in the 6th N. J. handing in any reports this month. 3BFH has come back. 3ZI has been working every District but the seventh on about 70 watts input. 3XAN has resumed skeds with 3XBF. 3SJ is on the job with his lone five watter. 3CBX lost his pole but is in action again. 3BRM has forsaken us for college. 3KJ at Atlantic City reports direct. 3ALX is still off the air. 3BO is tracing all his traffic. 3BWJ is working the west coast in day lite on twenty meters and finds it FB both ways. 3CO has taken a class of BCLs in code practice. 3JW gave them all a kick when he worked OA4Z in Capetown, Africa, recently.

Traffic: 3ZI, 7; 3XAN, 10; 3SJ, 4; 3BFH, 12; 3KJ, 4; 3BEI, 4; 3CO, 9; 3BO, 8; 3BWJ, 5; 3CHH, 1.

WESTERN NEW YORK — ADM, 8PJ — 8BRB has new antenna, worked 1CMP with .09 input. 8CYI is on 37.6 meters.

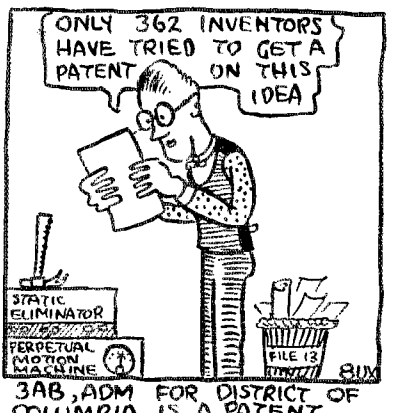
Traffic: 8BGN, 41; 8ALY, 43; 8BHM, 44; 8BLP, 3; 8CYI, 74.

DISTRICT OF COLUMBIA — Six District of Columbia stations have installed mercury arc rectifiers for high voltage plate supply, this type of rectification having become very popular. 3JO is the youngest and smallest amateur in the city and is doing some of the biggest DX, being heard regularly over the globe. 3ACM, using a five watt tube, is another station deserving special mention. 3BWT is the most consistent traffic handler.

Traffic: 3BWT, 44; 3ASO, 15; 3JO, 7; 3AB, 3; 3BSB, 2.

WESTERN PENNA.—All activity in this district centered around 8XE.

ALTOONA—8BAA has started up. 8BAA is on 10 watts, 8CCW on 170 meters. 8CCI is using fone on



170 meters. 8AHK is experimenting with Jenkin's pictures. 8AS is working with 8AHK in picture transmission and is the portable transmitter of WFBG. 8AKI is operated spasmodically.

9th Dist.—We have at least two aspirants to the traffic trophy. They are 8BRB and 8DPE. The second best rept. come from 8GI. The DS has been visiting around a little and the neatest amateur station he has seen so far is 8CJB. A bright spot on the horizon is 8AGQ. 8CEO is on the air at times trying to handle traffic, take care of Official Broadcasts, keep in touch with the stations in the district. 8DNF tried the Hertz but says ND. 8BW is going again. 8JW reports regularly. 8DOQ is having trouble on 40 meters. 8BY is on the air again. 8BBL is only on week ends. 8DNO is a new ORS. 8CRK and 8AYH are reporting regularly. 8BIT is on 39 meters with a 50 watter. 8VQ has been helping out at the shack but next month will have his own station on the air with his old call 8EW. 8CLV is back on the air on 39 meters after two months of experimenting with various types of aerial.

10th Dist.—The only prospects for a real traffic station in Johnstown seems to be in the union of X9CPQ and 8BYI. They are planning a 100 watt set to work on 40 and 80 meters. 8BRB is the real traffic station of Western Penna. 8CMQ has been quite active when he could keep tubes in the sockets. 8CMQ has regular schedule with 8CUH, 8CVE and 8DQ.

11th Dist.—8XAD would like scheds on 40 and 80 meters.

12th Dist.—8CXG, 8BDJ, 8CXS and 8BGB are all active at Erie and will be glad to take traffic for the Lake District. 8BXE is on the air with a 50 watter on 176 meters. 8DTS would appreciate a sched. with some of the stations in the dist. 8BUN is ready with his "perfect transmitter."

Traffic: 8BRC, 15; 8BRB, 77; 8CEO, 21; 8DPE, 42; 8BW, 6; 8BY, 4; 8DNF, 3; 8GI, 63; 8BLL, 11.

CENTRAL DIVISION

R. H. G. Mathews, Mgr.

INDIANA—The ADM finds that 80 meter stations are needed in every city of importance in the state so that messages can be more easily delivered.

Dist. No. 1—Several new stations are heard occasionally and many of the old timers are coming back on the air for the winter. ORS take heed; reports missed twice in succession is sufficient grounds for the granting of a divorce from your ORS certificate. 9BKJ has two schedules and works them in fine shape. 9AAI will soon have the OW as second Op. 9AVB and 9DLN are back on the air. 9QR is on regularly. 9DPJ keeps the operator on NISM in touch with the home town. 9EG is on 80 meters again, using a 50 with S tube rectification. 9EJT is stricken with forditis. 9DDA is on 180 meters. 9EJU was on 8 days when a storm got his antenna. This month another beloved ham, Walter (Pat) Moore, 9EJP, passed into the great beyond. His absence is felt by all. 9CAP is going good with two 201A's. 9DRS and 9EGZ are tearing the ether. 9CXG handles lots of traffic. 9BGO is working regularly. 9MM, at Converse, is going strong and craves some 80 and 180 meter stations.

Dist. No. 2—9DYT worked NISM at Haiti. 9DHJ worked a 6 with his 5 watter. 9BK says no local interest. 9ABI leads the South Bend list with 72. FB. 9BYL was heard in N. Z. 9AWU and 9BWI are both doing good work. 9AMI is leading out at South Bend with a 5 watter. 5OG's YL qrm is going again, but hasn't completely stopped his radio work. 9AIL is quitting the game. 9DLZ has gone back on 80 meters. 9BBH hasn't completely recovered from the burning down of his shack. 9AKD is going again. 9CUB is having bad luck with his master oscillator. 9ASX works all districts with his 5 watter. 9BO "Paul" is chief op at WSBT. 9DXI is the only station going at Mishawaka. 9DVE handles a lot of traffic on 40 meters. 9BYI is putting in telefunken 30 watter. 9ABP is going good on a 5. 9CP is still on 40 with a 50 watter. 9BSK is working sixes with a 5 watter. The Fort Wayne and Indianapolis gangs called on the South Bend gang Sunday, Nov. 23 and were royally entertained.

Dist. No. 3—9CKH refuses to go down lower than 80 meters. 9AHM reports activities light in Evansville. 9NG is on part of the time. 9AHM is working consistently on 40. 9NI is at Purdue. 9BSC has parts for a good 50 watt station. 9EBW has a standing schedule with 9ABL at Purdue so as to enable the home town boys to send for money without too much exertion or expense. 9BRK is on regularly on 40.

Dist. No. 4—9ADK is doing very good work. 9EJI, with two ops, handled the most traffic. 9CUR is operating an experimental set. 9BVZ has his sync rectifier going now. 9DTL, 9AXH and 9DUC are all going to Purdue. 1UW visited Indianapolis stations this month.

Traffic: 9ABI, 72, 9EJI, 65; 9ADK, 61; 9MN, 58; 9DPJ, 49; 9CXG, 44; 9BKJ, 33; 9BRK, 28; 9EG, 27;

9DVE, 22; 9OG, 22; 9BVZ, 22, 9CUR, 20; 9CKH, 20; 9DYT, 20; 9BUB, 21; 9EGZ, 18; 9DHJ, 16; 9CYQ, 16; 9DRS, 15; 9BSK, 15; 9CP, 14; 9AMI, 14; 9BYI, 14; 9AHM, 12; 9CCL, 12; 9CSC, 11; 9AAI, 11; 9AEB, 10; 9EBW, 7; 9QR, 6; 9AWU, 6; 9XE, 5; 9ASX, 4; 9BBJ, 3; 9DTL, 2; 9DLZ, 1.

OHIO—Dist. No. 1—8LO and 8AOE are on 80 meters. 8BSC is working on a scheme to increase Findlay's traffic.

Dist. No. 2—8RY handled a total of 52 messages. 8ZE is busy most of the time with school work. 8BXQ is out of commission owing to lack of tubes. 8BCE has just finished building a new shack.

Dist. No. 3—The Cleveland Radio Show, held November 7th, to the 15th gave the Cleveland Amateur Radio Association an opportunity to show their stuff. 8PQ was the call used and handled 526 messages for visitors. 8BWB wants everyone to know that he is now 8FL. 8DGP has been logging some fine DX. 8RJ is still on 80. 8BOP worked hard for the show besides handling 88 messages at home 8BPL of Akron, is pounding brass at 8DAE. 8PN is now in Cleveland. 8BYR is resigning as CM. 8-BNH and 8BPL now own a 50 watter. 8TT is stirring again on 40 meters. 8BKW is still shy a Power transformer. 8BKM is the only man we know using all wave bands from 17 to 200 meters. 8DMX and 8DRX have been QRW to do very much with their sets.

Dist. No. 4—8BON is going good. 8CWR will be on regularly now. 8CAU seems to be the star station of the district working foreign stations regularly. 8ARS now has a regular staff of operators on every night.

Dist. No. 5—8BYN is back for good. 8DO has too much studying to do. 8BAU is going good. 8DEM has been QRW college and football. 8GZ is working them all on 20 and 40. 8EI is rebuilding. 8PL has a 250 watter. 8BBH is chasing a YL and has no time for radio. 8DSY and 8CDI are up for ORS. 8CBI has been doing great work on 20 and 40. 20 meters is coming to life again and some great DX is being worked on that wave.

Dist. No. 6—This district is going to be reorganized by new Superintendent very soon. 8DFO is using 100 watts on 40 meters.

Traffic: 8DFO, 184; 8GZ, 104; 8BWB, 94; 8CAU, 86; 8DBM, 84; 8BOP, 83; 8BYN, 70; 8DPN, 57; 8RY, 5; 8BKM, 26; 8ADA, 29; 8PL, 26; 8DGP, 11; 8BAE, 5; 8TT, 18; 8BPL, 16; 8DMX, 17; 8ARS, 3; 8ZE 3; 8RJ, 8; 8CPQ, 1; 8DRX, 6; 8CWR, 1; 8BNH, 2; 8KC, 2; 8AA, 2; 8BCE, 3.

MICHIGAN—Dist. No. 1—8QN has a schedule with 8ZH. 8CWK was heard in N. Z. on a 5 watter. 8DOO leads the list with messages. 8BBI is seldom on the air. 8BD keeps chopping wood on 40 and 80 meters. 8AMS is still on the job for North Traffic. Saginaw High School's call is 8AOH. 8ZH is working only on schedules. Let the gang remember the next Michigan State ARRL convention to be held some time in February at Kalamazoo. 8DCW is having a hard time getting a good plate supply. 8MM is having a time with the various circuits. 8CED uses a "50." 8AYY is being heard all over the world. 8ALR is putting nice signals all over the U S and beyond. 8EG continues to do good work. 8AVO with one five watt bottle is working AYN near Australia. 8BWR is on the air with ¼ K. W. rectified and filtered A. C.

Dist. No. 3—8AUB of Grand Rapids is putting out a mean signal on 40 meters. 8CQG is going again. 8DSE is working out in fine shape, on forty meters. 8CPY is working on second harmonic. 8CPY is still looking for reports from the fellows in this district.

Dist. No. 4—8CE expects to be on the air regularly.

