An Invisible integrity—ever present, never seen—is on guard tonight, and every night in millions of American homes. Ceaselessly alert, it insures the performance of every Cunningham Radio Tube under the tremendously exacting conditions of 1926 Radio reception.

Ten years of concentrated effort on a single product has brought such uniform perfection that confidence in these tubes and in the name they bear is almost universal among radio enthusiasts. The vigilance that has won for Cunningham Radio Tubes such nation-wide confidence is not and shall not be relaxed. Our reputation is by far our most valuable asset.

All Types
C- and CX-
In the Orange and Blue Carton
It Must Suit You Experts

Specify your own expert test of the Thorola Isodyne—the dealer will comply. Regardless of price comparisons, number of tubes, or style of circuit, Thorola must be best by every standard in your most expert judgment.

Even you have not known performance such as Thorola Isodyne regularly yields. Not only the principle of Thorola Low-Loss Doughnut Coils, but every phase of Thorola design and construction points real reasons for Thorola superiority to the most critical scientific investigator.

You know much about radio. That is why we value your verdict so highly. That is why every statement here is made most advisedly. You have very likely had any number of sets. Now hear Thorola and know what still lies ahead even for you.

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Modernize Your Radio Set!

Write for Free
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Are you still using primitive methods of amplification? Why not make your receiver an up-to-date model by installing Autoformer amplification—the ultimate in reproductive equipment?

The Autoformer, a step up impedance amplifier, reproduces with full volume those bass notes lost in ordinary transformer amplifiers.

The Autoformer provides the unrestrained flow of distortionless music. It records everything from the slightest shading to the greatest extreme of volume, intensity, and timbre.

Better volume control.
More volume on distant stations.
Full bass note amplification.
Greater clarity on all signals.

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Transformer specialists since 1907
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For Those Who Understand and Appreciate Quality
—in Reception
—in Construction

THE appearance of the inside of radio receivers reveals little or nothing to the uninitiated. But men who are "radio-wise" see a vast difference in set construction.

By the former the ear only can be used in judgment; to the latter, the eye tells almost as much as the ear.

Look inside a Grebe Synchrophase. Your eye will be as delighted with the quality of construction as the ear will be satisfied with the superior receptivity, which this construction not only makes possible but maintains.

Ask your dealer to demonstrate.

A. H. Grebe & Co., Inc., 109 West 57th Street, New York
Factory: Richmond Hill, N. Y.
Western Branch: 443 Sth, San Pedro St., Los Angeles, Cal.
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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Address General Correspondence to Executive Headquarters, Hartford, Conn.
EDITORIALS

The A. R. R. L. Spirit

EVERY once in a while one of you fellows writes in a letter and tells about the feeling of intimate acquaintance and friendship which he feels toward everybody concerned in the A. R. L. It always warms the cockles of our heart and inspires us. Just why we radio bugs seem to possess this brotherly feeling to a greater extent than other groups of people is not entirely plain. Sometimes we think it is because of the deeper and more abstruse problems which we have to face. We who are closely identified in the study of radio communication are brought very close to the wonders of Nature. The great laws which govern all things and which we must always observe, give one a very much deeper regard for truth than comes to those who follow only the ordinary matters of life. The fact that we are all troubled with the same things arouses a feeling of brotherhood. The fact that we appreciate one another's failures and successes brings us close together. The romance of sitting alone in a little out-of-the-way room among a lot of instruments and yet in communication with congenial spirits in other distant and out-of-the-way little rooms is conducive to profound and reverent thoughts. The fun which bubbles over from so many of us, and finds expression in QST, is one of the interesting manifestations of the effect of our work upon us.

We used to think that it was possible to feel close to each other when we were seven hundred strong but that this would disappear when we grew large. The personal element would not stand the stretching. But this is not the case. We seem to be just as close together as we were when we were only seven hundred, and if we can maintain it among seventy thousand—!

Now for a confession. The above two paragraphs do not represent the current ruminations of what the present Editor calls his brain. Instead they have been cribbed bodily from page 16 of QST for May, 1917, nine years ago. The quotation marks were left off while you read them just to prove that this A. R. R. L. spirit is an enduring thing, for those nine-years-old remarks are as apropos to-day as they were the day they were written. To-day we are nearly twenty thousand strong, the physical assets of our organization have increased enormously, our fame has been sung around the world, but our most precious possession remains that selfsame A. R. R. L. spirit!

—K. B. W.

Rotten Sign-Offs

THIS isn't an "Old Man" yarn but it might well be one of his subjects.

As many of our members know, the headquarters office daily receives QSL cards from foreign amateurs and clubs to be addressed by us and forwarded to American amateurs. We forward as many as we can. If we haven't the call in the latest call-book, we send the card to the Supervisor for that particular district and ask him to forward it if the call has been issued since the call-book was published.

In spite of all these efforts there is on our desk a constantly increasing pile of "dead" cards—cards for which no call has been issued. What is the explanation? Poor transmitting on the part of American stations! Right now there is a large and healthy bunch of unclaimed QSL cards—for which there is no excuse. Many of you wonder why your station doesn't get reported; you blame the antenna, the location, the wave and everything else, when the fault may be your own hasty transmission. Some of the cards in our "dead" pile may be reports of your signals, but you will never know it, because in your haste you ran the letters together and the foreign amateur who reported you had to make a guess at what the call really was—and missed! You will never know that your signals reached South Africa or Australia, and the South African or Australian who reported you will have another grievance against the non-answering American ham.

Send at a natural speed, don't cultivate a "swing", and always sign deliberately, never hastily. It will react mightily in your own favor.

—A. L. B.
Breaking Into Amateur Transmission

By John M. Clayton, Assistant Technical Editor,

GETTING STARTED

Interest in short wave amateur radio telegraphy is increasing in leaps and bounds. Our headquarters office has been flooded with requests for data on how to get started in ham radio. Old and young alike are finding that the real interest in radio operating lies not in the twirling of knobs on a broadcast receiver, but in two-way telegraphic communication with kindred spirits hundreds of miles away. There is nothing mysterious about this business of becoming a telegraphic amateur. One first needs a good short wave receiver. That is easy, for many such receivers have been described in QST from time to time. A short wave receiver differs from the usual regenerative set as found in broadcast reception only in that the coils have fewer turns, the variable condensers fewer plates and the receiver must be free of body capacity effects. Fundamentally, both the amateur and the broadcast receiver are the same.

The transmitter is even easier, once the initial ice has been broken and you have plunged in. Transmitters, as well as receivers, have their tubes, variable condensers, antennas coils, secondary coils, grid condensers and leaks, A and B batteries (called filament and plate supply) and so on. These parts are connected in a circuit not very different from the receiving circuit. When the coils and condensers have been adjusted to give maximum output on the wavelength you are interested in you are ready to become one of a group of thousands of ever enthusiastic transmitting amateurs. You will find that your interest in radio has taken a leap forward and that no matter how long you are a telegraphing amateur there will always be something new for you to try, some new station or country for you to communicate with and always some new interest.

We are going to describe a transmitter that is simplicity itself. It can be constructed for a cost less than that of a three tube broadcast receiver! At the outset, some limit must be placed on the simplicity of the set. Many amateurs have communicated over distances in the thousands of miles when using a single UV-199 receiving tube as the transmitting tube! Such work requires that the operator be an exceptionally good one the location of the transmitter and aerial almost ideal, or the conditions under which transmission was effected so erratic that the set is not at all consistent.

For everyday use the UX-210 7½-watt tube is more than satisfactory in a low power transmitter. Using this tube as a basis we constructed a simple set, having the absolute minimum number of parts yet having everything that is absolutely required to make a good workable low power set. The set has been in operation only five hours during which time no trouble was experienced in working stations as far south as Jacksonville, Florida; west as far as Minneapolis and north to Maine. No attempt is being made to claim that the little set will give you consistent communication over a distance of 500 miles every day. That would be foolish, for you already know that the range of broadcasting stations varies greatly from night to night. Some nights you can hear ordinary 500-watt broadcasting stations on the opposite coast and other nights you get almost nothing. Short wave telegraphy is not that bad. You can duplicate fairly regularly all of your communications except the very best. Your results will depend on your location, the way the transmitter is adjusted and the amount of time you spend "pounding brass". If you keep at the set long enough you can make freak records over distances as long as those any station can make, regardless of power. Enough to say that a vast number of amateur transmitters are equipped with a single 5-watt tube.

The radio telephone is a different thing. It is not nearly as good. The set will be complicated, it will take much more power to cover the same distance, static bothers a lot more, the set is more expensive and it makes a lot of interference in the neighborhood. If you must have a radiotelephone, this set can be turned into one rather easily, but why turn a telegraph set...
with a 100-10,000 mile range into a radiophone with a range that is very unlikely to exceed 80 miles with the rarest luck?

**List of Material**

The following material will be required. Parts of equal quality can be substituted for the specified manufactured instruments. The market is full of excellent equipment.

- One baseboard of hardwood, $\frac{1}{4} \times 8 \times 18$ inches.
- One panel, hardwood or hard rubber, $\frac{3}{4} \times 6 \times 18$ inches.
- Two 250 µfd. (.00025 µfd.) variable receiving condensers (Cardwell).
- One 1,000 µfd. (.001 µfd.) receiving grid condenser (Sangamo).
- One 2,000 µfd. (.002 µfd.) receiving grid condenser (Sangamo).
- One 5,000 ohm Lavite grid leak (receiving leaks not suitable).
- One 201-A type tube socket.
- One 2 ohm rheostat capable of carrying at least $1\frac{1}{2}$ amperes.
- Two Xmas tree lamps with sockets.
- One 3\frac{1}{2} volt flashlight lamp with miniature base.
- One 1\frac{1}{2} x 3\frac{1}{2} x 6 inches.

Three hardwood strips $\frac{1}{2} \times \frac{3}{4} \times 4$ inches.

Seven lengths of number 12 flexible lamp cord, each length 8 inches.

Five Mueller test clips (get the nicked variety, not the lead-coated).

Three lengths of No. 12 or No. 14 tinned bus wire.

Two brass angles $\frac{1}{2} \times \frac{3}{4}$ inch for supporting panel.

Two brass angles $\frac{3}{4} \times \frac{3}{4}$ inch for supporting inductance.

Ten brass wood screws, No. 6 round head, $\frac{3}{4}$ inch long.

The above material can be purchased for $16.50. To this list must be added the R.C.A. UX-210 tube which can be purchased for $8.00, bringing the total cost to $24.50!

This does not, however, include filament and plate supply. These will be discussed in detail later.

**The Primary Inductance**

The only part of the set that is almost totally home-made is the inductance. The primary inductance will probably cause most of the trouble, although it can be constructed readily and in short order. Your local cabinet-maker or carpenter can make the six wooden strips for you or you can do it yourself. The carpenter should do the complete job for about fifty cents so it is hardly worth the effort on your part. Referring to Fig. 1 a layout of the six strips is given. As will be seen these strips are a half inch wide, three quarters of an inch deep and ten and a half inches long. The first notch is cut 1\frac{3}{4} inches from the end. The notches are all 1\frac{3}{4} inch wide and about 1/16 inch deep and are spaced 1\frac{1}{4}.

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2—See page 34 of this issue if you want to purchase the primary and secondary coils ready assembled.
inch. Get the carpenter to cut them out, making all the strips the same length—ten and a half inches. If you are handy with a hacksaw you can cut them yourself. Line up all the strips so that their ends are together and clamp them in a vise. Then lay out the notches in pencil and cut across all six strips at once. After that the notches can be gouged out with a small chisel or a pen-knife, finishing them down with a small fine file.

After all the notches have been cut the ends of the strips must be cut off at the places marked "saw here" in the figure. Strip 1 is cut an inch from the first notch. Strip 6 is cut off 1 ½ inches from the first notch and the intermediate strips are to be staggered as shown in the photograph. The cuts are about a twenty-fourth of an inch. Guessing the amount is much easier. This

staggering is necessary in order to get the proper pitch to the winding which is to be put on later. As all of the strips are the same length when finished after they have been cut off at the left end it is merely necessary to measure 8 ½ inches from the left and cut them again.

A hole is drilled one-half an inch from the end of each strip. A number 27 drill should be used. The strips should now be placed in a vessel containing boiling paraffine. They should be left to soak for at least an hour. Don't be worried if the strips show no trace of paraffine when they have been removed. Despite the fact that the paraffine is not visible on the surface of the wood, nevertheless the wood is soaked full of it. This completes the wooden strips.

Next, the hard rubber or bakelite rings are laid out and drilled with six holes ½ inch from the edge. These holes are spaced equally around the circumference of the ring. The quickest way to do this is to take a compass or divider and by the hit and miss system try and try again until the edge of the tube is divided into six parts. The holes should then be drilled with a No. 27 drill.

The wooden strips are bolted to the hard rubber rings by means of 6-32 round head brass machine screws an inch long. Take particular care to see that the strips are put on in the correct order from 1 to 6, and also be sure that none of them are put on with the ends reversed.

The copper or brass strip is next wound on, first anchoring the strip by means of a 6-32 machine screw through a hole in the strip and the wooden spacer. If Ford magneto coil strip is used it will be necessary to solder two lengths of it together. One coil contains about 10 feet. Do this

before you start winding the strip on the form.

A brass angle is attached to one end of the inductance and another angle at the 5th turn from the opposite end. These angles are held in place by means of wood screws in the strip. The angles hold the inductance in a horizontal position (see photographs).

The Secondary Inductance

The secondary or antenna coil is much simpler. It consists of 5 turns of No. 12 wire threaded through three wooden strips with the turns spaced ¼ inch. Five holes are drilled in the strips and the wire is first wound on a form 3 inches in diameter and allowed to spring off after 9 turns have been put on. It is then carefully threaded through the wooden spacers until 5 turns with a diameter of 6 inches have been
formed. This type of construction was made because the losses in the secondary coil are not so bothersome and we can get away with smaller conductors in the antenna coil. If it is desired to make a more substantial job of the secondary, a coil similar to the primary may be made up using 5 turns instead of 11.

A hole is drilled through one of the spacers near the end of the strip and through this hole a No. 6 brass wood screw 1 inch long is passed. When the set is finally tuned up and adjusted this wood screw is screwed into the baseboard and holds the secondary inductance firmly in place.

The Complete Assembly

A glance at Figs. 2, 3 and 4 will show the relative position of all of the parts. Figure 2 shows a front view of the panel. The left dial controls the condenser shunted across the primary inductance, and the right dial controls the condenser in series with the secondary which is directly behind this condenser. In the upper right hand corner of the panel is the flashlight bulb used to show the relative amount of antenna current. We did not have a socket for this bulb so we drilled a hole in the panel and "threaded" the flashlight bulb into this hole. The rheostat is controlled by the small knob between the two dials. Inked-in arrows served as indicators for the condenser dials.

Again, in the upper right hand corner, mounted on the panel, will be seen the flashlight lamp, and lastly to the left of the inductance, mounted at right angles to it, is the radio frequency choke. This coil consists of 150 turns of No. 28 or No. 30 D.C.C. magnet wire wound on a cardboard or wooden form ¾ inch in diameter. The choke is held in place by virtue of the stiffness of the connecting wires.

Figure 4 is a view of the rear of the trans-
mitter from a different angle. The radio frequency choke appears at the right. It should be mounted in this position so that it will be as far away from the large coil as possible. The large coil is suspended ¾ inch above the baseboard so that the secondary (at the extreme left) can be slid over the left hand end of the main coil. The main coil is mounted on ¼ inch brass brackets as shown in this photograph. The

brackets are screwed into the wooden spacer strips and into the baseboard. The left hand bracket, however, cannot be mounted at the end of the coil since it will interfere with the secondary when the latter is over the primary. For this reason this bracket is mounted back in from the left end of the coil, as shown in the photo.

No detailed panel or baseboard layouts are given as it is not necessary to follow this layout to such extremes. It will be well, however, to follow the general plan shown in the photographs as the important leads are of minimum length when this scheme is duplicated.

The Secondary Circuit

The complete circuit is shown in Fig. 6. This is known as the inductivity coupled Hartley circuit. It will be easy to follow the circuit if we refer back to the illustrations as we go along. The antenna lead-in is connected to the front binding post at the right of Fig. 3. A wire runs from this post to one terminal of the flashlight lamp in the upper right hand corner. Another wire goes from the other terminal of the lamp to the "statimary" plates of the right hand variable condenser. From the rotary plates of this condenser a flexible lead connects to one end of the secondary inductance coil, S. This coil is directly behind the right hand condenser. Another end of this coil is connected to the back binding post on the same terminal strip with the antenna post. The counterpoise or ground is connected to this binding post. This completes the secondary or antenna circuit. Note that there is no physical connection between this circuit and the rest of the apparatus. The coupling between this circuit and the balance of the circuit is inductive and not direct as it would be were there any wires running between the antenna coil and the primary (P) coil.

The full 5 turns of the secondary coil B are connected in the circuit at all times, no clips or taps being arranged to change the amount of wire in this coil. The distance between the S and P coils can be called the "coupling distance". As shown in the photograph this distance is relatively large, that is, the coils are far apart. In operation the coils will assume this position, or possibly the secondary may have to be slid farther in toward the primary.

The Primary Circuit

That part of the circuit associated with the largest coil P is called the primary. It is in this coil that the radio frequency currents are set up and transferred to the antenna circuit and the antenna.

The filament supply is connected to the binding posts A. In series with one of these posts is the 2 ohm filament rheostat R2. It does not matter in which lead this rheostat is connected. From the rheostat a wire is run directly to one of the filament terminals on the tube socket, the other filament terminal being connected to the other A post. As shown in Fig. 7 the two Xmas tree lamps are connected in series directly across the filament leads and as close to the terminals of the tube socket as possible. These lamps serve as a center-tap device, permitting the use of an un-tapped filament heating transformer. This completes the filament wiring.

From one of the four binding posts on the left of the set a wire is connected to one end of the radio frequency choke coil. The other end of this coil is connected to the plate ter-
To this same plate terminal (and at the socket) the 2,000 \( \mu \)fd, fixed condenser is connected. One of the flexible leads with a clip on the other end is attached to the other terminal of the fixed condenser (C2). One terminal of the grid condenser is connected to the grid terminal of the socket, the Lavite resistance \( R \) is soldered across both grid condenser terminals, and the other end of the grid condenser has a lead and clip attached.

The other plate supply binding post is connected to the center-tap between the Xmas tree lamps (see Fig. 7). A flexible lead and clip are also attached at this point. Two additional leads with clips are soldered to the condenser terminals on the variable condenser at the left of Figs. 2 and 3 (C1). Now the set is completely wired!

There yet remains the job of providing the filament and plate potential, the erection of a suitable antenna and the tuning of the transmitter. These things are easy. They will be discussed fully next month. In the meantime get busy and get the transmitter finished. If you are stuck on anything do not hesitate to write our Information Service Department.