Traffic: 8CWK, 57; 8AUB, 46; 8DOO, 39; 8QN, 34; 8ZH, 26; 8EG, 16; 8ZZ, 16; 8CPY, 11; 8BOK, 11; 8DOE, 10; 8BD, 8; 8CEP, 7; 8EFP, 7; 8DFB, 6; 8AFS, 6; 8CED, 6; 8DSE, 6; 8DBO, 5; 8AKE, 4; 8DKC, 3; 8CFK and 8PF, 3; 8CQG, 2; 8JG, 1; 8ADK, 2; 8MM, 1; 8ACU, 1

ILLINOIS—G. W. Bergman has resigned as ADM of Illinois. The DM wants to take this opportunity to thank Mr. Bergman for his assistance while serving in the capacity of ADM.

Dist. No. 1 — 9AWU is attending Bradley in Peoria.

Dist. No. 2—9ALF took two messages from NVE the USS Utah at Guatanamo, Cuba. 9AJM is using one "fiver." 9BRX is on 40 but going to be on 20 and 80 meters again.

Dist. No. 3—9AHJ is using 5 watts on 40 meters. 9ATT has been heard in N. Z. on two "fivers."

Dist. No. 4—9AVH is getting his station on the air again. 9BCS is again in operation. 9VV and 9KX are rebuilding. 9CZL didn't handle as much traffic as usual. 9CLJ is installing two new DeForest H tubes. 9DQU has a new UV-204-A.

Dist. No. 6—9DQR is still experimenting on 40 meters. 9DCG did some experimenting on 20 meters with 2 wO1A's. 9EHQ says school QRMing his radio work.

Dist. No. 7—9AAE is now working down on 40 and 80 meters. 9ALJ is out for an ORS. 9DWH had trouble with his chemical rectifier the first part of the month and missed lots of traffic. 9RK was in operation almost every night. 9DAV replaced his five watter with a new UX210. 9ACW is in regular operation. 9AAW has been in operation entirely on 40 meters. 9ALK has been sick. 9APY has rebuilt his transmitter. 9BHG was on for only a short time because of school work. 9BOY has just returned from Wyoming. 9CIA moved his QRA and is rebuilding. 9COW blew his fifty. 9DLG is a new station. 9DZF is rebuilding. 9EAS was in operation only a short time during the month. 9FI is equipt with a new Generator and UX210. 9GE still handles traffic. 9GI is using phone and CW on high waves. 9QD has a new UX210. 9DXG is using a five watter on 84.4 meters.

Traffic: DWH, 164, 9QD, 78; 9IX, 73; 9RK, 59; 9CZL, 45; 9DQU, 37; 9AMO, 36; 9APY, 34; 9AAW, 31; 9CLW, 20; 9CLJ, 29; 9CNB, 20; 9AOL, 19; 9AIZ, 19; 9BHM, 16; 9ATT, 14; 9AQY, 11; 9GE, 12; 9ALF, 10; 9ALK, 6; 9AJM, 4; 9BQA, 3; 9BDA, 3; 9DYP, 2; 9CIA, 1; 9AVH, 1; 9CKZ, 1; 9DZR, 1; 9DQR, 1.

WISCONSIN—Dist. No. 1—9DTK is very busy with schedues. 9BBY receives due credit for his traffic handling. 9EIH handled some traffic this month. 9HW is still hibernating. 9CIB is on 80 meters. 9AFZ is on 40 and 80 meters.

Dist. No. 2—9EK is on for any emergency and has dry cell B Batts for any such case. 9BIB is going to rebuild soon. 9OM wants schedules with Madison and St. Paul. 9EAN is attending U. of Wis. at Madison. 9UZ was well represented at the QSO party. 9CUO is pretty QRW at BCL work. ORS's who didn't report, better watch ur certificates as some have not reported for two months now. 9COI is still using a "fiver" on 38.25 and 21 meters.

Dist. No. 3—9DKS is on 40 meters with a "250." 9DKA says he has been busy lately at "QSO" parties. 9EMD is still looking for more schedules. 9CIU is going good on 40 meters. 9BVA is having great success on the 40 meter band.

Dist. No. 4—9AZN still holds one schedule at noon with 9DTK. QRM from power leaks interfered badly with reception at LaCrosse. The interference committee is on the job. 9DCX says that school work keeps him pretty busy this season. 9BSO says school is the reason he reports no messages handled. Interest in traffic work in this district seems to be falling off and is not so good as last season. We must stick to the ARRL if we wish to survive and try to forget the few cents we can make serving BCLs.

Dist. 5—9DPR seems to be the only station left in this district. It looks as if the northern part of the state would have to be included in some other district before long, there is so little activity here.

Traffic: 9DTK, 502; 9EK, 238; 9BIB, 103; 9CUD, 83; 9DKS, 84; 9DUJ, 82; 9ATO, 67; 9AZN, 66; 9BBY, 58; 9DLD, 53; 9DKA, 50; 9CIB, 30; 9EBV, 18; 9OM, 18; 9EIH, 15; 9EMD, 13; 9DCX, 11; 9COI, 9; 9AFZ, 8; 9CIU, 5; 9BVA, 2; 9DPR, 2; 9BWD, 1.

DAKOTA DIVISION

D. C. Wallace, Mgr.

THE big coming event for Dakota is the South Dakota Division Convention. The dates are to be February 12th and 13th and the convention will be held under the auspices of the Coyote Radio Club at Vermillion, South Dakota.

We confidently expect that a man from Headquarters will attend this convention and we know enough of the Coyote Radio Club to be able to assure all who attend an extremely good time. The convention will be under the direct supervision of Assistant Division Manager Junkins and we strongly urge all those of the entire division as well as those of South Dakota to attend this convention.

MINNESOTA: ADM, 9EGU—Who says old Minnesota isn't in the race for the TD trophy? 9SE shows

us that the traffic is there if we only go after it. Messages? Yes—847 of them, and everyone of them bona fide. It makes us "puff up" so that our hats are too small and the buttons won't stay on our vests, and we're going to have some real traffic totals from now on. Schedules are working out nicely, and since the gang is getting back, the old war bonnets, the air is going to be mighty hot from Minnesota signals and activity. The rest of the states will have to wear asbestos cans so they don't burn their ears, and we have ordered lots of special long-wearing, heat-resisting pencils, too.

Dist. No. 1—9CMS is on regularly on 40 and 80 meters. 9EEP works good DX on 42.5 and 85 meters. 9EGU rearranged the shack with better results, moving the wall out of the field of the inductances. He is arranging schedules which are reliable. (Good idea for some of the rest of us, dontcha think? DS). 9DKR handled quite a bit of important traffic this month, and works on reliable schedules. 9EGF has trouble with power plant QRM, being only about 500 feet from one. 9CWN finds quite a bit of traffic handling collegiate messages. (For the last time the Duluth gang will have to snap out of that trance—the DS is on your trail, and your ORS appointments aren't worth very much right now. Let your conscience be your guide. ADM). 9ADW, a new ORS, is out for all there is in it.

Traffic: 9EGU, 20; 9EGF 4; 9CMS, 6; 9DKR, 27; 9CWN, 33; 9EEP, 8.

Dist. No. 2—9BNF uses a repaired 5 watter 17 months old and works NZ, A and Hu. 9ACT sold his set. 9AIR and 9EHO handle traffic on schedule. 9BTZ has rebuilt his entire station. 9EBC and 9COF find little traffic but are on regularly pegging away at what they can find. 9DMA has a 50 perking on 40 meters. 9CAJ works on all waves, and operates a fone on 170 meters. 9BIY, a new ORS, reports fine cooperation from the BCLs in the line of messages. 9EGG broke his wrist, keeping him off the air. 9DBW and 9BMT have consolidated their stations, and use a 50 on the 40 meter band. 9MB works the West Coast in daylight. 9DDB is installing a motor-generator set. 9BBV also changed from B batts to a MG set. 9MF is too busy with school work to operate very much.

Traffic: 9BTZ, 9; 9CAJ, 15; 9COF, 1; 9CPO, ?; 9EBC, 15; 9MB, 3; 9BBV, 1; 9BIY, 20; 9BNF, 19; 9BMT, 9; 9AIR, 6; 9EHO, 18.

Dist. No. 3—This month has been more or less broken up with the election of a new CM for Minneapolis, and the resignation of the old DS, Smeby. D. A. Bancroft, 9SE, is the new CM for Mpls. He is certainly starting out fine—banging out with a report like he did. Of the 847 messages handled at 9SE, 52 were for foreign countries, and were relayed to 13 different countries by ARRL stations. Most of the traffic originated at the Radio Show in St. Paul. 9SE says, "It would be wise to keep close watch to see where that TD Trophy goes, and I am hot on its trail." 9DGE is right with us, and hands in a fairly good total of traffic. 9DWO has installed a 50 and is getting down on the short waves. 9BNK worked F8Z, Mexican, and works on daily schedules. CZQ is QRW school but will be on at 9XI a little later on. 9ZT has worked a total of 24 countries, and works Great Britain almost every time he tries. His receiving antenna has been increased to 750 feet long, with a proposed extension of another 400 feet, and sure does bring in the foreigners, as well as U. S. stations that were never heard before. He says he hears Gs like 6es now. 9ECC is a new ORS.

Traffic: 9ECC, 62; 9BMX, 5; 8DYZ, 21; 9PH, 3; 9CVC, 16; 9DWO, 5; 9ABK, 3; 9BNK, 21; 9ZT, 25; 9DGE, 76; 9BOL, 18; 9SE, 847.

9BOL had his set at St. Paul Radio show. He uses a 203A and has been working Australia and BER.

SOUTH DAKOTA—9DDH is on with a 250 on 40 meters. DC on the filament and RAC plate. They are getting exceptional results and have ten ops on the job, 9BRI, 9BWN, 9AGL, 9BOW, 9EGU, 9DH, 9ASO, 9BNE and 9MN. 9AGL also has his own ten watter going on 40. 9BIY is building a sixty foot lattice mast and is ready to make schedules. He is the only active station in Sioux Falls. 9ALN is back on the air and doing good work on the 40 meter band. He is one of the old 9YAK spark ops. 9CKT blew his last fiver and invested in a new De-Forest H tube.

The second district has inaugurated a series of miniature conventions, two of which have already been held, one at 9CKD and one with the Milbank gang, both of which were highly successful, and a wonderful time was had by all the gang. Milbank has four active stations on the air. 9TI has a complete storage B battery plate supply. 9BDW handles messages from Aussies and several from pi-1HR. 9CBF blows fifties and merely laughs about it. 9NM finds traffic very scarce on 40. 9BKB originated his share of messages this month as he has been on more consistently on account of a cracked ankle received in a football game. 9DXR leads the district in traffic. 9DBZ has been on 20 and reports good results. 9DGR is back with another fiver. 9DZI is a new OBS and is very active. 9TI and 9CKD are Milwaukee read emergency stations. 9DID is moving to Milbank with another good station. 9CJS is trying out a DeForest 150 watter and worked everything the first nite. 9DVH is working on 150 with a fiver and doing fine work with a pure DC station.

Traffic: 9DIY, 2; 9DDH, 88; 9ALN, 2; 9CKT, 54; 9NM, 3; 9BKB, 11; 9DXR, 52; 9DBZ, 16; 9BDW, 15; 9CBF, 18; 9DGR, 27; 9TI, 9; 9DZI, 17; 9BBF, 5; 9CVH, 4; 9CKD, 7.

DELTA DIVISION

B. F. Painter, Mgr.

THE following were given certificates of Honor for the month of Sept. 15th to Oct. 15th and Stars were given for the reasons shown: 4CU: One certificate of Honor—One silver star for greatest traffic originated—One silver star for greatest total traffic. The following were given certificates of Honor for the month Oct. 15th to Nov. 15th and stars for the reasons given: 4IB: One certificate of Honor—One silver star for greatest traffic originated—one silver star for greatest total traffic. If you have not received information on the Delta Division Honor Roll, write the DM.