### The South Dakota Convention

THE Dakota Division, 5th Annual South Dakota State Convention, is a thing of the past, but February 11th and 12th will linger in the memory of the fifty odd "Hams" who were present, for a long time to come. The thanks of all go to the Coyote Amateur Radio Club under whose auspices the convention was held. With the buildings of the University of South Dakota at Vermillion thrown open to the delegates, interest was shown in the engineering shops and laboratories. Doctor Brackett of the University gave a lecture on constructional hints which furnished some valuable information on transformer construction. Then came Will Doohen with a good talk on "Latest Developments of Switchboards and Portable Instruments", this being followed by some interesting motion pictures on electrical subjects. Oh! we forget that Doohen’s talk and the pictures were given in the Coyote Theatre.
Isolantite—A Unique Material
By Austin C. Lescarboura* and Robert S. Kruse**

WHAT would you think of an insulating material twice as hard as glass, tougher than cast iron, completely moisture proof, electrically excellent, and capable of being machined accurately? Impossible? Not at all. There is such a material, although it is hard to tell the story without seeming to write a prospectus, the material is so peculiar.

Of course anyone can see that a material as hard as agate cannot be threaded, turned and drilled. It must first be soft and then become hard after machining. Porcelain does something of that nature, in fact it is a type of distant relative of Isolantite, but the beginnings and the endings of porcelain and Isolantite are quite different.

Porcelain is made of clays and other ingredients stirred together to make a paste, then formed, dried and finally baked. No precise machining is possible because the material is shrinking all the way through the process, therefore it is not possible to make the pieces of exactly the same size and shape. That isn't all. Inside the piece of raw porcelain there are impurities—water is an actual part of the material and various other things are there, either because they cannot be driven out, or else because they are needed to stick the "dough" together. When this compound has finally been baked it has become a sort of glass sponge with the holes filled by particles of other substances.

A Powder

Isolantite starts from natural materials—but from that moment on, things are worked out in a different manner entirely.

The process begins with a mineral product which is pulverized to such a degree that it will float in air—a cupful of it can be poured out but very little of it will reach the door—it will mainly float about in the air of the room. This mineral product is chemically purified to a point where it will readily pass the government tests for the purity of drugs. It contains no organic matter whatever, likewise there is no water—not even as water of crystallization. This powder is then poured into a mould—and it pours much in the same fashion as water, except for the tendency to blow away. The mould is set under a press. Now if the ram of the press is run down into the mould and then brought up again we will find a surprising thing—the powder has entirely failed to stick together, even under a pressure of 25 tons per square inch. The reason is that there simply is nothing in the mixture that will cause the grains to stick—nothing fatty or moist. But, if the thing is done with a certain chemical agent present the powder does stick together very promptly, or rather it ceases to be a powder at all and becomes a new substance. The right pressure must be used but the chemical "catalyzer" is absolutely necessary. Just what the substance so used is may not be mentioned here—although its nature is known to the writers.

The powder is formed in two round or square rods or blocks, according to the product to be made. The blocks are pressed in a wide range of sizes, starting with rods 1/16" in diameter and ending with rods 10" in diameter or 8" square. The pressure of the hydraulic press is controlled by 5 separate checks.

Each press has several heads or working cylinders and is operated by 2 girls to gain the necessary speed. One girl loads an empty cylinder, with a definite amount of...
powder, then as the cylinder moves around the machine the mould is entered by a ram which compresses the material under chemical action as mentioned. The second girl unloads the cylinders.

Since the moulds are accurate the rods and blocks are accurate—as in the case of Bakelite mouldings.

**Machining**

The next step is to cut the rods into pieces of the desired length. This is done by gang saws, automatic screw machines, etc., or by other methods, depending on the job. The pieces are then finished to their desired final form just as metal parts would be, using all the ordinary methods of a machine shop.

Let us consider for example the operation of producing an Isolantite vacuum tube base. The rod comes from the press of the correct diameter, the automatic cutter has made the pieces of the right length. The piece is now hollowed out on a high speed lathe, shown in one of the photographs. The cutting tool is so shaped that it cuts the inside of the shell to the correct shape, even to a small internal groove. The piece is then drilled for the various pins. The plain shell is placed in a jig saw under a gang drill, and 4 drills make the connecting pin holes while an auxiliary drill makes the pinhole at the side.

Isolantite can be threaded, both inside and outside. The Isolantite threads have even greater strength than metal so that an iron screw which has been screwed into threaded Isolantite will actually be stripped before the Isolantite threads give way.

The material can also be ground and lapped. As stated before—the material is in all ways handled in accordance with good machine shop practices for metal.

**Firing**

So far we have been talking of a material easily worked, having in its makeup much the same sort of things that are found in such well-advertised products (or natural materials) as Andalusite, Sillimanite, and Steartite—in other words silicon, oxygen and magnesium. Isolantite is chemically purer than the above compounds mentioned and therefore is more uniform. Porcelain analyses in much the same manner except that it is certain to contain some water and quite likely to contain iron. These undesirables will boil out in firing, but this will change the shape of the piece.

Here is a curious advantage of the new material—it does not have these impurities involved in itself, therefore there is no need of an extra firing. This means two things—the piece will not change shape or size and it can be fired at high speed.

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**The B Point**

So far, the material has been soft and easy to cut or polish. The pieces are now stacked in carborundum saggars (trays) which in turn are piled on the floor of a furnace, after which the floor is lifted into
under pressure to the burners which extend into the furnace, the flame striking the Isolantite pieces directly—a process porcelain would not stand so soon in the process. Gas is fed At about 1500 degrees Fahrenheit the material strikes the “B point” and some sort of chemical change takes place. Just what this change is, cannot be described in simple terms. The new material has very little hardness (about the same as graphite), it is not very strong electrically (only about 1000 volts for 1/8") but it can be rough-handled with regard to heat. It is perfectly possible to run water through the inside of a red-hot tube of the material without breakage. Whatever this change is—the material absorbed heat at the “B point.”

The A Point

The “B point” material is not commercial Isolantite. From this stage the test is carried up to the “A point,” which is at about 2800 degrees Fahrenheit. Here the material suddenly gives off heat. It is held there for 60 seconds during which another change has taken place—a very great change. The soft material has suddenly become harder than any other substance except diamond, has become as strong as cast iron and so tough that a dish of the material can be dropped 20 feet onto a concrete floor without chipping anything but the floor. If one cares for figures the hardness is 9.5 on a scale in which glass is 3,

Case hardened steel 6.5, stellite 7-9.5 and agate 9.3.

As soon as the A point is passed the material can be taken out into the air with little delay—it does not tend to go to pieces from swift cooling.

Electrical Rating

Originally, Isolantite was intended for use in spark-plugs for airplanes. It has proved useful for other products in various ways. Its dielectric strength is over 30,000 volts per millimeter thickness. The dielectric losses are low, the phase angle being less than 1/100 of a degree. The dielectric constant is 3.6, and at 50% relative humidity the resistivities are—6 x 10^6 ohms per C.C. and 5 x 10^6 ohms per square Cm. The material (this is of real importance to the radio man) continues to insulate at high frequencies even when red-hot. The mechanical properties have been mentioned but figures can be given here as well. The crushing strength is 60,000 pounds per square inch, the tensile strength about the same.

Some curious uses for the material have been found. Perhaps the most unusual is that of the small anvils for automatic can making machines. Here it is required to meet acid flux, flame, melted solder, and hammering. A great variety of previous materials—glass, metal and stone had lasted a day or so at the most. The Isolantite anvils have an average performance of 100 days.

WWV and 6XBM Schedules

The standard frequency signals from WWV, Washington, D. C., and 6XBM Stanford University, California, for the months of April, May and June, are as follows:

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* Eastern standard time for WWV, Washington, D. C., Pacific standard time for 6XBM, California.
The Making of a Single-Control Receiver

By A. S. Blatterman, B. Sc., E.E.*

All of us have known for a good many years that the difficulties encountered in laying out a receiver with only one tuning control to manipulate several tuned circuits are not to be treated lightly, nor easily disposed of. The first obvious requirement is that the several inductances and capacities that are directly involved in the tuning, must not only be identical but must also remain identical as they are varied. If one sets out to build one or two receivers this is not especially difficult to accomplish. Nearly all of us can wind up half a dozen coils and have them come out pretty nearly of the same inductance. I suppose that every experimenter in the game has at some time spent a few half hours bending the plates of a variable condenser back and forth to make them run true. If enough patience is put into this work one can always make such a hand-made receiver operate satisfactory, even at rather short wavelengths.

The thing is entirely different when one attempts to make many single-control receivers. All of the problems become much more intense. For that reason the single-control receiver will be discussed with particular reference to a successful commercial type. It must be remembered, however, that the same remedies which are used in this receiver will apply with the same force to receivers with other wavelength ranges.

When the single tuning control problem was definitely brought to our laboratory about a year and a half ago, our feeling was that it couldn't be done. We were by no means encouraged by the performance of the first few bread-board models that were built up on the basis of mathematical calculations. As time went on, however, and measurements and test data accumulated, the circuits began to get down to business, and finally the finished set emerged without any verner take-ups or extra compensating devices. It was planned and built so that it could be manufactured in quantities, and with reproducible performance characteristics.

We were interested, of course, in the most commonly used broadcasting band of wavelengths, i.e. 200 to 500 meters. Selectivity was important, tone quality or fidelity of reproduction equally so, and sensitivity or long range ability a requirement second only to these. The general circuit arrangement decided upon was the conventional two R.F. stages, transformer coupled, detector, and two audio transformer coupled stages. The details of the circuit layout are shown in Fig. 1.

There were several reasons for selecting this circuit. In the first place, it has been found that the sensineness secured through two properly designed cascade R.F. stages is sufficient with an average antenna to get down to the average winter static level. There is no use building up a sensitivity beyond this point. In the second place, two R.F. stages call for three tuned circuits, which, if properly built, provide ample selectivity. We found it easily possible to get too much selectivity; that is, it was found that with certain arrangements the tuning could be made so sharp that de-

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*President—Mu-Rad Radio Corporation, Asbury Park, N. J.