TENNESSEE—4IV reports that he soldered all the connections on his transmitter and the darn thing shows no visible improvements. 4CU has entered South Western University. The Memphis CM came up to visit the ADM and he reported that the local gang were in the clutches of the YLs.

BEMIS—The ADM is enlarging his station and will shortly have 500 watts.

KNOXVILLE—4HE has two 5 watters going on 80 meters and has a regular schedule with Memphis. 4UV is reported courting and is hardly normal. 4GL is doing very well except is QRW with a broadcast station. 4FX is still kicking up a little fuss now and then.

CHATTANOOGA—4IB is now on the air with his 250 watter and leads the Division with message total. 4EE has a couple of S tubes and is rebuilding. 4FP is still fighting to keep his counterpoise clear of the washerwoman. 4MM is trying out the 201A as a transmitter tube.

Traffic: 4IV, 2; 4KM, 19; 4IB, 63.

ARKANSAS—The BCL club in Little Rock offered prizes for the best transmitter and receiver. Some cooperation in that town. 5AW will soon be back on the air with Bradford, formerly 5ABY, as operator. 5ABI will shortly move to Conway, Ark., and will be heard from there. 5WK has worked over 600 stations since July and has found very little traffic. 5AWX is changing from AC to Chemical rectified.

Traffic: 5ANN, 2; 5ABI, 22; 5AIP, 22; 5AWX, 8.

LOUISIANA—5ASJ was injured in a motorcycle accident and badly cut his key finger. 5BZ is selling out. 5ABC has finally given up the YLs again but is QRW at school.

SHREVEPORT—5ML is using a superhet for receiver. 5BB hasn't done anything yet. 5AGJ is still trying to get a suitable rectifier. 5WY is still trying to hold down two jobs.

NEW ORLEANS—5EN has handled a few messages. 5NJ is moving his station from his summer home at Waveland to New Orleans. 5QJ works a New York Station and is connected with his brother by telephone. 5MQ kicks up an awful fuss with his UX-210. 5UK has done nothing unusual this month. 5AEN, who a short time ago, was a BCL, is woking all districts with his lone 5 watts.

Traffic: 5EN, 7; 5UK, 17; 5ACY, 33.

MISSISSIPPI—5FQ is working on 80 meters. 5AEV is having trouble with his transmitter. 5KR is having QRM from YLs and it looks like it will be fatal. 5API says that DX is good on the higher waves but no traffic. 5AGS has been working and attending school, so has little time for radio. He has ordered a German 40 watter. 5AKP has trouble with his receiver but DX is great on 40 meters. The Meridian Club celebrated its Fourth Anniversary Nov. 21 with

a big dinner and then pounded brass at 5AIZ and 5ARB all night.

Traffic: 5AWU, 11; 5ANP, 3; 5AFV, 20; 5AGS, 4; 5ARB, 10; 5QZ, 40; 5AKP, 31.

HUDSON DIVISION
E. M. Glaser, Mgr.

2CTY of Brooklyn takes the prize for the most traffic with a total of 119 messages. He has 38 originated, 42 delivered and 39 relayed. Ye D. M. is taking up the army work in the 2nd Corps Area and will appoint ORS whenever possible. He expects the utmost cooperation of the regular traffic department officials. Several officials are beginning to fall down on the job. ALL THEY DO IS TO SEND IN A MONTHLY REPORT. They should use a bit of initiative, join clubs, come to the Division meetings. WAKE UP! About 250 were present at the Second Division meeting at New York. We had talks by J. C. Banks of the Jewell Electrical Instrument Co., R. S. Kruse of *QST*, Dr. Dunn, Division Director, and the DM. We will probably have Reinartz in January. ATTEND! These meetings are certainly awakening some spirit in the dead ones and making the live ones livelier. All ORS not strictly observing rules are being cancelled rapidly. Better report or YOU will be left off the list. Watch your WAVELENGTH. Too many stations are outside their bands. Let's have some more traffic and make sure you know how to count messages.

NEW YORK CITY: ADM, 2CWR—2BEE has changed call to 2APV and is doing the usual fine work. There isn't much doing in the Bronx this month. 2BQL, 2CJE, 2CVL and 2CYX were the only traffic handlers. The C. M. of Brooklyn is away because of bad health and the borough is going dead except for a few reliable ones. About six ORS are going to be cancelled right here. 2BRB has been QSO Western Australia and all of Europe in a few nights of operation. A good phone is going on 180 meters which will probably be put on 85. The D. M. has been doing some experimenting below 5 meters also. 2WC was away to Chicago but did some good work in the remaining two weeks. He is QSO Australia and N. Z. 2AOF is doing well on a "fiver" since the fifty got dark inside. 2CTY did some fine work with NISM. 2KU handled a good bit of traffic. 2PF has a new shack and antenna and is giving a party upon the reopening of the station. 2BNL is using an antenna 10 feet long on the ground floor which works well on 40. 2ALS is doing well on his 50. 2AUY moved his tranx to Columbia University which is now going under the call 2FK. 2LD is very busy. What? 2CRZ is moving around the corner. 2EV now has a converter and S tubes in conjunction with a Hertz. 2AMJ has worked a few Is and Gs lately. 2HJ, ex 2XNA, New York City College, is doing good DX when the president (2BRB) gets time to operate. A Hertz antenna puts a good kick in the sigs. 2CHK attended the Montreal Convention. 2AQD is a new station. 2KR handled some traffic with his father in California. We wish the C. M. of Queens would get some pep in him and round up the flock of new stations on the air. 2AEP is doing practically all the work for the borough. 2BSL has a schedule with his cousin at 6BUC, Honolulu. 2AVE complains of business pressure. (We hope it isn't monkey business—D.M. Hi!) 2CIS has resigned his ORS because of lack of time. That's the spirit, OM. Now you can have it back whenever you want—D. M. 2ACZ is on 40. 2AKK has some new Kenetrons.

Traffic: 2BQL, 6; 2CJE, 4; 2CVL, 14; 2CYX, 21; 2BRB, 17; 2WC, 37; 2AOF, 18; 2CTY, 119; 2KU, 84; 2PF, 3; 2BNL, 42; 2CHK, 2; 2HJ, 10; 2AMJ, 18; 2EV, 18; 2ALS, 24; 2FK, 7; 2LD, 10; 2CZR, 6; 2AQD, 22; 2KR, 39; 2AEP, 32; 2BSL, 9; 2AFV, 37; 2AKK, 5; 2AKR, 15; 2ACZ, 3; 2CEP, 24.

EASTERN NEW YORK: ADM, 2GK—Dist. 1—2GY is doing a lot of experimenting on low power and reports working 8XAB in daylight on less than one-half watt input. They also worked A-2YI and B-4YZ. 2CLG has been keeping a schedule with PR-4KT to handle traffic between a sick girl in Jersey City and her relatives in Porto Rico. (F. B. OM.—D. S.) He also worked 2F's, 1-Z, 2-A's and BZ-5AA. 2AV is working F. B. now and that his right hand is almost in good enough shape to pound the brass again; he has been using his left hand for the past month. 2AIZ has been keeping a schedule with 2CKG who is at sea and delivered 45 msgs for him. 2BPB has been fitting up a station for a new ham in Mineola; just waiting for a call now. He also has a set perking on 5 meters and also has a schedule with MIT. 2AKV is using one UX-210 and he has schedules with 9APY, 2AKH and 1BUB. 6CKC is working his station while in the east. 2AJE sent in a good report. 2KX worked a few 6's and F's.

Dist. 2—Yonkers—The gang is returning to 80 meters and handling more traffic than ordinarily. A few new stations are going to be on the air this winter. 2ADD has been assigned the call 3WV at school in New Jersey. 2AAN has been handling more traffic than usual. 2CTF brothers have gone into the hardware business. 2AJQ is kicking out in fine shape with an entirely new station. 2DD is having trouble with the rectifier but still plugs away. 2CBG tried a Hertzian antenna and says it beats the inverted "L" by a mile. 2CIL is throwing out his little "Cess Pools" in favor of a generator. 2AG has the M. G.

going again. The D. S. operates the station Wednesday and Saturday nights. Peacox is also getting a new station going but is stalled for an antenna.

WHITE PLAINS—This gang has all gone down to 40 with good results. 2BQB was homesick a while and so turned in the greatest tfc total in a long time. He is trying a single wire in place of the cage. 2AZZ is working to win his ORS. 2CNS pulled down the cage. QSY'd to 40 and worked two G's right off the bat.

POUGHKEEPSIE—2CCV reports all Jake as usual and likes the town so well he has decided to stay there.

HOLMES—2APT expects to have a 50 going on 40 soon.

Dist. 3.—2AGM is off air on account of motor generator going bad. 2CTH is reaching out as usual and has a fine daylight signal. 2CDH is doing some excellent work in spite of trouble with BCLs. 2ANM has been QSO Australia and New Zealand. 2SZ is heard very often and works several schedules.

Dist. 4—2AKH continues his good work and is the star traffic handler of the district. 2CYM reports things very slow. 2AGQ has been appointed OBS. 2BSE expects to be married in a few weeks and will be on the air again soon with the O. W. as op. 2COV is on 40 meters and is stepping out quite well. 2AOX is trying to make his fiver perk on 40 meters.

Dist. 5—2AWF is busy these days at his Radio Store so not on air as much as usual. 2BSB didn't get started yet. 2PV rebuilt his transmitter during the past month.

Traffic: 2BPB, 2; 2AV, 15; 2CLG, 64; 2AIZ, 53; 2KX, 14; 2GY, 62; 2AKV, 49; 2AJE, 40; 2COV, 4; 2CIL, 1; 2BQB, 83; 2AJQ, 1; 2CTF, 1; 2CNS, 3; 2AAN, 34; 2AAZ, 42; 2AKH, 71; 2CYM, 4; 2AGQ, 30; 2SZ, 12; 2CDH, 65; 2CTH, 32; 2ANM, 9.

NORTHERN NEW JERSEY: Dist. 1—2BIM is having no trouble working the Aussies and the World. 2AT has the best traffic for the month in this district. 2CTQ is still pushing a five watter hard. 2CYV is operating at 2CXE. Two new stations have opened in this district, 2IS and 2AWI. 2ADU had the misfortune to lose his mast in a stiff gale. 2CVF and 2CGB have trouble working DX on 40 so are now on 80 working everything. 2CJX has returned to the air which was a result of his appointment as District Superintendent. 2CY is a new ORS.

Dist. No. 2—2WR is still off the air due to a bad power leak which hits the ADM hard. 9EHJ spent several weeks visiting the amateur stations in Dist. No. 2 as a guest of 2WR. 2AHK has a large traffic total due to his confinement to the house with a fractured leg. 2JH is still sticking to spark with plenty of QRM. 2SY reported for the first time in a year. 2JC reports working F8IK and 6 foreign lands. 2ZB is installing a new mast and will be on all waves.

2EY is one of the few on 200 meters. 2KS is rounding up the hams of Newark and promises us some good material. 2BW worked BZ1AB on 80 meters and handled traffic with NVE. 2ABS and 2TP are now on 40. 2AXF has dismantled the transmitter and bought a flivver. 2AGZ formerly of N. Y. is located in So. Orange.

Dist. No. 3—2AMB is organizing a new radio club in Woodbridge. 2AOB is in line for an ORS and maintains a very efficient transmitter equipped with emergency power supply. 2CRW has resigned as C. M. of Elizabeth. 2AEY and 2ACO are QSO school work. 2NK and 2AAW are new stations heard quite often. 2QS reports Plainfield gang very quiet. 2DX is rebuilding his transmitter copying that of WNP. 2CQZ is experimenting with crystals on 40 meters.