THE CHASSIS OF A SINGLE-CONTROL RECEIVER

Mu-Rad type A receiver before enclosing in cabinet. At the left, somewhat below the R.F. transformers, may be seen a control rod which is operated by a small knob on the panel and serves to actuate the springs of the jack between the two nearest R.F. transformers. Across this jack is connected the small fixed antenna series condenser next to the terminal strip. The knob therefore serves to shift the natural period of the antenna without bringing the antenna near the panel. This idea should be very useful in short-wave sets.
The ratio of inductance to capacity in the tuned circuits of the receiver is somewhat higher than is commonly found. The maximum capacity of the condensers is 230 µfd. The inductance of the R. F. transformer is 338 microhenries. The inductance was pushed to as high a value as possible without impairing the minimum wavelength. A special design of the condensers when a smaller one is employed. Better signal strength and selectivity are secured with smaller tuning condensers and correspondingly larger inductances provided their design is well carried out.

There has been a good deal of conjecture and some really good comment on the question of direct pickup on a receiver. Of course any energy getting into the receiver for low minimum capacity assisted in this direction. The figure of merit of the coils

\[ R \frac{1}{\lambda} = 0.0004 \]

is very good despite the deviation from the straight solenoidal construction. The resistance of the secondaries in their cases and mounted in the set is about 0.7 ohms at 400 meters. It should be stated here, that the argument frequently advanced against the use of small capacity tuning condensers, namely: that variations in tube capacities will upset the tuning (these being in parallel to the condenser) is not sound. The reason is that the tube capacity only begins to become important at the shorter wavelengths, that is, at the bottom of the condenser scale where the latter is nearly out of mesh. All good variable condensers whether they be of 500 µfd. or 200 µfd. capacity at maximum, have very roughly the same minimum capacities (something of the order of 15 µfd.). Hence the tube affects the tuning at the low end of the scale practically as much when a large condenser is used as other than that arriving directly through the antenna is not subject to the filtering action of the successive tuned circuits, and will cause such interference that it may not be possible to handle it successfully. This is particularly true if one is located close to a modern broadcaster. This problem came in for considerable investigation as a result of which many of the claims for the so-called fieldless coils were well substantiated. Such coils, however, do not completely circumvent the difficulty. Complete and proper metallic shielding seems to be the only way of preventing all direct pick-up. Very good results, however, can be secured when a smaller one is employed. Better signal strength and selectivity are secured with smaller tuning condensers and correspondingly larger inductances provided their design is well carried out.
with restricted field coils. Of these, the twin cylinder or binocular "door-bell" coil is one of the best. It has the advantage of rather high distributed capacity and high resistance at the shorter wavelengths. The old cross wound Navy doughnut has similar disadvantages, plus the fact that it is hard to reproduce accurately in quantities. The toroidal coil is fairly good when properly proportioned, but must be constructed with solid wire and invariably seems to wind up with a rather high resistance. Furthermore, it is anything but rugged and must be handled carefully. We were never able to subject it to the acid test of quantity production and have them come through with sufficiently uniform inductance.

The Mu-Rad R. F. Transformers

The coils developed for the receiver are shown in Fig. 2 and Fig. 3. Both the magnetic and static fields of these coils are quite restricted. They have a remarkably low self-capacity, are sturdy and rugged, and can be manufactured in quantities with such small variations in inductance, that special arrangements have to be utilized to detect any difference at all. When the windings are completed they are assembled in the moulded cases, Fig. 3, making a permanent inductance unit that can be handled with impunity. The three series connected secondary coils are wound with "Litz"; a vitally important factor in its effect on resistance in all closed field coils.

The wire is wound on formica tubs \(1\frac{1}{8}\)" in diameter and is wound on HOT. The heating of the wire as it is wound on results in a tight winding when the wire cools down owing to the contraction of the copper, and the winding will not get loose on the spool after the set is put into service. This is worth-while insurance against a possible change in the inductance of the coil after it is built and tested.

The completed coils are tested in their cases for inductance and resistance. The inductance test is made by observing the zero beat note from a 300-meter oscillator on a second oscillating circuit whose inductance is that of the coil under test. This test circuit is provided with a small vernier condenser having a maximum capacity about \(\frac{1}{2}\) of 1 percent of the total circuit capacity. A standard coil is inserted in the test circuit and the zero beat note tuned in with the vernier at half its full capacity. The standard coil is then replaced by the coil to be tested and the latter, to be acceptable, must give zero beat note within the range of the vernier condenser.

The primary windings of the R. F. transformers in a single control circuit of this type must be proportioned with as much care as the secondaries. In the first place, a reasonably tight magnetic coupling between primary and secondary is required though the capacity between these two windings should be reduced as much as possible. The proper magnetic coupling is a function of the tube characteristics, the frequency, the associated tuned secondary characteristics, and the sharpness of the resonance curve desired. It turns out that unity coupling not only gives broad tuning, but at the same time results in less amplification than is secured with a coupling considerably less than unity. As the coupling is reduced from unity, the selectivity improves and at first the amplification increases. With further reduction of coupling the amplification begins to fall off, and below a certain coupling value there is no improvement in selectivity.

In finally determining the proper coupling value and then the constructional details of producing this value, very careful consideration must be given to some other
factors. In a receiver with more than one tuning control these are not especially important, but in single control operation they spell success or failure. Coupling a primary coil to a secondary affects the tuning of the secondary because the characteristics of the circuit coupled to the primary are reflected into the secondary through the coupling. In the second and third transformers of a two stage R. F. amplifier the primaries are connected to the output elements of a vacuum tube. In the first or input transformer, the primary is connected to an antenna. The antenna characteristics are obviously quite different from those of the tube, and the detuning effect of the coupled primary winding is therefore likely to be entirely different in the first transformer than in the second and third, and the single control idea is therefore a failure.

We found, however, that these differences could be compensated with a high order of precision provided we kept away from abnormally long antennas with natural periods up in the broadcast wave band. The problem was to keep the equivalent or reflected primary reactance into the secondary the same in the antenna stage, as in the tube stages.

Fig. 4 shows diagrammatically one of the tube stages. The network attached to the primary impedance which affects the tuning of the secondary of the output transformer exactly as though it, (the primary network) were replaced by a capacity $C_r$, Fig. 5. The value of this equivalent capacity obviously depends upon the internal tube capacity, the tube capacities, and the constants of the preceding tuned circuit. I do not believe the importance of the latter has been generally appreciated heretofore, but the magnitude of its effect is shown in Fig. 6 and is seen to be considerable. This particular curve was taken on a Signal Corps VT-1 tube (W. E. Type J). It shows the equivalent plate to filament capacity of the tube for different impedances of the input circuit connected between grid and filament of the tube. This impedance ($= \frac{L}{C_r}$, see Fig. 4) is not constant, but changes as the tuning is adjusted for the reception or different wavelengths. Hence the value of $C_r$, and therefore the effect on the tuning of the output secondary is different at different wavelengths.

In the antenna transformer the same sort of effect is present, but here the capacity associated with the primary is the effective capacity of the antenna which in general is different from the equivalent tube capacity $C_r$ just discussed, and varies with wavelength as shown in a general way in Fig. 7.

It may now be seen that this part of the problem is solved when the effect of the antenna capacity on the tuning of the first resonant circuit is made to be the same as the effect of the equivalent tube capacities in the succeeding stages on the tuning of the second and third resonant circuits. As may be suspected, the solution of this problem was quite a job experimentally, but it was accomplished by adjusting the resistances, inductances, and capacities of the tuned circuits and properly proportioning and locating the primary coils of the transformers. The primary of the antenna transformer is wound with No. 32 D.S.C. wire, the turns being spaced with a pitch of 20 turns to the inch. The primaries of the second and third coupling transformers are wound with the same wire, but their turns are spaced 36 to the inch. All these windings are on 1-1/8" diameter formica tubes fitting snugly inside the secondaries. The switch S, (Fig. 1) throws a shortening condenser in the antenna circuit, but is only needed when an antenna is used that has a natural period up near the higher broadcasting wavelengths.

The Tuning Condenser Arrangement

The group controlled variable condenser unit is shown in cross section in Fig. 8. The construction of these condensers and their method of assembly into a group con-
trolled unit is rather unique and entirely overcomes the usual difficulties encountered in gang condensers mounted on a single shaft. The condensers are separately mounted each on its own bakelite bracket support and each is provided with a large die cast gear. These gears mesh with small fibre pinion gears carried on the control shaft. The gear ratio is 6 to 1. The pinion shaft is pressed firmly upward by spiral springs. Such a spring being located in each of the molded condenser brackets. This construction eliminates back-lash entirely. It will also be noted that through the construction employed the capacities of the condensers cannot possibly be affected by expansion or contraction of the mountings, warping of the base board, slight misalignments in assembly, or through shocks in transportation. Such construction insures permanency in the tuning characteristics of each stage, a factor of vital importance in single control operation.

On the shaft of the condenser nearest the panel is mounted the pointer which moves over the calibrated dial. The dial and pointer are shown in Fig. 9. The dial is given a frosted gold finish on which it is possible to mark the call letters of various stations in lead pencil, writing through the windows of the pointer. It will be noted that the wavelengths are spaced in a nearly uniform manner which results from the use of parabolically shaped plates in the variable condensers. The wavelength calibration of the dials is etched in permanently and is the same on all receivers. This is made possible by the accuracy of coil and condenser construction, and by the provision of the “set and lock” compensating plates on each variable condenser. These plates are shown at “A” in Fig. 8. The rear end of each condenser shaft is squared off or flatted and carries a single loose rotor plate that can be moved back and forth along the shaft but turns with the rest of the rotor. By moving this plate horizontally toward or away from the outside end stator plate the capacity of the condenser can be changed by some 18 µµfd. when in its fully meshed position. These separate rotor plates therefore provide a means of bringing each stage exactly in tune and also adjusting the wavelength indications of the pointer to correct values. When the correct setting of the end plates is found they are locked in place by the set screws and are never changed thereafter. This adjustment, of course, is made at the factory.

Volume Control

It will be seen from Fig. 1 that the regulation of signal strength or volume control is secured by adjustment of the plate voltage delivered to the R. F. amplifier tubes, that is, by regulation of the radio frequency amplification. This applies to both the R. F. tubes because changing the plate voltage changes the internal tube impedance and if only one of the tubes was operated in this way, the tuning of the stage thus controlled would vary slightly from that of the other stage. The filaments of all tubes are controlled by a single rheostat for the same reason. At this point the writer wishes to state that in his opinion the only proper way of controlling signal strength is to

FIG. 7. EFFECT OF ANTENNA CAPACITY

THE MU-RAD TYPE A RECEIVER COMPLETE

While the three-compartment arrangement is normal, certain features distinctive with the single-control type are notable. The wiring is relatively simple, the parts accessible and the panel both small and free from complexities. At the center is the scale and its indicator with the vernier control knob just below. The knob to the left is the R. F. grid potentiometer control or “sensitivity control.” To the right is the rheostat knob. In the lower left and right corners respectively are the filament switch and the antenna jack-switch buttons.

control the sensitiveness of the receiver, that is to regulate the input to the detector.

Adjustment of the audio frequency amplification is distinctly less satisfactory. In the first place, strong signals which require reduction in volume are often overloading the detector tube and thereby distorted and in such cases reducing the audio amplification will not straighten things out. On the
other hand if the strength is reduced by reducing the radio amplification, or sensitiveness or detector input, the signals will be brought down to the required volume and the distortion caused by detector overloading will be corrected. In the second place, when one regulates volume by adjusting the amplification of the R. F. stages, he can set the receiver at any desired sensitiveness level. This is a big factor in the mitigation of back-ground noises, (static or otherwise). On some nights the noise level is high and there is no use trying to listen to distant or weak stations. One must be content to listen to nearer and louder broadcasting, and this can be done with comfort if the sensitiveness of the set is reduced to a point where the back-ground noise disappears. The signal

Audio Amplification

The audio amplifier end of the receiver is not visibly distinctive. It consists of two 3½ to 1 transformer coupled stages with C-battery. Well designed, flat characteristic transformers are no longer hypothetical affairs. As a matter of fact we believe that much of the criticism directed against transformer coupled audio amplifiers is not attributable to the transformers nearly so much as it is to the layout of the receiver. For instance, it is now known very definitely that capacity feedback in an audio amplifier tends to put a marked peak in the amplification-frequency curve at the higher frequencies (around 3000 to 5000 cycles). Microphonic regeneration due to tube element vibration is another very serious cause of distortion in an audio amplifier and is not easily recognized by the unininitiated. This usually occurs right in the middle of the frequency range and plays havoc with quality. Resistance in the B-battery leads or in the B batteries themselves (which is more often the case) causes regeneration (resistance coupling between stages) and often bad distortion in the audio circuits. It is surprising how hard it is to convince people whose B batteries read full 90 volts that it may be their batteries that are causing poor quality reproduction. The importance of this point, however, cannot be overlooked, and was brought home quite forcibly when we found that a resistance of only 15 ohms in the B-battery circuit of a certain amplifier caused a regenerated amplification peak at 200 cycles; nearly 3 times the amplification at 1000 cycles, whereas with this battery resistance removed, the amplification characteristic was practically flat.

In the development of the present receiver, capacitive feed-back in the audio stages, microphonic regeneration, and the common plate-circuit-resistance-effect was reduced so that the actual characteristics of the coupling transformers were approached very closely. The fidelity of reproduction seems to be very satisfactory and the measured characteristic is practically flat from 90 to 5000 cycles.

Strays

QTK—QTK!

A new “Q” signal—put it down on the list, OM. 9CAN was working the set with raw A. C. on the tube and a fellow told him his QSB was pure D. C. 9CAN came back with a “QTK—QTK, OM” which when translated means “Quit The Kidding!!”
By R. C. Hitchcock

Using a given variable condenser in series with a fixed condenser of correct capacity, a variable combination can be made having nearly any desired maximum capacity. For example, if a variable condenser of .0005 microfarads is on hand and a value of .0001 microfarads is wanted (to tune over a shorter wavelength band) use a series condenser of .000125 microfarads. The formula to calculate this value is the regular reciprocal relation for series capacities, i.e.:

\[ \frac{1}{C_{1}} + \frac{1}{C_{2}} = \frac{1}{C_{n}} \]

The condensers \( C_{1} \) and \( C_{2} \) being used in series to obtain \( C_{n} \). This article includes a table and chart based on this formula, making easy the prompt finding of the proper series condensers to use throughout the present broadcast and lower wavelength bands. The numbers representing capacity are given in micromicrofarads (µµfd); to obtain microfarad (µfd.) divide the values given by one million.

Whatever is said about variable condensers in series with fixed condensers, applies as well to fixed condensers in series, the difference being that the chart and table give maximum values for the variable-fixed condenser combination, and the only value for the fixed-fixed condenser combination. Table 1 was calculated in order to find what series condenser to add to a given variable condenser to get a known capacity. The first column is the variable condenser \( C_{1} \), the second column is the desired capacity \( C_{r} \), which is obtained by using the condenser value \( C_{1} \) in the third column. For instance, suppose we have a condenser of 500 µµfd., \( C_{1} \), and want a capacity of 100 µµfd., \( C_{2} \), the third column shows the series capacity to use, \( C_{3} \) equals 125 µµfd.

This table shows those values to be used in obtaining capacities ordinarily used. However this sometimes necessitates using series condensers that are not standard.

For an example, fixed condensers of 125 µµfd. capacity cannot be purchased in the open market.

The more easily obtained capacity fixed condensers are, 100, 200, 250 µµfd., etc., and a chart was drawn for these capacities, to show the capacity to use in series with regulation size variable condensers up to 1000 µµfd., (.001 µfd.). On this chart there are the three separate units; \( C_{1} \), \( C_{2} \), and \( C_{3} \) each having the same meaning as in the formula, and in Table 1. On the chart, \( C_{1} \) is shown by the left vertical scale. \( C_{2} \) is represented by the curves, the capacity values of the curves being given at the upper end of each. \( C_{3} \), the resulting over-all series capacity, is shown at the bottom of the chart. The use of the chart will be made clear by an illustration. Suppose we have a 600 µµfd. variable condenser to use in series with a 500 µµfd. fixed series condenser. At 600 at the left, \( C_{1} \), move right until the 500 curve, \( C_{2} \), is met and follow...
this down to C, finding the approximate capacity to be 275 µµfd. The value by calculation is 273 µµfd., the error here due to using the chart being less than one per cent.

Consider another use of the chart. Suppose we have a 500 µµfd. condenser and want a capacity of 125 µµfd. From the table we can see that the capacity, 167 µµfd., is not one of the regular commercial sizes. By using the chart it will be possible to find what capacity would result if the nearest commercial value of condenser were used. Follow 500, C, from the left until it meets the line from 125, C, below—this, intersection will be seen to lie between the curves of 100 and 200 of C, and nearer to 200 µµfd. The chart here shows more clearly than a table, that the nearest commercial size, 200 µµfd., will give a resulting capacity of 145 µµfd.

There is a phenomenon to be noted when a variable condenser is used in series with a fixed condenser. To tune to short waves, condensers should have a low minimum capacity, as the series connection does not reduce the minimum very much. As an example, suppose a variable condenser having a maximum capacity of 500 µµfd., and a minimum of 52 µµfd., is to be used in series with a fixed condenser of 500 µµfd., giving 250 µµfd. maximum. The series capacity with the variable condenser set at its lowest point, is 47 µµfd. Given as a ratio from maximum to minimum—a real indication of its tuning ability—the original variable condenser alone has a ratio of 9.6:1 (500/52). This ratio, when used in series with the condenser mentioned above, becomes 5.3:1 (250/47). This will make the relative tuning range of the series combination less than that of the original condenser. The great advantage, however, of a series connection when used for radio work, is the spreading of the tuning of the lower wavelengths over a greater section of the dial. As condensers of present day manufacture have quite low minimum capacities, the resulting series capacity is still low enough to allow tuning over a fairly good range.

### IMPORTANT NOTICE

##### Increase in A.R.R.L. Dues

By action of the Board of Directors, the annual dues for membership in the American Radio Relay League have been raised, effective April 1, 1926, from $2.00 to $2.50.

Members residing outside the American Postal Union are required to remit 50 cents extra, as heretofore, to cover foreign postage on QST; making the amount to be remitted by such members $3.00.

This increase in dues will not affect memberships already paid. Commencing April 1, 1926, however, all remittances must be at the rate of $2.50 (foreign $3.00) per year.

—Kenneth Bryant Warner.

### New England Division Convention, April 9th-10th, 1925 at Providence, Rhode Island

All "HAMS", OW's, YL's and their friends take due notice, that the Annual New England Division Convention is to be held at the Providence-Biltmore Hotel, under the auspices of the Providence Radio Association.

All roads lead to Providence, Rhode Island, and assurance has been given by the Committee that this year's convention will surpass any previous one.

The convention city is so near to Hartford that the whole of Headquarters Gang has promised to show up in a body Saturday afternoon and be with us for the Banquet. We also have it on good authority that our worthy President, Hiram Percy Maxim, will be with us on the last day.