Dist. No. 4—2BUY and 2CXY say they never see their calls mentioned in traffic note so here they are OMs. 2AER is a newcomer in Red Bank, has a five watter on 40 meters. 2AUH has been busy with traffic with NISR. 2CPD is stepping as per usual. 2FC has rebuilt his antenna "a la 2WR" and the first night was reported in South Africa. 2CGK has been in silence for several months. 2BGI is QRW BCL sets.

Traffic: 2WR, 4; 2ADU, 1; 2CTQ, 36; 2AT, 48; 2BIN 6; 2CGB, 12; 2CJX, 6; 2BW, 6; 2AFG, 7; 2KS, 8; 2EY, 6; 2ZB, 37; 2JC, 11; 2CDR, 10; 2AHK, 15; 2CQZ, 22; 2DX, 1; 2AMB, 2; 2QS, 4; 2AEY, 4; 2FC, 4; 2AUH, 34; 2CPD, 29; 2CVF, 6; 2SY, 5; 2AGZ, 6; 2AER, 5; 2CRP, 18.

MIDWEST DIVISION

P. H. Quinby, Mgr.

A GENERAL house cleaning is taking place all over the division. New stations are appearing on the air every night and lining up schedules. Others are rebuilding last year's transmitters or replacing with new models. Everything is set for a winter of heavy traffic. New stations should write their ADM (address on page 5 of *QST*) and get lined up with instructions for reporting. The ADM will also be glad to help you solve your problems in getting on the air. Just ask him. The Army Amateur Radio Nets are getting under way, and those who are interested should register with the DM or the TM. Vigilance Committees are working overtime at this season and all stations should lend whatever cooperation is necessary. Committees should see to it that the BCL and the newspaper is fully represented in its membership.

IOWA — 9LC has 17 operators, and is open for schedules with any station desiring to handle traffic. 9CZC is going strong and has several schedules. 9AED's 50 kicking mean sigs all over the US and N. Z. 9BKV handled the most traffic. He is on 75.5 meters and claims it is better than 165 and 40 put together. 9DMS is on the air from 12.30 to 2 a.m. after work at KOIL. 9DMS handled one special Railroad msg. 9BPF and 9DIP report their transmitter has been on 78 meters, and their DX durmg the month, being Alaska, Nova Scotia. 9BCD's traffic was lighter this month. 9CGY is on the air, and has worked 18 states, 6 districts since Oct. 17th on 5 watts. 9DJA is operating on 40 and 80 meters. 9DAU succeeded in working Cuba and was heard in England. 9CWG has a master oscillator working on 40 meters. 9DOA kept schedules with 9BKJ, 9CYQ, 9DBZ and 9DXY. 80 meters was used. 9CS worked Cuba. 9EFS handles msgs from NVE, NRRL, NZ and Australia. His schedules were with Chicago, (9DWH) at 5.30 p.m. on 40 meters.

Traffic: 9BKV, 110; 9BEW, 2; 9CZC, 2; 9AED, 5; 9EKX, 7; 9DMS, 34; 9BCD, 4; 9CGY, 17; 9DAU, 41; 9CWG, 2; 9HK, 12; 9DOA, 44; 9CS, 10; 9LC, 40; 9EFS, 44.

MISSOURI—Dist. No. 1—Traffic is slow but more stations are getting on the air. 9PW reports joining 9BEQ and will operate there. 9AOT is QRV for traffic. 9BEQ takes first honors for traffic with 2 sets working. 9ZK-AAU is on but no traffic. 9DLB was on some but no msgs handled. 9BHI is remodeling.

Dist. No. 3 — The gang are ARW hamming when business and other QRM permits. 9EEH is a new one, on 40 and 200. 9DWK, also on 200. 9BSH has been on at times but no msgs. 9BDS has not located permanently.

Dist. No. 4 — 9ELT takes the honors for DX and traffic handling. 9RR, 9TJ and 9BKK are next. 9DRD continues his N. Z. and Aussie DX. 9EEZ worked 7 Z and A stations this month. 9BKK is back with a 203A instead of 201A. 9ACX blew his transformer and will resume with a 210. 9DBD is a new 5 watter. 9BND put in a 210. 9CZW is a new one with 5 watts. 9TJ was appointed OBS and is using a 210. 9FM is back. 9ADR rebuilt the works but says he's going to quit the 40 meter jam and go up again. The gang held a pole raising 9RR, who proceeded to hold a ragchew with the DM for 2½ hours at the first QSO.

Dist. No. 2—9CRM was confined to the hospital by sickness and while there received a pair of DX babies from some genuine ham friend. 9BUE continues, though handicapped by power leaks. He schedules 5ES of Commerce, Okla. The R. I. was at 9BUE recently and set wave at 174. 9AOB is batting out the QTC with a 250. 9UI has been heard often. 9CLT is trying a schedule with 9DAE. 9DAE also has one with 9DNJ, and 9DNJ has one with 9BSP. 9AOP keeps schedules with 9BFG. 9DLH was heard testing on 80 meter band again. 9ARA is still at school. 9EBY and other Butler stations are reported on the shelf. 9DVF is on Saturday and Sunday. 9AYK reports 40 good for DX but not much news. 9CDF is on 38 with 80 watt input. 9AOB sends a war report that BCL's have twice cut down his 70 foot mast and it is protected by a barbed wire fence enclosing the back yard which is made more attractive by connecting a live transformer to the fence. No smell of BCL roast yet reported. 9DJI is on 40 for traffic. 9CYK has a new 50 foot mast and gets better DX than before. 9DAE is still bucking the BCL's at noon and after 10.30, but they are not satisfied with that. 9EAO is still active. 9BSV and 9AJW are new stns. 9FF is on again.

Traffic: 9BEQ, 51; 9AOT, 10; 9DXN, 10; 9DVF, 16; 9CDF, 2; 9AYK, 4; 9DIX 1.; 9EAO, 7; 9AOB, 44; 9EEH, 14; 9DWK, 14; 9CZW, 2; 9BND, 28; 9EEZ, 26; 9AOC, 1; 9DAE, 6; 9ELT, 61; 9BKK, 19; 9ACX, 1; 9ADR, 4; 9ZD, 1; 9DRD, 2; 9TJ, 32; 9RR, 94; 9CRM, 15; 9BUE, 7; 9DNJ, 22.

NEBRASKA — Dist. No. 1 — Interest in traffic is certainly livening up in this district. 9NL got back on the air with a 50 on 40 meters. 9DUO has his set built up in good shape. 9BFG continues his good work on 80 meters and maintains regular schedules. One look at his traffic total ought to convince us that this is the solution of our traffic problem. 9AWS is heard consistently. 9DXY is now on regular working schedules and DX. 9CGS was heard a couple of nights, then silence. 9AIJ is a consistent station. 9RGK, with his brass tube antenna, is working DX but not much traffic. 9AL is also on. 9BNU reports no activity. 9DPS is on spasmodically. 9CDB and 9AHF are new stations.

Dist. No. 2—9EEO is working DX as usual and will take traffic from nearby stations. 9DAC is still working everything in sight on 20, 40 and 80 with the 50 watter. 9EAK works on 20, 40 and 80 also. 9ALT is doing good work on 40. 9PN sends in a fine report as usual. 9DI is using low power and sends in a larger report than some of the fellows with big tubes. Schedules, of course! 9AFR, 9BDU and 9DJP have little time for radio at present. 9AML is giving the BCL's a rest. 9ANF and 9CIN are operating at KFAB.

Traffic: 9DUO, 2; 9BFG, 183; 9AWS, 6; 9DXY, 35; 9DUH, 16; 9NL, 57; 9EEO, 6; 9EAK, 10; 9DI, 15; 9DPS, 7.

KANSAS—Dist. No. 1—The Lawrence gang have a real active station in their midst in 9DNG. He is on about four or five hours daily. 9EHT is on when he can get the time from school activities. 9AJU and 9DVI are on week ends. At last we have some activity in Topeka again, 9CET and 9BZG. Kansas City activity dull. 9CKM is out for DX on a new 40 meter set. 9BXG moves the traffic. 9DMB and 9ECZ report "Wifie" QRM. 9DBH uses a Hertz with a UX210 in Hartley circuit and reports it all FB. 9CVL says the Atchison gang are tired of working N. A. and although they hear many foreign stations, they can't raise them. 9CFI has been dismantled but is back on 40 and going strong. 9QR is on 80 rarely. 9ACQ puts 175 watts into 80 watt tube and gives BCL QRM.

Dist. No. 2 — 9DHW is now on 40 with a fiver. 9DHW is a very QRW. 9AIM is still working Aussies, and reports traffic good. 9BRD didn't handle any traffic, but says that he isn't dead by any means. 9CCS moved a few messages.

Traffic: 9BHA, 20; 9AFP, 8; 9AIM, 20; 9DHW, 6; 9DVN, 30; 9DVL, 35; 9DBH, 16; 9DNG, 19; 9EHT, 2; 9BVN, 55; 9BXG, 33; 9KM, 28; 9CFI, 2; 9CCS, 6; 9ACQ, 3.

NEW ENGLAND DIVISION
T. F. Cushing, Mgr.

RENEWED interest is being manifested in all districts and every mail brings requests for ORS applications to Division Headquarters. All indications seem to say that this will be the amateur's busiest Winter. Different Assistant Division Managers are offering special prizes for the best traffic totals in their localities. Another ADM is arranging to work all his ORS stations during the month. Other ADMS could follow this idea, also, and the Division Manager would then try and work all the ADM's during the month. This would tend to unite the whole Division.

There have been many recent ORS appointments, some of which are: 1PB, 1CAB, 1AFO, 1HJ, 1AYJ, 1SO, 1RF, 1ACK and others. Many cancellations have been made, and I am sorry to say, some for not reporting. In future if an ORS is cancelled because you fail to report to your district officer, it will be noted in this column, where all can read. Moral: Watch out and don't have your ORS cancelled for this reagon. As Division Manager, I assure you I do not like to cancel your ORS certificate, but the Rules and Regulations to which you agreed and signed say you must report regularly. These Rules and Regulations must be lived up to, and your Division Manager has installed a system whereby he can check all stations in the Division not reporting.

EASTERN MASSACHUSETTS—Dist. No. 1—1AEO has a schedule with 9HP, and his best DX is G5TA. 1AHZ had his halyard on his 100 foot break and is now waiting for some steeplejack to put in a new one for him. 1LM is standing by. 1NV, also a member of the "also ran" class as far as traffic is concerned, reports QRW from school studies. 1BAD has schedules with 2BPB at five P. M. daily, 9CSL at 10.05 pm daily for two weeks, and 9EZ at 10 pm daily. 1YC has daily schedules with 1YB and 1AID so can guarantee express traffic in those two directions. The daily schedule with 1YB hasn't failed to function since it was established a month ago. A message was taken from 2XBF for Edison Electric Co. in Boston and was delivered immediately by telephone, a testimonial letter from the Edison is now on the wall of the shack. Who says people don't appreciate "ham traffic?" 1ZW is having his "A" battery charged after fifteen months of continuous service without a charge. 1CIT hasn't been on very much as he has a special job at Tufts. 1CJR is very QRW at MIT but managed to handle quite a bit of traffic. 1AGS is at Northeastern. 1AF is no more. The shack on top of the Harvard station burned down.