By the time you read this, you will have received a personal invitation through the mails, and if your reservation has not yet been made, drop a line to H. Young, 1CAB, Chairman, 73 Clarence Street, Providence, R. I., and tell him you will be there. Fellows, let's make this a 100% attendance.

—A. A. H.

The Cardwell ad on page 88 of the February issue of QST refers to transmitting condensers only.
The Modesto Radio Club's Housewarming

By R. L. Brown, Jr.

In modern phraseology, the Modesto Radio Club has "gone and done it again." Here is a club composed of twenty members, only four of them over twenty-one years of age, which seemingly, has more push and vigor than any other club we have heard about. That is a bold, but deserving statement; for the Modesto Radio Club has, in the five years of its active existence, done more for amateur radio, or rather has done more to put amateur radio over on the Pacific Coast, than any other one body.

As the story goes, in the fall of 1924 the officials of the League in the west, met in the Director's office to find someone to put over a Pacific Division Convention. It was going to be a big job—to do it right—as the ham spirit was surely on the skids and had been for some time. Someone—I believe he was from the R. I. office—suggested Modesto, a hitherto unknown town, in a little-known section of the country. This came to the club right on top of, and on account of, their program of collecting burnt out tubes from all over the United States, the metal to be used in making a replica of the Wouff-Hong. This was to be awarded to the best all-around station in the Pacific Division.

With the members of the club busily engaged in their studies and engrossed over the idea of the Wouff-Hong, one would naturally suspect that the Convention, or the Wouff-Hong, or at least their studies, would suffer somewhat for inattention. However, none did—yes, they even made the grade in school. They put over the biggest convention the Pacific Division has ever seen, which incidentally it was the means of rejuvenating ham radio on the Pacific Coast; and they had the Wouff-Hong at the convention to show to the fellows.

After that really big effort, the pendulum of interest filled the old saying and took a decided swing in the opposite direction, only to swing back in the course of a year, with more force than ever before.

Since the organization of the club, it had been faced by the housing problem. It had met in officers' houses, until said officers' mothers have run it out; then it took up its abode in the shacks of the individual members.

In the late spring of 1925 someone lightly suggested going into the "Hot Dog" business as the means of raising revenue to enlarge the depleted treasury. Heh! Good joke! Nevertheless the idea stuck, and when it was announced that Modesto was to have a county fair the size of the State fair, somebody woke up! Being more or less of a community organization, the club was able to obtain two, and the only two, hot dog stands on the grounds. The trials and tribulations of a bunch of inexperienced "Hot Dawg" men were many. However, there was a certain amount of glamour and thrill in the work that "egged" the fellows on. The end of the week found them all tired and "hot dog sick", yet smiling through it all for in that one week they cleared something over $700.00.

What followed is now current history. Suffice it to say here, that with the $700.00 they bought a lot, borrowed $1700.00 with the lot as security and have just completed their own home, which as far as we can determine, is the only one of its kind in the world.

When they were all set to move in, they invited all the hams in California to another of their famous hamfests.

With the members of the League in the west, met in the Director's office to find someone to put over a Pacific Division Convention. It was going to be a big job—to do it right—as the ham spirit was certainly on the skids and had been for some time. Someone—I believe he was from the R. I. office—suggested Modesto, a hitherto unknown town, in a little-known section of the country. This came to the club right on top of, and on account of, their program of collecting burnt out tubes from all over the United States, the metal to be used in making a replica of the Wouff-Hong. This was to be awarded to the best all-around station in the Pacific Division.

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To say that it was a success does not do it justice. It was more than that, as anyone who was there will tell you. Over a hundred were present. A gang of the "old timers" came along; the kind who were going strong in the spark days, and who have since been to every continent on the globe, besides operating at KPH, NPL, NPS, etc. They got together after the banquet and started slinging the ol' oil. I left the party a little after midnight, and they were there, still going strong, with an audience of several score of wide-eyed "kids" who have yet to follow the trail of the setting sun. Mr. A. H. Babcock, our Pacific Division Director, was there, and with him the whole Sixth District R. I. forces. Jerry Best was there with flying colors, and on the other side of the table was Col. Foster, 6HM—Canadian 9CN—the ham
who works 'em with 5-watts input! Next to him was 601, the fellow who has worked every continent on the globe, with a lone fifty watter.

With all that talent we could have had speeches until daybreak but there was a raffle that had to come off, and—the inevitable M. R. C. stunt. That, as usual, was the spice of the program. In the raffle, 6FH came out on top winning the “H” tube, while 6CKV, president of the San Jose club, walked away with a year's subscription to "Radio".

The San Jose bunch gave the assemblage quite a treat, when they showed motion pictures of all the stations in their vicinity. They added to the reel, by taking pictures of all the Modesto gang the next day.

After the banquet was over, the rest of the evening, (and part of the morning) was spent at the clubhouse, where, as we said before, the gang engaged in the art of “slinging the oil”. To express it mildly, we all had a whale of a good time; and that only means that the M. R. C. scored another big point in the ham spirit of the time.

The clubhouse, pictured above, is forty feet across, twenty feet deep, made of white stucco, with orange and black “trimmin’s”. The pole in the background is sixty feet high supporting a vertical one-wire antenna that is used in transmitting on the forty-meter band (call 6CB).

Some More Changes at Headquarters

By the time this issue appears it will be generally known through amateur radio that Mr. Fred H. Schnell has resigned his post as A.R.R.L. Communications Manager, which fact it is our unpleasant duty to record in these pages.

Mr. Schnell has now become associated with the C. F. Burgess Laboratories, of Madison, Wisconsin, in radio experimental work. He joined A.R.R.L. Headquarters in April, 1920, succeeding Mr. J. O. Smith, as Traffic Manager. Under his leadership our Traffic Department expanded into the huge machine it is today. With the possible exception of our Treasurer, Mr. Hebert, Mr. Schnell is probably personally known to more of the membership than any amateur in the country. He is an excellent operator; he was the first American amateur to work Europe; and his general qualities caused him to be selected by the U. S. Navy to operate their short-wave experimental equipment on the recent cruise of the U. S. Battle Fleet to Australasia on which mission he was phenomenally successful. It was inevitable that his successes should open wider field of opportunity to him. We are sure that his many friends throughout the League join with us at Headquarters in wishing him every success in his new work.

Mr. F. E. Handy, of Augusta, Maine, formerly 1BDI-IXH at Orono, Me., has been appointed as the new Communications Manager. Mr. Handy is by no means a stranger to the department, having served as Acting Traffic Manager last summer during Mr. Schnell's absence with the Fleet. During that time Mr. Handy made an excellent name for himself and amply demonstrated his ability to manage the department with credit to himself and the League.

Mr. Clark C. Rodimon, 1BIZ-1SZ of Florence, Mass., joined our staff on February 23d as assistant to the Managing Editor, instead of Mr. Johnson, of 1HN as we reported in our last issue.

Miss Elizabeth C. Murphy, for some years the crack dictaphone operator of our editorial department, left us during February to become Mrs. C. A. Service, Jr. Mr. Service, until recently our Assistant Secretary-Treasurer, is now located at Sarasota, Fla., in the radio business. (Free ad.) This, then, is a Headquarters romance—but not the only one! Our Assistant Technical Editor married a young lady from our Circulation Department; so did Louis Hatry, until recently in charge of our Information Service; and to round out the story the engagement has recently been announced of Miss Winifred G. Richardson, formerly of A.R.R.L. Hq., to our new Communications Manager!

—K. B. W.
The Board Meets

The A. R. R. L. Board of Directors had its annual meeting in Hartford, on February 26th and 27th, with every Director and officer present in person. This is the first time in our history, since the present constitution was adopted, that every Director was actually present in person, able to speak authoritatively about what A. R. R. L. members want in the Division that elected him. It made a fine, representative meeting that went into the heart of all matters affecting the welfare of our League, receiving the annual reports of the officers, considering their recommendations, initiating new policies and outlining plans for the year. The highlights:

Hiram Percy Maxim, 1AW, was unanimously re-elected as our president for the years 1926-1927, the office he has held since the formation of the League in 1914. Charles H. Stewart, ZES, was unanimously re-elected vice-president. In re-electing Mr. Maxim the Board adopted the following resolution:

"Whereas we, the Board of Directors of the American Radio Relay League, are conscious of the universal sentiment of the members of the League throughout the country and concur with our constituents in the deep admiration and affection which they entertain for our beloved President, Hiram P. Maxim, and

"Whereas further, we are of the opinion that the leadership of Mr. Maxim is of such high character and of such an altruistic and thorough devotion to the ideals of our organization, that it is particularly valuable at this time when the League stands at the beginning of a greater usefulness and higher aspiration, now therefore

"BE IT RESOLVED, that in re-electing for two more years of leadership the beloved founder and inspiration of our League, we offer to him this unanimous expression of our appreciation for his efforts, our confidence in his ability and leadership, and of our deep affection."

The membership dues of the League were raised to $2.50 per year, effective upon the publication of the announcement. The Board made a careful study of the finances of the League and took this step only when it was apparent that our decreased income from other sources made it imperative, if we were to continue our normal activities. Considering that every member receives QST, and that the normal yearly subscription rate of a 25c magazine is alone $2.50, it was believed that the membership would be quite willing to support this small increase in the dues in order that our League may carry on. Although a very small addition from each member, this increase will produce a material increase in the League's annual revenue.