Dist. No. 2—1UW knocks the cans off a few NZ's and Aussies when he is home. 1AHL bought a WE 250 but junked it. 1ACI blossomed out with a pure d. c. note. 1CC is all set to go with a new set, although 1SE is trying to find his pure d. c. It left home one night and has never been seen since. (perhaps 1ACI has it.) 1BUO is QRW school. 1BAT has just started up and worked all but the 6th and 7th districts with one UV-201-A. 1GA with a three foot four inch counterpoise worked NZ and Aussie and South Africa 4Z, the first night. 1AXA is only on week-ends but can work the world each time he is on. 1RR is getting married. 1RF is a new ORS. He has a 50 watter and is getting on very well. 1BVL is QRW but found time to QSO R-4YZ with 11 watts input to a fiver. 1AUF is on again. 1ZG is getting out with his 50 watter. 1ALP is trying for an ORS. 1CH says not much traffic but can work DX. He worked a new Country, L-1JW in Wadfr, Luxembourg. 1SL sent in his report. Remember every one a prize for the station that handles the largest number of messages for three consecutive months and all messages have to be perfect, and sent to me for checking.

Traffic: 1AEO, 24; 1ZW, 3; 1CJR, 41; 1CIT, 3; 1KY, 36; 1BAD, 34; 1ACJ, 7; 1YC, 136; 1BZQ, 10; 1CEA, 3; 1ACI, 13; 1AHL, 4; 1AVF, 42; 1ALP, 14; 1AXA, 10; 1BUO, 57; 1BAT, 6; 1BVL, 13; 1CPQ, 6; 1CH, 14; 1GA, 152; 1RF, 12; 1SE, 10; 1ZG, 8; 1AIR, 10; 1SL, 10; 1DI, 7; 1OU, 18; 1NT, 4.

WESTERN MASSACHUSETTS—Dist. No. 3—1AMZ is a very active station. He reports that traffic is picking up. He is still on 40 meters with a 5 watter. 1CLN blew out his lovely generator. He is now on S tubes temporarily. 1AAE has been keeping a schedule with NVE, and the West Coast. 1XU only heard occasionally and then on 40. 1VC reports fine DX and lots of traffic. His DX during the period was BZ-1AB, 11GN, NTT, H-9AD, G-2AO and G6TD. 1ARE is taking a much needed rest and having an overhauling.

Dist. No. 4—1BVR is using a 50 watter now with 225 watts input, and getting out fine. 1AAC still doing Transatlantic and Transpacific DX with ease. 1ABF is giving up his ORS. 1BLU received a QSL from the STORK and now he has a Junior Operator. 1APL, one of our newest ORS has changed his plate supply, but is handling traffic regularly. 1CRZ is the proud owner of the only ORS certificate in his city. 1AWW very busy with Division Manager's duties, but is on the air somewhat.

Dist. No. 5—1BIZ-1SZ is handling lots of traffic for Smith College. If anyone has YL's at Smith, route messages through his station for prompt service. During the month, he handled 42 mesages for the College.

Dist. No. 6—1BC-1BOM has been closed down for the Winter and Darling is now operating from 1AOF. 1AOF will be on very consistently.

Dist. No. 7—1BKQ is rebuilding from the skyhook down. 1DB reports better results in his new location. 1AAL has moved again. 1BQK is back again. 1XZ is on frequently and is working good DX. 1BBP is back in Leominster. 1JV has given up his ORS. 1AQM is making efforts to get back on the air. The D. S. almost believed Bill had turned BCL, but he knows different, as he almost lost a night's sleep helping him build a few things which are needed in a transmitter.

Traffic: 1DB, 4; 1JE, 10; 1XZ, 11; 1AKZ, 5; 1ASU, 5; 1BIZ, 92; 1AAC, 8; 1BVR, 13; 1AAE, 37; 1VC, 61; 1CLN, 6; 1AMZ, 52; 1BLU, 5; 1APL, 22; 1AWW, 33; 1CRZ, 4.

RHODE ISLAND—1DP, the CM of Pawtucket, reports that he tied up with BCL work so no traffic was handled at his station. 1AHE has a receiver that beats them all. 1ABP is on about the same and is working Europe regularly. 1AFO is on 40 meters and getting out in good shape. 1CAB is rebuilding to work on 40. 1BCC is using a UV-201-A tube and working good DX. 1PB is a new ORS and is getting out FB with one fiver. 1AEI is simmering along but seems to find the same trouble on 40 as all of us, no traffic. 1AWE blew himself out of 50 watters so put in one of the new UX-210 tubes and worked two 6's the first night. 1BIE is rebuilding his receiver and putting in another 50 watter. 1AKK reports that he has too many schedules to keep with his YL, so no traffic has been handled. 1ABEI-AGX is a new station.

Dist. No. 2—1AAP has been changing from 40 to 80 and picked up a little traffic, but is back on 40 again. Using one fiver, he has worked seven European stations in a week. 1BVB has been on 80 and picked up a load of traffic. Will someone please tell us why all the traffic is on 80?

Dist. No. 3—1BQD is the only station running here. There were four stations in the Providence District that failed to report this month. Failure to do so next month means cancellation of their ORS certificates. As there is no DS in Providence, all stations are requested to report direct to the ADM at Westerly until a DS is elected. All reports must be in this office by the 18th of the month to be included in the ADM's report.

Traffic: 1AHE, 2; 1ABP, 10; 1AFO, 41; 1BCC, 6; 1PB, 10; 1AFL, 5; 1AWE, 14; 1BIE, 6; 1AGX, 16; 1AAP, 15; 1BVB, 104, 1BQD, 45.

MAINE—As this will be my last report as ADM, I wish to thank you all for the hearty support and cooperation which you have given me, and also to wish you a very Merry Xmas and a Happy New Year. 1AYJ, 1SO, 1BIG, 1OR, 1ACK, and 1UU have all applied for an ORS ticket. Who said things were dull up in Maine? 1SO is on 40 meters. 1CKQ is on 80 meters. 1APF is on 40 occasionally, and even an old time spark man is going to start with a modest low power transmitter using "B" batteries for power. 1AYJ has been issued an ORS certificate. 1VF has a new UV-203-A, but due to lack of plate voltage gets only as good results as with a fiver. 1BNL is acting District Superintendent of District No. 2. He will have a Uv- 201-A on 40 meters soon in Rochester N. H. 1ACO is on 80 meters every night from 6.00 to 8.00 pm. 1ATV is trying to fix his transmitter so that it won't bother 1KL's Father, who is nearby and cannot get interested in code. (We take it that 1KL's OM is a BCL). Why don't you convert him? ADM) 1KL is experimenting on 40. 1IT says that bread and butter comes first, and he has

not time for radio now. Same applies to 1BHR and 1BKK. 1BIG who is one of the applicants for an ORS, handled 60 messages. Things have started with a bang in Bangor. There are three stations on 80 meters and one on 40 meters. Of these, 1UU and 1ACK have applied for an ORS ticket. 1EF leads the state again in traffic handled. He is resigning as ADM on account of going away the first of January, 1926. 1AUC is going to Connecticut for the winter so all the 5th District hams please report direct to the ADM until further notice.

NEW HAMPSHIRE—1AER is on again with a 50 watter on 83 meters. 1BFT is on every night on 38 meters, and as 1OC on 75 meters, and has a schedule with 2CDH. 1YB tops the state for traffic this month with 341 messages. They have worked South Africa and Australia. They are keeping the following schedules: 1YC at 1.00 PM, daily, 1SZ at 6.20 pm daily and 1BIG at 1.30. 1ATJ has just completed a transmitter like KFUH and reports it FB on 40 meters.

Traffic: 1YB, 341; 1AER, 56; 1BFT, 49; 1ATJ, 19; 1ACO, 8; 1ATV, 32; 1ACK, 16; 1AYJ, 14; 1BNL, 11; 1BIG, 60; 1EF, 73; 1SO, 15; 1UU, 10; 1VF, 4; 1KL, 11.

VERMONT—The 1st Dist. contains a fine report from 1YD and notes the fact that their reception includes Japan 1AA and stations in every continent. 1BEB is the only traffic man in the district handling 12 messages. 1BBJ has promised some for the next month so watch out. 1AVZ not on the air much of late due to the death of his Mother. Please accept our dee pest sympathy, OM. 1BDX the Dist. Supt. reports QSLing this report while sitting on the transmitter. 1BIQ landed back from South Africa.

Dist. No. 2—1APU not on much due to illness of the OW. 1AC, the Dist. Supt. is as usual on very often and handled some traffic on his 50 watter on 80 meters. 1AJG is very busy with the ADM business. 1AEY eloped and is now happily married.

Traffic: 1BEB, 12; 1AC, 11; 1AJG, 14.

CONNECTICUT—Your ADM trusts that all stations in this state have received the Division Manager's request to keep at least one schedule a week. This would put traffic handling back into its old stride and our totals would move up accordingly. Come on, fellows, let's get some short-jump relaying in the works and this will make a lot more fun in our game and give us all a chance to do something. I want to thank all the ORS men who have been faithful in reporting so regularly and certainly appreciate their cooperation. Let us all work to make this a record-breaking Radio season.

1ADW is working under adverse conditions due to a bad power leak, but is able to put his traffic through in spite of it. 1MY is reaching out on 40 meters and reports working Brazilian 2FP. He will probably be hooking up soon with WSP now that WNP is off. 1BFI has joined the Naval Reserves down at 4NKF. 1AOX has five stations lined up to work schedules. 1AFL is carrying on the work of the Waterbury district. 1CBG has a commercial ticket. He and his Dad are ready to handle any messages that come their way. 1AYR is planning on a fifty watter. 1BGC, 1CTI report no special excitement except BGC worked Mexican 1AF. 1BHM says he works France and England. 1ANE is anxious to get lined up with some nearby stations for traffic. 1AVX reports being heard in Holland and Italy, also worked British 6NF. 1AJO, 1HJ, 1BLF, 1ABN, 1BGQ, 1AXN, all good Stamford relay men, are outrivalling each other in trying to see who can get the biggest message total. 1AXN, City Manager, says next month's report will be a "whopper" since a prize has been offered by the local radio club for the best traffic man. F. B.

Traffic: 1BLF, 2; 1HJ, 35; 1AJO, 23; 1ABHM, 18; 1MY, 2; 1AVX, 15; 1ANE, 91; 1BGC, 8; 1ADW, 34; 1AOX, 28; 1CBG, 19; 1ABN, 7; 1AXN, 40; 1AFL, 10.

NORTHWESTERN DIVISION

Everett Kick, Mgr.

ONLY a few stations reported this month. The reason for this in unnecessary, snap out of it gang! Circular letters will be mailed this month with a few questions to each ORS and each are compelled to be answered if you wish to retain your ORS.

OREGON; ADM, 7IW—Portland is real active this fall. Stations in operation most consistently are: 7LQ, 7IT, 7PP, 7VP, 7ADM, 7ND, 7AEK, and 7KY. 7YK, the Benson Tech. Radio Club will be on shortly with a 50. 7LQ has a whiz of a Xmitter and receiver. 7IT uses 800 volts of Willard Storage Battery for his 50. He recently received a pair of stirrups for being the first station in the 7th Dist. to QSO Chile. FB! 7ND is QRW but manages to be on once in a while. 7AEK makes good use of a 203A. 7VP is happy for a report from Aust. in form of a card. 7PP is very consistent on 80 meters, despite blowing up a number of tubes 7KY uses a 5er with "S" tube rectification. 7AJB kept a sched. with a couple of sixes.

Traffic: 7AJB, 27.

MONTANA, 7NT, ADM—7DD put up his regular monthly antenna and handled the most traffic. 7GS, who has a sched. with 8ZU, handled a nice amount of traffic. 7EL is still getting fixed up. 7NT is QRW with office work. 7AHH has a fiver on the air. 7AGF hasn't had much success on 40 so is contemplating to QSY up to 80. 7MB is at Bozeman doing his stuff at the State College. 7PU has moved to Stevensville and about ready for traffic. 7ACI is about ready to be back again.

Traffic: 7DD, 24; 7GS, 23; 7NT, 5; 7ZU, 10.

IDAHO, ADM, 7OB—7QC is on once in a while. 7JF is observing quiet hours until he has a set going. He hasn't his call yet but is ready to start upon its arrival. 7RQ and 7VU have their College set going on 40 meters. 7YA is heard, doing good relay work. 7PJ is back from the Coast where he was pounding brass on shipboard. 7FT has left his ship and entered the U. of Washington.

Traffic 7JF, 26.

ALASKA; 7DE, ADM—7SM is on 190 meters using 2 50's but not QSO the states. 7CX and 7OE will be on the air soon. 7KN's antenna blew down for the second time. 7DE is still doing good work on 40 meters.

WASHINGTON; ADM, 7GE—7EK ex 7ABB is reconstructing station.

Dist. No. 1—7VL, a non-ORS, takes the traffic honors. 7AF has a fifty coming up. 7AFC will be on soon. 7WA and 7FQ failed to report. Watch your ORS tickets, OMs!

Dist. No. 3 -7WQ tried a MO set but it's not so good, due to bum tubes. 7NH got a late start but knocked off a few. 7AHA sez more power coming up. 7NO and 7DC are back on the air. 7WS is a commercial op and sez he can't live up to ORS regulations.

Dist. No. 5—7AFO reports trouble with keying system but will be OK soon. 7AIM lost his antenna, Halloween nite. 7IJ reports no traffic to be had. 7DF blew his second tifty. 7AGI will be on shortly.

Dist. No. 7—7AO-7RL are QRW school at W. S. C. 7UL, the station of the Radio Frat at W. S. C. will be on the air soon. There ought to be enuf ops at W. S. C. with 7AO, 7RL, 7ADP, 7GB and others attending the school. Arrange your schedule now, fellows!

Seattle—7OY is Seattle's new CM, and is showing up the old one already. 7OT is a new ORS. 7NL is going good and rates an ORS ticket. 7UQ works everything. 7ABF and 7BL are experimenting. 7AFL, 7ADQ, 7AKD, 7YB and 7BU will be on soon. 7AQ, 7FD and 7HO are experimenting on forty meters. 7FD reports his new QRA is 50% better for DX than the old one. A2YI and A3EF are the first DX hams heard. The YMCA is building a set for 40 meter work, with 7RU doing the heavy work on it. Our DM up in Everett, is rebuilding his Ether buster. Insure your fones, now, fellows! He signs 7EK instead of 7ABB now. Judging from DX heard at 7FD last few nites, next month's report should be a dandy. Let's make it complete next time by reporting your traffic and other work.

Traffic: 7NL, 53; 7UQ, 48; 7BY, 36; 7OY, 35; 7WQ, 32; 7VL, 25; 7AFO, 23; 7HO, 16; 7AIM, 9; 7TT, 9; 7NH, 5; 7AO, 4; 7DF, 2; 7OT, 2; 7AG, 1; 7AHA, 1.

PACIFIC DIVISION

P. W. Dann, Mgr. No. Section

NORTHERN SECTION—A resume of the reports shows that the traffic handling has increased considerably and the Manager is very much pleased to see this, so let's get busy, fellows, and hit for a higher average next month.

Dist. No. 4—The mighty 6OI opened up this month. 6BMW was the STAR for traffic with forty two, with 6CLP splitting honors with 6OI for second place with a total of thirty-five. 6BON QSA Aussies and NZlanders and doing excellent work. 6HC received good reports from Australia. 6AMM did some fine work with HU-6BUC and saved a sick person a good deal of time and worry. 6CAI due to the arrival of a Jr. op, has not had much time for radio. 6BCL's schedule with C9CK discontinued. 6AOI has a fiver meter set going and wants tests with amateurs. 6CUX is the new CM for Stockton.

Section 5—B. Molinari, SM—6CKK is experimenting on the 4.7 and 77 meter bands with a lone fiver. 6CGR, an old timer and prewar 6DW, is back on the air on 40 and 80 meters. 6CLS is trying to decide whether Mullard or RCA tubes are the best. 6DCD and 6BGI say that 80 meters is the only wave. 6RH has one fiver that the Aussies ond NZ gang know. 6CRF is having trouble making his 3.5 meter set work. 6AC-6CW are on steady with two ops. 6CHL is having good luck with his new 100 watter. 6AWT will be on the air with 500 cycle juice supply. 6GU on 40 works HU-6BUC. 6 CEG, on 80 meters now but will QSY as soon as he gets his 50 watter and new slop rectifier. 6CLZ has been very busy; all he needs is a pole. 6IM worked 9ADO on a fiver and an indoor antenna. 6BI QRW now with audibility tests for the Radio Research Society of Calif. 6ZD reporting tho not yet? ? an ORS. If you fellows want to see a real "HE" station, take a squint at our Director's station, 6ZD's. Some station ! ! ! 6AKU a new ORS is sure doing his stuff on 40 meters. 6BJV is a tuned plate-grid enthusiast. 6AOA is working on a new receiver. 6CTX still using the lone fiver and getting out F. B. 6EW has been sick. 6ANW reports changing to 50 watts. Becker, the D. S. of Dist. 5, advises that most all of the ORS stations of Oakland have failed to send in their reports and requests some cooperation or the "PINK" cards will go to Headquarters, which means that you fellows who do not report will lose your ORS's. 6VK and 6WP have combined stations. Three transmitters will be usable, viz: One M. O. set on 80—One fifty watter on 20-40 band and the other on high wave work 150 to 200. 6CMG has a neat receiver and transmitter. He is one of the stations who is sending in his reports on time. 6CQG-6BGR has moved and things are rather upset in his new location. 6CLB has a new antenna which is working fine. 6AHG. the live wire President of the WARA, and the ARRL, is back on the air after an absence of almost two years. 6AUU has a new set in the process of construction and expects to be on soon. 6BIP-6TI not on much due to 6BIP QRW with Thesis work and 6TI's absence on a trip around the world. Sacramento district is practically dead as 6FH is the only one on in this district. 6BAF reports slow progress but with his persistence and stick-to-itiveness, he will get a couple of stations going. He reports 6BWR and 6SA showing life. 6BAF will have "S" tube rectification supply on his new 50 watter.

Traffic: 6UO, 18; 6CMG, 5; 6CLB, 9; 6VK, 10; 6WP, 10; 6AKU, 10; 6AOA, 5; 6CTX, 11; 6GU, 2; 6IM, 3; 6BIP, 8; 6CRF, 9; 6BIA, 8; 6RH, 11; 6CHE, 11; 6RW, 25; 6AC, 22; 6CLS, 35; 6CVQ, 32; 6JP, 1; 6AWT, 60; 6CHL, 20; 6AOI, 4; 6CUL, 12; 6BLT, 12; 6CLP, 35; 6BVY, 17; 6ADB, 5; 6AIH, 22; 6NX, 22; 6BON, 9; 6AMM, 18; 6HC, 5; 6OI, 35; 6AJZ, 7; 6BMW, 42; 6CAI, 3; 6CFI, 8; 6BCL, 10.

M. E. McCreery, Mgr. So. Section

Southern California hams are reporting a general deadening of the ether as winter comes on. Whether this is due to the fact that few stations are on the air or because 40 meters is not so good in California, in the winter is question. Some of the gang are trying 80 meters again in hope of improving things. As is usual, most of the traffic is being handled by a very few stations but messages are getting through OK. Originated traffic is a sure remedy for those who complain of wasting away for lack of something to do.

Dist. No. 1—Activity in Orange County is none too peppy, due to the efforts of good looking YLs in that neighborhood. 6HU and 6APP, however, have enough manhood to resist their treachery, and stick to the key. The San Diego Silver Gate Amateur Radio Association has just been reorganized, and meetings are now held every two weeks. New officers are: Pres. 6CHX. V. Pres. 6AJM. Sec'y. 6AKI. Treas. 6BAY. 6SB has been experimenting with different antennas, but all seem to push the sigs equally well. Hawaii has been worked several times by 6BWY, who uses two 201A tubes. 6BAS is building an experimental station to use the call 6XBI. Although 6CHX is kept busy at the YMCA and schooi, he has a 5 watt master oscillator set ready for 20 meters. 6AJM is the DX station of the district, having worked stations from Europe to Australia. 6CGC has a temperamental receiver that works about once in two weeks. 6ZH is trying a new antenna. 6BQ has opened up at La Jolla, and has kept a schedule with P. I. for several weeks, he can guarantee to QSR west.

Dist. No. 2—Ham radio is running along nicely here. 6AKW reports illness in the family. Too much DX spoils 6RN's traffic. 6BBQ has a good mixture of traffic and DX. 6CMQ is trying to get a new 50. 6BLS ops on 80 meters. 6CTN is kept busy by the Xmas rush. 6VC gets nothing but r8 and r9 from the East Coast now. African stations are heard regularly at 6BJD. 6CSW's DX list looks like the ABC's 6JI and 6BCS maintain reliable communication east. 6CTO is all torn up in hopes of getting the set working scientifically. 6RF is again on using 1 5er. 6IH is on the air every night with 50 watts. 5LG is helping 6BGC run his fiver like a fifty. Traffic is wanted by 6AFG. No more power leaks are heard at 6BBV. 6DAH is using a quarter KW, and a sync. 2ops and a "250" will soon be heard from 6AE. 6BJX has worked the Philippines for six weeks without a break. School work has kept 6BUR in the back seat. 6CAE is looking for a cheap 50 since his 5er hit the dust. 6DAA has a fifty watter. "No fooling," said 6CGK, "I'll be on the air in two weeks." Which reminds us of the fellow who cried "wolf! wolf!" 6CGW has been off the air, due to school QRM. 6CDY is kept busy with demonstrations of B. C. sets and his new YL, so has little time for radio. 6ZBJ who has been silent since the earthquake, will be on the air again the last part of November. Ex-5VM, now 6NW works all he hears, which is plenty, including three continents.

Dist. No. 3—6AGN, way back in the mountains, using 220 volts on a fiver, maintains good communication as far as the Mississippi, and is practically the only active station up this way.

Traffic: 6SB, 26; 6HU, 19; 6AIB, 16; 6AJM, 11; 6BWY, 10; 6APP, 4; 6BAS, 3; 6CGC, 1; 6ZH, 1; 6CHX, 3; 6BUR, 6; 6VC, 55; 6AE, 69; 6DAH, 20; 6BBV, 39; 6AFG, 16; 6BGC, 19; 6IH, 22; 6RF, 5; 6CTO, 27; 6JI, 11; 6CSW, 23; 6BJD, 36; 6BJX, 168; 6RN, 15; 6BBQ, 103; 6CMQ, 14; 6BLS, 45; 6NW, 15; 6BQ, 115; 6AGN, 77; 6BCS, 13.

K. A. Cantin, Mgr. Hawaiian Section

The Radio Club of Hawaii, 6BUC, has done excellent work, both in traffic handling and DX. A sink rectifier has been installed and greatly improved 6BUC signal. Contact has been established with pi-1HR and R-BA1. Eastern mainland stations have been worked while daylight in Hawaii (time 4.00 PM) and 6th district stations have been worked as early as 3.15 pm Hawaiian time. 6BUC wants traffic and will also QSR for mainland stations to New Zealand, Australia, Philippines and to any other stations that they are QSO with East of Hawaii.

6AJL blew a 50 watter working MIX and was off the air for a short time. With his new tube, he was QSO with 43 stations for the month being QSO with all U. S. districts, Australia, New Zealand, and pi-1HR. 6AFF tried to improve his antenna system and spend about half the month adjusting his transmitter to its most efficient point 6CST has installed a 50 watter in place of his "fiver." Due to a bad power leak, which starts at 7.00 pm, 6TQ is forced to do all his DX work before that time. U-6BMW and 6OI accept most of the 6TQ traffic. (Note: *They deliver it too.*) 6ASR has been experimenting with a 250 watter. 6CMH using 50 watts, is back on the air again. 6DBL has installed a 250 watter and is QSO with mainland stations. Keeps a schedule with U-5AID. 6BCG was on the air long enough to QSO U-6ZD, when he found that the house lights responded to the key also. KFUH continues to pound in nightly from the South Sea. Hu-6DCF does most of the work with him.