The name of our Traffic Department was changed to the Communications Department, a much better title for the department that handles so many other operating activities beside message traffic. The title of Traffic Manager similarly was changed to Communications Manager. Then a far-reaching change was made in the structure of the department and the old Division-Manager system, which has served us so well for these many years, was washed out in favor of a new plan. The new plan contemplates a larger number of operating regions, to be known as Sections, each in charge of a Sections Communications Manager who will work direct with the Communications Manager (or, in Canada, with the Canadian General Manager). This new plan will greatly reduce the delays in correspondence, reports and bulletins, enable the publication of more up-to-the-minute field news in QST, and will reduce the maximum work required of any field official. The amended by-laws adopted to effect this change read as follows:

"5. For the activities of the Communications Department, the operating territory of the League shall be further divided into Sections. In each Section there shall be a Section Communications Manager, who, under the direction of the Communications Manager, shall have authority over the Communications Department within his Section. He shall be responsible to, and report to the Communications Manager. In this paragraph, as regards the Dominion of Canada or Newfoundland and Labrador, the words 'Communications Manager' shall be read as 'Canadian General Manager'.

"6. The operating territory of the League in the United States, its island possessions and territories, and the Republic of Cuba, shall be apportioned into Sections for the purposes of the Communications Department, by the Communications Manager with the advice and consent of the Division Director. Similarly, the operating territory of the League in the Dominion of Canada, Newfoundland and Labrador shall be apportioned into Sections by the Communications Manager with the advice and consent of the Canadian General Manager. The boundaries of any Sections may be changed by the same officials as from time to time may be desirable.

"6A. The Section Communications Managers shall be elected for a two-year term of office. Whenever a vacancy occurs in the position of Section Communications
Manager in any Section of the United States, its island possessions or territories, or the Republic of Cuba, the Communications Manager shall announce such vacancy and call for nominating petitions signed by five or more members of the Section in which the vacancy exists, and naming a member of the Section as candidate for Section Communications Manager. The closing date for receipt of such petitions shall be announced. Immediately after the closing date the Communications Manager shall arrange for an election by mail. Ballots shall be sent to every member of the League residing within the section concerned. The candidates' names shall appear on the ballots and the candidate receiving a plurality of the votes shall become the Section Communications Manager. The Canadian General Manager similarly shall manage such an election for a Section Communications Manager whenever a vacancy occurs in any section of the Dominion of Canada, Newfoundland or Labrador.

“6B. The office of any Section Communications Manager may be declared vacant by the Executive Committee upon recommendation of the Communications Manager, with the advice and consent of the Director, whenever it appears to them to be in the best interests of the membership so to act, and they may thereupon cause the election of a new Section Communications Manager as provided in the preceding paragraph, GA.”

No way could be found to finance the A. R. R. L. Laboratory and the Headquarters Station we have dreamed of so long, but the Board authorized the Executive Committee to prepare a plan for the establishment of a trust fund to which contributions could be solicited, so that there may come into existence a foundation for conducting experimental, research and development work in amateur two-way communication.

The name of the Vancouver Division was changed to the Vanalta, and that of the Winnipeg to the Prairie.

Standard radio “cable-count” was adopted as A. R. R. L. standard practice for message checks, instead of the wire-line check which has been our practice.

Considering “FS’s” departure, the Board adopted the following resolution.

“RESOLVED, in view of the faithful, efficient and progressive manner in which Mr. Fred Schnell has carried on his work as an official of the League, that we, the Board of Directors of the League, appreciating these services, hereby extend a vote of appreciation and thanks to Mr. Schnell, and further assure him of our best wishes for success and happiness in any field of endeavor he may choose to enter.”

The two-day meeting of the Board was held at The Hartford Club. Two days later the club was practically ruined by fire. We realized the discussion was pretty hot in spots but never thought—

K. B. W.

Financial Statement

By order of the Board of Directors, the following statement of the income and disbursements of the American Radio Relay League for the last quarter of 1925 is published for the information of the membership.

K. B. WARNER, Secretary.

STATEMENT OF REVENUE AND EXPENSES FOR THE THREE MONTHS ENDED DEC. 31, 1925

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<th>REVENUE</th>
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<table>
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<th>EXPENSES</th>
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<td>Net Gain from Operations</td>
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An unfortunate error in the Station Description of u6HM in the March issue of QST gives the impression that there are two operators at u6HM regularly. Not so—Harry Lyman constructed the outfit while Colonel Foster was in the East. The Colonel does the heavy brass-pounding.
Peaked Audio Amplifiers
By Robert S. Kruse, Technical Editor

The title isn’t supposed to be a joke, although it may sound that way. It might have been more accurate to say, “Audio Amplifiers Having a Peaked Curve of Amplification Against Frequency,” but that doesn’t sound like a title—unless perhaps the title of one of these bulletins that the Government Printing Office is always out of.

Getting down to business—why does anyone want a peaked audio amplifier—an amplifier that does most of its work at one pitch—a “distortion amplifier” Such an amplifier does not always give a greater per-stage amplification, often the signal is not as loud as it would be with a good flat (broadcast) amplifier such as the General Radio 6/1 ratio transformer. Now if that is so why do we want a peaked transformer?

The Reason

To understand this one has to think over the almost universal preference of telegraph operators for one stage of audio amplification. Why only one stage? Simply because most folks find that the air is seldom clear enough of interference to permit using two stages of ordinary audio; it is of little advantage to amplify signal and interference together. Now if we had an audio amplifier that amplifies one pitch only, and did not amplify the line leaks and static and off-tone signals we would be able to use one stage to read with one stage. In other words we would be able to make the signal stand out from the noisy background.

To find out something of the sort of peaked amplifier that fits short-wave C.W. work, a great deal of cutting and trying has been done. The big advantage of this is that the ear and the nerves are not wearied by having to listen to a scrambled “background” for hours at a time. Copying be-

![FIVE PEAKED AUDIO TRANSFORMERS](image)

comes much less tiring.

What Sort of Peak

To find out what sort of a peak would best fit amateur C.W. work, a great deal of cutting and trying was done by the writer. During 10 months, different transformers were cut in and out with a cam-switch arrangement that made a split-second shift possible. It turned out to be a most confusing problem. The answer was not the same at all times, it depended on the steadiness of the wave of the sending station, the amount of static, the pitch that the operator preferred and finally the kind of plate supply the sending station used. In the end my own final choice is for an amplifier with adjustable sharpness, either by switching two transformers or...
HOW AN AUDIO TRANSFORMER CAN BE TOO SHARP FOR EVEN C.W. RECEPTION WHEN THE WAVE IS UNSTEADY.

If the beat note is set at 1000 cycles and the received frequency changes only 200 cycles, the amplification will drop 9/10 as shown at B and C.

Let me tell the story and leave your own choice to you.

It seems off-hand that we certainly do not want the curve A of Fig. 1, which is a good radiophone transformer. For our C.W. work something like B or C in that figure is the correct thing.

It seems off-hand that the peak should be as sharp as possible but that isn’t always so. To begin with, most C.W. signals are unsteady as the deuce and if the peak is very sharp they keep falling off and being lost. Thus, in Fig. 2 a signal at A will be amplified almost 10 times as much as at B or C. If the sending station has only a 200 cycle “wabble,” it will sound like first rate fading. For wabbly signals a very sharp peak is not wanted.

But—even if one is working with a steady signal from 4XE, a sharp peak may mean trouble. A very sharp peak means a sharply tuned circuit—one that will oscillate easily. If it does not howl it is still tending to “ring” when static splashes come alone, and will also put “tails” on the dots and dashes as shown in Figure 3.

It is hard to decide just how sharp the amplifier peak should be. If it is too sharp we get into the troubles just mentioned, if it isn’t sharp enough there’s a lot of interference to tire the ears. Even that isn’t all. A few of us (including myself) have ears that work best at about 480 cycles (the pitch of the spark from the old Marconi 240-cycle sets) but we hate the thin piping and wailing of a signal pitched to 800, or 1000, or 1200 cycles. For us the transformer would need a curve like that of Fig. 1B. Most ears are best at these very pitches we object to, and the owners of those ears deliberately tune signals to make 1000-cycle notes (the same pitch as that of a 500-cycle spark set). For them there must be a transformer like that of Fig. 1C. One very peculiar thing will be noticed about the use of these transformers; one like 1B will let through less static than one like 1C. This seems odd because we always think of static as low pitched. It isn’t really odd at all because a great part of static noise is quite high pitched, which accounts for the effect.

Getting The Peak

Generally speaking, the easiest way to get a peak in a transformer curve is to use too few primary turns. This will drop the amplification at all places except that one where resonance occurs. At this place it will hold up pretty well. See Fig. 4 for an

EFFECT OF REDUCING PRIMARYTurnS OF AN AUDIO TRANSFORMER

illustration. Now it is not easy to tear turns off a transformer primary so the thing is usually up to the manufacturer unless one can invent another method. Several manufacturers have done the thing, using their own ideas as to the proper degree of sharpness. The best known exam-
ple is the OLD General Electric transformer sold by the Radio Corporation as the UV-712. This had a 9/1 ratio, in other words there was not a great deal of primary. It was meant to amplify 500-cycle spark signals (1000-cycle tone) and it did that in beautiful shape because resonance occurred in the neighborhood of 1000 cycles, but not sharply enough to result in ringing or "dragging." Later on this transformer was given more primary turns, bringing it down to 3½/1 ratio. This type is marked UV-712*.

One of our illustrations shows several special transformers made experimentally by the Fort Wayne (Indiana) works of the General Electric Co. These are of different degrees of sharpness, but all sharper than the UV-712. The sharpness of them has a little more tendency to "hang onto the dots" than I like—sounds as if the sending station had the key ahead of the filter. This transformer is perfectly hopeless with a wobbly signal. All of these transformers go at the thing in the same way, adjusting the inductance and distributed capacity of the windings so that the peak is obtained by means of audio resonance.