Mr. William H. Friedly, 1825 Dole Street, Honolulu, T. H. has been appointed Assistant Division Manager of the Hawaiian Section, Pacific Division.

Traffic: 6BUC, 135; 6AJL, 28; 6AFF, 7; 6ASR, 6; 6CST, 3; 6TQ, 9.

ROANOKE DIVISION
W. T. Gravely, Mgr.

WEST VIRGINIA — Ex-8BKE is home from sea and on 40 meters. 8DJN and 8CBR are on 40 meters. 8AYP very active also was ill. 8DOI

deserves the medal, as he handled 69 messages on 80 meters, using a UV-201-A! 8BJG on, glad to hear from you, OM. 8AUL's DX still very FB. 8BSU is passing into the fourth stage of amateur radio (big Tubes). 8CDV getting out good, reduced power to 40 watts and works 1500 miles on 40 meters.

NORTH CAROLINA—Dist. No. 1—DEAD!!! 4RF has been doing fine work on 40 meters.

Dist. No. 2—4NJ is doing good 40 meter work. 4TS's "S" tubes were lost in shipment. 4MI is working both a five and fifty watter. 4PF is a new station at Hendersonville.

Dist. No. 3—4TJ is trying to get back on the air. 4QK is a newcomer in Gastonia. 4BX has been rebuilding. 4JR will be QRW most of the winter.

Dist. No. 4—4RW has been keeping a schedule with NIVD, the U.S. coast guard cutter Modoc. Business has been taking 4NT's time. 4WE has applied for an ORS.

VIRGINIA—Dist. No. 1—3QF is trying for an ORS. 3TI had set working two nights and pole came down. 3SB on 40 meters. 3CEL working F3CA, O5K, B4YZ, MIN, Q2JT and others too numerous to mention. 3OL tuning the set up for 80 meters. 3AHK off the air. 3MK temporarily dismantled. 3UV has just returned from Florida. 3CJU got lost in Florida.

Dist. No. 2—3ATB with orchestra in Florida. 3BMN runs a radio shop which QRMs his ham activities.

Dist. No. 3—*3BGS has rebuilt his station.* 3AAI copied one Navy Day message, had transmitter on 40 meters, back on 80 now for keeps, saying 40 meters *NG. Had a new 70 foot mast still trying to work* across the pond, with two 7½ watters. 3IW, changing to remote control transmitter. 3RX, a new station at VMI, Lexington, operated by 8BBM and 3RI. They have a fifty watter on 80 meters and 20 watter on 150 meters.

Dist. No. 4—3CKL seems to have an ideal spot for radio. He is working 20 meter band around noon with 2XI and 9XK. 3BZ, like 3CA, has trouble working anyone. The sets don't seem to get out or maybe we are not far DX enough to have anyone QRX, OM!

Traffic: 8AUL, 36; 8ATC, 42; 8AYP, 86; 8DOI, 69; 8AMD, 64; 8BSU, 1; 8CDV, 38; 8BJG, 4; 4RF, 10; 4NJ, 8; 4TS, 6; 4MI, 51; 4BX, 6; 4JR, 102; 4RW, 54; 4WE, 53; 3AAI, 13; 3CKL, 17; 3RX, 9; 3QF, 44; 3TI, 12; 3SB, 7; 3CEL, 3.

ROCKY MOUNTAIN DIVISION
N. R. Hood, Mgr.

UTAH—Ogden Dist.—6FM is on the job and handled 25 messages. Salt Lake City Dist.—6AKM handled 31 messages and blew his tube. 6BTX handled 41 this month. 6BUH has been sick. 6CRR handled only 1 message. 6CRS handled 24. 6RM-6ZBS handled 30. 6RV is installing a Telefunken 30 watt tube. The ADM has been out of the city for the past month, visiting San Francisco and the bay district. It will be necessary for him to spend much of his time out of town for the next three or four months, therefore Mr. Don McRaie, 6RM, will handle all ADM work until 6ZT returns. Utah now boasts a YL operator—temporarily at least. Miss Ellsworth, 7SEI, of Boise, Idaho is attending the U of U. While in Salt Lake, she will sign 6BNV. Welcome 7SI.

Traffic: 6AKM, 31; 6BTX, 41; 6CRR, 1; 6CRS, 24; 6FM, 25; 6RM-6ZBS, 30.

COLORADO—Mr. M. O. Davis, 9CDE is the new DS for District No. 2. Some of the gang are beginning to keep schedules, and also some important traffic is coming to light.

Denver:—9EFY sends in his last report from Denver for a while. His station is now located in District No. 1 at Boulder. 9EAM kept a schedule with 9BFG and put thru traffic as a result. 9CAA was kept busy working up the messages from the Radio Show. He is working on 40, 80 and 160 meters and gets out well on all three bands. 9WO has been getting reports from Europe. 9OO has a new 50. 9CDW has moved to a new QRA. 9QL is still doing his stuff. 9BDF is rebuilding his tower. 9BDF YL had her 12th birthday this week. 9DQG also reports QRM fm a YL but he did pretty well in spite of it. He es 9CAA traded jobs also. 9DKM has been sick but is back. 9AJQ and 9BJN are experiencing some trouble but we hope to have them with us strong next time. 9CJY didn't get time to do anything acct school QRM but he has been heard on a couple of times. He always reports the FB, OM.

Traffic: 9OO, 6; 9CAW, 9; 9WO, 41; 9EAM, 86; 9QL, 14; 9CDW, 2; 9EFY, 12; 9CAA, 97; 9BDF, 10; 9DQG, 64, 9DKM, 8.

Dist. No. 1—9AOI is away at college. 9DVL worked all districts on one 5 watter. 9BVO has failed to report for some time, and his ORS is hereby cancelled.

Traffic: 9DVL, 32.

Dist. No. 2—The Southern Colorado gang had a big snow storm and the Railroads called on them to handle their stuff. 9CDE had to use his flivver to drive the MG and did excellent work in getting the gang gg in La Junta, but because of the power being off, it was pretty much of a failure. All of them deserve credit for what they did, tho, and it was no fault of theirs that they couldn't be of much assistance, for they certainly left no stone unturned. 9CFY and 9ADI have applied for ORS. 9DZY is trying to get his set to perk on 80 and 40. 9CHT has been observing his honeymoon. Hi! 9DFH and 9DKV are away from home. 9EAE reports as usual.

Traffic: 9CDE, 24; 9ADI, 31; 9EAE, 32; 9CHT, 3; 9CLD, 97; 9DFH, 30.

WYOMING—7LU is back on the air now with his QRA Casper, Wyo. He reports fine daylight DX on the 40 meter band. One 50 watt tube doing duty here. 7HX carries on a regular schedule at noon with 9CAA. Some important traffic has passed between these two stations on this schedule. 7ZO has a set now on 40 meters, but lacks the time to devote to the set. It is ready for emergency however.

Traffic: 7HX, 30; 7LU, 20.

SOUTHEASTERN DIVISION
A. D. Trum, Mgr.

SOUTH CAROLINA—Summer is all right but winter is better. DX is more frequent and messages more easily handled. 4HW has gone back to Atlanta. Traffic to and from Clemson College is being handled by 4JV. We have a good station in 4VQ at P. C. College. 4RR-4VL is having fair success with his new "50."

Traffic: 4HW, 5; 4JV, 23; 4VQ, 86; 4IT, 5; 4RR-4VL, 71

WEST GULF DIVISION
F. M. Corlett, Mgr.

OKLAHOMA again leads the Division, qr stations reporting the movement of 363 real messages. 5GJ heading the list with 127. In Northern Texas, 5AKN leads the section with 33, in Southern Texas, 5ASD tops the list with 32. While there is an increase in the number of reporting station over last month, there is a slight decrease in total traffic and station average. Message totals for the Division being 493, an average per station reporting of 15, a half a message per day per station! ! !

The University Club of Oklahoma City has challenged the University Club of Dallas to a chess *tournament to be held by amateur radio.* Plans are being furthered to efficiently handle this tournament by relay stations and considerable interest is developing. The press is planning to give us considerable publicity and the results of the tournament will probably be broadcasted by WRR or WFAA Dallas and KFJF Oklahoma City. Schedules are being made to handle BCL applause to several of the prominent broadcasting stations. 5ZM is installing his new 250 with a prayer. 5CE is fondling a new 203A and is getting with a terrific wallop. 5AQW is using a German 30 watter. 5ADO is down to one 5 watter. Some bird cut 5ANL's guy wire during Halloween with disastrous results. Pipe the new lattice tower as a consequence. 5PU graduated to the 50 class. 5PI is on about 3 hours every night. 5ABO keeps his 50 watter busy on 200 meter phone and CW. 5APQ QSO every district, Canada and Mexico with fine results. Tulsa turned the trick this month. 5GJ carries honors this month and the whole gang are showing a good traffic average. Looks

like Oklahoma City is going to be hard put to it to maintain her lead. **CM, 5ATU,** is working hard whip his gang into line. He challenged 5AAV, CM, Oklahoma City to contest based on station averages. 5AHD says that the "Golden Buckle on the Cotton Belt" is coming to the front. 5ASE, 5KM and 5AGC have hooked up together at Post Field and have a 15 watt D.C.C.W. set going on 200 meters. Traffic handled averaged 25 per station with 14 stations reporting.

Traffic: 5ANL, 18; 5ADO, 18; 5PI, 5; 5AQW, 18; 5ABO, 14; 5APQ, 30; 5APG, 32; 5SW, 9; 5PU, 33; 5CE, 12; 5GJ, 127; 5ATA, 25; 5ATU, 21; 5AHD, 1.

NORTHERN TEXAS: What activities are going on are on the 40 meter bands, it seems, however, if there is very much activity of any kind going on, the fellows are failing to let the ADM know about it at the proper time. 5CC is working good DX on 38 meters. 5AKN, handled some rush messages from Phil Islands; he is also keeping schedules with 6BJX (sure thing, I remember him, OM. Hi. ADM). 5ACL is doing FB DX work. Also handling traffic consistently. His QRA is Care of Dallas Telephone Co. instead of call book address. 5AMG is now at Marshall. 5ATH is now 5WW of **Jasper.**

Traffic: 5WW, 1; 5AMG, 8; 5ACL, 23; 5AKN, 33; 5CC, 16.

SOUTHERN TEXAS—It seems that reports are getting more and more scarce. My receiver tells me that the Division is not altogether dead. Maybe the gang is too busy to report but we sure would appreciate it just the same. 5ASD is a newcomer and seems to have a fine station. He has a daylight schedule clear across the state. 5 EW is doing fine work and he always reports. 5ZAI is going good. 5HC complains of being unable to raise anyone. Too much DX again. His signal is plenty strong to reach the antipodes. Let's snap out of that DX craze fellows, its killing amateur radio.

Traffic: 5ASD, 32; 5EW, 6; 5HC, 5.

CANADA

THE month of November has been mainly notable for the convention held at Montreal on the 26th-28th. Attendance was very good from all of Eastern Canada and a fine time was had by all the delegates. A number of delegates from the United States were present.

The most outstanding feature of the convention from the viewpoint of the transmitting amateur was the announcement by Commander C. P. Edwards of a trade of wavelengths by which the Canadian amateur gives up the wave band from 198 to 200 meters in exchange for an exclusive short wave band between 40 and 80 meters to be announced in the near future. This band is to replace the 120 meter band which is falling into disuse owing to the cutting down of antennas for satisfactory working on the shorter wave bands. Announcement of this new wave will likely be made from Ottawa in the near future.

Another matter cleared up with the Radio Department, was the matter of using Canada's exclusive wave for inter-Empire communication. Mr. Edwards has agreed that the wording of the present licenses is ambiguous and announced at the banquet that Canada's exclusive wave may be used for inter-Empire communication as well as for trans-Canada.

MARITIME DIVISION

W. C. Borrett, Mgr.

THE DM is pleased to announce that Mr. Joe Fassett, c1AR, is the winner of the Murphy Radio Cup for the year 1925. This year the ORS were asked to voice the opinion and the choice of the gang was between 1AR, 1DD and 1AM. While this cup is not a purely DX cup, Mr. Fassett's DX work has been of such an outstanding feature that the DM feels sure that all will agree that he is fully entitled to win it for the second time. Ole Joe, as he is familiarly known to us, has placed the name of the Maritime Division all over the globe again this year by his steady and persistent work and has been the one station owner that has pushed his signals through all year. While we hate to see any station get a strangle hold on that cup, nevertheless, as one ORS said, "Let justice be done." It is hoped that in 1926 some other station will show as good a record and give Joe a run for the cup. 1AR's DX work is too long to publish in detail, but amongst the countries he has worked are the following: Argentine, Brazil, Checho-Slovakia, Denmark, England, France, Finland, Holland, Italy, New Zealand, South Africa and WAP & WNP at Etah, Greenland. The DM doubts if any station in Canada can beat this.

Traffic this month is small and most stations are spending their time in trying out the different wave bands. Many of the gang are to be found at noon on the 40 meter band and it is a splendid time for inter-division work. 1-AK has his 250 watter going good and works every afternoon. 1AM is still doing good work, having worked Italy and also c4GT direct. He is now building a Hertz Antenna. 1AF is in St. John, N.B., at Law school and will operate probably at 1EI while there. 1BO has just returned from his holidays and is now ready for traffic. 1AN likewise. 1AI has been amusing himself putting up his antenna on his 80 ft. mast. (No one else would go up Hi). He should be OK now. 1EI is now on 40 meters. 1DQ of Dartmouth has returned to life and between reels at the Movie business is at it with a vengeance. 1DJ, 1ARQ, 1DD are the other Halifax Stns working these days. 8AR of St. Johns, NFLD has been QSO 1DD and several USA stns on 35 meters. Other Maritime Stations are not mentioned in this report on account of failing to have their monthly report in the hands of the ADM or DM on time. **Pse Remember mail your reports on the 15th of each month.**

Traffic: 1AK, 11; 1AM, 7; 1DD, 8; 1AR, 8; 1DQ, 1.

ONTARIO DIVISION

W. M. Sutton, Mgr.

Headlines for This Month's Report
Read 'Em and Weep
Mongrel Fifty Works Brazil
Canuck Operator Establishes Station in British Guiana
Regina Ham New Toronto City Manager
Sounds Like Remote Control

EASTERN DIVISION—3AF is operating a new experimental station under the call 9CC, and low power tests have been carried out with 3AFP. 400 miles per watt is the present record for two day work. After trying out eight varieties of aerials, 3HE decides on the single wire. 3MT rebuilt his station, raised a new antenna heavenward, then went into the wilds of Northern Ontario looking for big game. 3NF is back home and camped on 40 meters. 3AEL with his fiver continues DX work. 3AFZ is responsible for the vibroplex heard in Kingston. A new station in the Eastern Division is heard on the air using 40 meters, call 3GJ. Welcome OM.

SOUTHERN DIVISION—3KP is working the Antipodes regularly using Hertz antenna and S tubes, but has had the misfortune to break the halyard on his 80 foot tower. 3KA experimenting with antennas, and is a regular attendant at Wed. night prayer meetings. 3ZB and 3DH have rebuilt, and now using new UX-210 tubes. 3AQ also rebuilding, and 3MF now using 50 watter. 3FU having trouble on 40 meter band. 3XX, 3TL, 3DS and 3TN will be on the air soon. Things are quiet in St. Thomas. 3AA in Galt after having worked N. Z. 25 times, now threatens to sell out. In Sarnia, 3AD and 3XI are on the job, the latter still being ST N. Z. 3YV is expected back on the air soon.

NORTHERN DIVISION—Glad to be able to include some news from this division this month. 3NI reports that there is not very much doing yet, as his station is the only one in active operation. He has Allan Beattie (AB) as second op, and is anxious to arrange schedule with eastern stations after midnight. He complains that the quiet hours have to be observed as strictly as ever, and, owing to inability to erect larger antenna, is unable to get up to 120 for weekly hamfest. (How cum?)

CENTRAL DIVISION—News arrives this month from London and Hamilton. 3GY in London reports a new tin mast going up there, and he will be heard on 20-40 and 80 meters. 3ADN is having QRM from his school work, and 3TB is busy coaxing DC from his S tubes on 80 meters. 3UJ is at present operating XDM, a Canadian Merchant Marine vessel running down to South America. He started a ham station in Br. Guiana. This station is operated by J. T. Tusker, Georgetown, Br. Guiana, who by the way, is senior op at BZL. This station uses 1000 cycle current supply, and will be heard on 70 meters. Hamilton; 3HT is not on much but reports a real station starting up there. 3DW is installing a 250

watter and has a first class shack, and a real pole. 3WG reports no traffic as a result of attending school in Hamilton.

TORONTO—Zowie! 3FC, who has been rather in the background until lately breaks loose and works BRAZIL. This is on his new WE fifty with the CE thorium filament—sort of a mongrel. Toronto now has a new CM in the person of J. F. J. Hill of Regina 4AJ and Toronto 9BJ. This boy has done a great deal for the advancement of Amateur Radio in this city and deserves the honor. We mourn the loss of a good ham operator; 3CQ-3TV has moved to Montreal and will be a real asset to the twos—3EL is increasing MC voltage, while 3CK, our other fiver is reaching out in good shape. 3PH has at last discarded his Rip Van Winkle tactics and is erecting a Hertz. 9AL handled his usual quota of messages and is getting a new super-transmitter to match his deluxe receiver. 3VH is swamped with work; building ham transmitters and receivers and selling BCL sets. 9BJ is completely rebuilt and is working fine DX. The two ops keep the old lantern sizzling. Quite a crowd are leaving here for Montreal convention.

Traffic: Southern Division: 3FU, 20; 3XI, 19; 3KA, 2; 3DH, 2; Total 43. Central Division: 3WC, 0; 3EL, 1; 3CK, 11; 9AL, 41; 3VH, 0; 3KQ, 6; 3PH, 0; 3MV, 0; 3FC, 20; 9BJ, 10. **Total 89.**

shimmy a Hertz antenna. 5HS has just completed rebuilding his set on new QRA. 5AH has a Northern Electric 50 jar now and is contemplating changing his QRA. 5BA—not so good QRM yl skating rink et. nuff sed. 5GF has been remodeling the antenna for 40 meters, also making a battery charger to run the light bill up further. 5EF reduced his power to a small MG and is getting much better results. 5DD has started a radio club in the Tec School. (FB, OM. That's the stuff—DM).

By the time this appears in print c4GT will be an OBS for Alberta, a quarter KW station with lots of kick and should be FB. He works all kinds of International stuff and has a fine layout. 4IO is away moose hunting. 4AX is QSO every dist. and has things screwed down for the winter. 4CC is a newcomer on the air. Medicine Hat will soon be represented on the air. 4BH of Hilcrest is having difficulty in getting out with his set, but the Calgary gang are helping him. 4AL is trying 40 meters for a change.

5GT, at Prince Rupert, is still making himself felt but reports no traffic. He will arrange sheds with anyone who writes him.

4HF, at Edmonton, says 50 watts rotten, note morals corrupted, closed down till a rectifier can be made. 4IE is installed in the University of Alberta and is

FIRST ALL-CANADA CONVENTION, MONTREAL, NOV. 26-27-28, 1925

QUEBEC DIVISION
J. V. Argyle, Mgr.

THE big thing this month was the holding of the First All Canada Convention at Montreal from the 26th to the 28th, at the Windsor Hotel, at which 109 delegates were present. We had one member from the West Coast (ex-c5GK) and from the extreme east we had several from St. John, N. B., and also c8AR, Mr. Loyal R. Reid, of St. Johns, Ngld. Many delegates from Ontario were with us, including our recently re-elected CGM, the most popular ham in Canada, A. H. K. Russell. A good attendance came from south of the line, including u2CHK, who greatly assisted us by loaning us his room and relieving the many parched throats around the hotel. u8ADG, u1YD were also conspicuous around the meeting places. Some of the gang after the trip to VCA coast station, opined that Schnell had the right idea—go to Tahiti for a convention — Messrs. Hebert & Schnell of HQ gave us all the latest dope from HQ besides the wonderful NRRL talk. Special mention must be given to c2BE and c2HV for giving their whole hearted support to this Convention and also to 2BV, 2AU and 2CM for their committee work.

Traffic: 2AU, 12; 2CG, 3; 2BE, 11; 2BG, 5.

VANCOUVER DIVISION
W. J. Rowan, Mgr.

ANOTHER month of the DX season has passed away and the traffic totals remain small if not more so. There seems to be a vague uncertainty about traffic handling these days. Is it this super DX stuff that is killing the game or the fact that we are split up into various bands and so lost touch of each other?

We are sorry to report that 5HP has resigned his ORS and will probably not be on before the New Year. 5BM is going regularly on 42 meters and results more satisfactory. In July he reported hearing g2KG testing on 75 meters. It was the op of 2KG art but the station was on MS Aorangi, who has a set working on 36 meters and wants reports. Call GDVB. 5CR has worked all US Dists on 40 meters and is hearing oodles of foreign stations but no British yet. 5AN is persuading a worn out fiver to getting good results. 4AH is working the whole continent with a master oscillator rig. 4JF, the Edmonton, RI, has a very poor location but is experimenting with antennas.

5CT is still jinxed with his power but manages to keep the OBS going; he says 80 meters works best for him.

WINNIPEG DIVISION
W. R. Pottle, Mgr.

ACTIVITY in this district has been steadily on the increase during the past month, and the traffic totals also look more healthy. Several new fists are being heard on the air in Manitoba. 4AE on 80 meters and 4DW on 40 meters broke loose recently and are raising some smoke. 4AE just lost his stick. 4DY is on regularly and gets good DX. 4CR is on fairly often also, and he says he can't complain of the DX. 4DY pulled off a speed relay of citizen radio messages in conjunction with c-3CO. The Winnipeg gang claim the Schnell Tuner is the best yet. 4DE is playing a little game of "come seven"; he works all other stations with ease, but the 7's are elusive. The Peg Traffic Ass'n are very active and are laying plans for a big winter. 4CJ and 4CX are combining stations. 4EA-K 4FZ not on much as yet. 4EA operator at CKY, but he goes home and pounds brass, which he says is more entertaining. Mr. Duffield, the senior op at CKY, has also been inoculated with the "ham" bacteria and will he heard on the air soon. 4PA is getting good DX. 4AV off air for awhile. 4FC just got a new pole up O.K. The Moose Jaw Gang are the busiest bunch on earth just now chasing up A.C. interference. 4HH has joined the cave dwellers; he sure has a nice layout in the cellar cool. 4EO is on night duty and unable to get on the air much. 4IW, 4BF and 4AO pound brass whenever they get the chance, which hasn't been very often, owing to business QRM. 4DR has sold his set. 4IQ is back on again now. 4EM has been making some spare dough threshing. 4CB just opened up as strong as ever. 4GH is doing good work.

Traffic: 4OY, 15; 4AW, 3; 4DE, 7; 4EA, 4; 4AO, 4.