Tunable Transformers

This naturally suggests using a condenser-tuned transformer so as to get a moveable peak that can be set where the operator pleases. This idea is used in the "Erla" (Electrical Research Laboratory) transformer shown in another picture. A fixed condenser is supplied which tunes the transformer to 1000-cycle response, but a variable condenser or a fixed condenser of different value may be used to get a peak at another point than 1000 cycles. An amplifier using lumped capacity (instead of distributed capacity) has more of a tendency to sound "hollow" and to "drag" the dots than one of a more usual design. This can be taken care of by adjusting the grid bias. It may also be taken care of by means of a "Centralab" variable high resistance connected in any ONE of the positions shown in Fig. 5.

Tubes To Use

In all of the foregoing schemes the peak was obtained by cutting down the primary turns. The reason this gives a peak is that the input impedance of the transformer is low except at the resonance point. Very obviously we can get the same sort of a result by running the plate impedance of the tube up instead of running the primary impedance of the transformer down. This means that we can make a peaked amplifier of an ordinary broadcast amplifier by simply putting in tubes with a high plate impedance, such as the Daven "High-Mu" tube. When using a detector and two stages of audio amplification the detector may be left alone and the first audio tube exchanged for a high mu tube, leaving a normal tube (UX-201-A for instance) in the last audio socket so as to fit the impedance of the phones. Whenever the flat amplifier is wanted again one replaces the UX-201-A in the first amplifier socket where it was originally. With a detector and one stage of audio it is a little harder to get the same results. Depending on the receiver, a high-mu tube may—or may not—work in the detector socket. Depending on the phones, the tone at which best amplification occurs.
Tuned Shunt Feed

Another scheme for getting a peak with ordinary equipment is shown in Fig. 6. Here the amplifier is shunt fed thru a tuned choke. Let us say that the system LC is tuned to 600 cycles. When the beat note of a received signal is set at 600 cycles this LC circuit acts as a "rejector" (because of parallel resonance) and the 600 cycle A.C. is impressed on the transformer primary P, thence repeated thru the rest of the amplifier. If a 400-cycle tone comes thru, it will not encounter much reactance from LC as the tuning of that circuit is fairly sharp, therefore the 400-cycle frequency will mainly "fall thru the B-battery" and will not have much effect on the amplifier transformer primary. The main disadvantage of this arrangement is that it may — or may not — be the same one at which the amplifier transformer is in resonance. It is best to replace one tube at a time and then try the fourth combination, i.e. with high-mu tubes in both sockets. This arrangement has no tendency to put tails on the dots and dashes and the amplification is often greater at the resonance frequency than it was with ordinary tubes. This idea was suggested by Mr. J. C. Warner, of the Research Laboratory of the General Electric Co.

![Diagram of Shunt-Feed Scheme for Converting Flat Amplifier to Peaked Amplifier](image-url)

SHUNT-FEED SCHEME FOR CONVERTING FLAT AMPLIFIER TO PEAKED AMPLIFIER.

The circuit CL1 is tuned to the pitch that is to be amplified. When switch S is on point 1 the amplifier is fed thru the tuned choke and operates with a peak. When the switch is on point 2 the amplifier operates in the usual way with a flat curve and the stopping condenser C2 becomes simply a B-battery by-pass. C2 should be very large—at least 1 microfarad and as much larger as possible. 10 microfarads is not at all too much.

The LC1 circuit may be made up in various ways for instance: 1600 turn honeycomb coil shunted by a .5 microfarad condenser, 1500 turn honeycomb coil shunted by a .2 microfarad condenser. If the tuning is too sharp a small iron-cored inductance may be used. The value is seldom known exactly and the correct shunt condenser must be found by trial.

One fellow hung a "Jumbo" A. R. R. L. emblem on the top of his mast. The neighboring B. C. L.'s think it is a license to broadcast.

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Rules of the A.R.R.L. Information Service

1—Before writing, search your files of QST. You will probably find the answer there.
2—Do not ask for comparisons between advertised products.
3—Be reasonable in the number and kind of questions you ask.
4—Put questions in the following form:
   A—A standard business size (not freak correspondence size) stamped, self-addressed envelope must be enclosed.
   B—Write with typewriter or ink on one side of sheet only.
   C—Make diagrams on separate sheet and fasten all sheets together.
   D—Number each paragraph and put only one question in a paragraph.
   E—Keep a copy of your letter and put only diagrams.
   F—Put your name and address on each sheet. We cannot spend time digging your address out of the callbook.
   G—Address all questions to Information Service, American Radio Relay League, 1711 Park Street, Hartford, Connecticut.

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Strays

The Great Lakes Naval Station NAJ has discontinued transmission with the 30-K. W. arc set on long waves. All traffic is now handled on a small tube set operating on 34 meters. This is the first of the Naval stations to rely solely on short waves for all communications.

One fellow hung a "Jumbo" A. R. R. L. emblem on the top of his mast. The neighboring B. C. L.'s think it is a license to broadcast.
How Antennaz Shirk

The Most Amazing Revelation in Radio Chronicles, by the Former Secretary of the Berkshire Brasspounders

The Berkshire Brasspounders met at 1CLN's combination chicken coop and radio station to discuss the question of "Antennaz", at the request of the Technical Editor. When that man wants to know something he comes to the right place.

Ray Boize of 10M spoke while the pounders were getting comfortably buried in two feet of fresh straw. It was Ray's only chance.

"Well, boys, I spread out the wires in my sky hook and increased my radiation nearly an amp. If I don't get out better—"

"Hold on", interrupted Thomas Tomascus of 1XU, stuffing straw down 10M's throat, "why didn't you make it like mine while you were at it and have it perfect? My counterpoise is the exact duplicate of the antenna. This perfect balance together—."

"Hey you birds", chirped Mite Needham of 1AXH, "can't any of you remember to say ANTENNA CURRENT instead of RADIATION? If antenna current represented power, some of you fellows would be putting 100 watts into the set and getting enough antenna power to run a Lincoln Light Four."

Several shifted uneasily in the straw but Red J Snitch of 1AMS managed to open his mouth first. "I can prove," said Red, "that the less antenna current you have the better you get out. My current was 2 amps and after I raised the antenna 40 feet it dropped to 1½ amps, but just the same I get out better."

This puzzled the gang.

Lily White of 1ARF then gave an eloquent appeal for no antenna current, but has asked that we omit this because he has since found out that his meter was at the antinode.

(We will here omit most of Bub's paper for lack of space.—Tech. Ed.)

Then arose Professor Utell M. Whichisvitch.

"These antenna current arguments," said the professor, "are getting us nowhere. Let us talk about the actual process of radiation. A series of 439 measurements of field strength at a distance of 6 wavelengths from my station has been made. During this time the antenna was changed, taken down or blown down, 136 times. I have now proved conclusively that the steepness of the wavefront at a given frequency is a function of the vertical dimension of the displaced dielectric, times the amount of dielectric displacement. This latter is affected by 17 variables of which 14 are under control."

The professor paused to see if this was soaking in. It wasn't but that made no difference.

"Now then—these 14 factors are so related that when we have one right the others are all wrong. For instance we know that a high ratio of counterpoise capacity to antenna capacity tends toward the production of maximum voltage surge at the free end of the antenna. If we try to apply this principle in practice we will find the nodal point out under the crab-apple tree and the antenna current in the chandelier."

By this time three of the pounders were asleep, two were shooting craps on a hen's nest and 1CEK was trying to sell a fifty watter to 1VC for two dollars. 1VC was refusing obstinately for fear he might be getting one of his own back again.

"Gentlemen!" screamed the professor. "Listen to me! I am about to explain how 99% of this energy is wasted in a process of ether-shaking."

The three woke up, 1VC bought the tube in the excitement and the bones rolled down into the straw.

"The dielectric between the antenna and the ground contains countless electrons in elastic suspension. When oscillations are present these electrons are all set into violent motion. Their number is countless—as I have said—let us count them. In a cubic centimeter of the atmosphere, during midnight in November, and at an elevation of 1000 feet above sea level, when the temperature is seventy—."

Here the professor reached into the feed box for a piece of charcoal to be used in
figuring on the whitewashed wall. His spectacles fell off and—

“They ought to stay on”—sneered a heavy voice—“your nose is big enough.”

There in the door stood Poory Seever, the man who started that last petition to the Radio Supervisor. He looked back over his shoulder and yelled—

“All right! Let’s gooo!”

The shanty rocked and groaned, the sides separated from the foundation and dozens of dusky forms swarmed in on us.

My memory is hazy from this point on. There was a struggling mass of cackling chickens and cursing humanity—fists and feathers flew. I was nearing the top of the hundred foot mast with Poory close behind when I caught my toe and dove off into space. With a wing-like motion of my arms I flew toward a nearby cloud where another angel lay basking in the sunlight.

“Maggie!” I cried in recognition.

Yes—it was Maggie my very first 5-watt bottle. As I gazed into her pale face I wished that we were starting all over again in this greatest home and health wrecking hobby of amateur radio. What a thrill when we had first raised 2BM less than 50 miles away. What another thrill when (with increased voltage) we first were QSA at Canadian 1EF. Then with ever increasing work on Maggie’s part, we kept reaching out further and further until that glorious morning when, with Maggie’s supreme effort (and 2000 volts) we woke British 6LJ from a sound sleep and Maggie became a martyr.

“Come back to me Maggie, I’ll never treat you like that again.”

“I gave my life for you willingly,” she said, “but I hadn’t been dead an hour before you married a fifty watter.”

“Maggie—come back to me and together we will smash every bottle in the shack. Can’t you believe in me?”

Then she melted. Throwing her arms around me she said, “Yes Bub, I believe in you but I cannot go back—but cheer up. At your present sleepless pace it will not be long until there will be another black rectangle in QST and you will be with me where there are no fading signals, no bad fists, and no complaining neighbors. You will be in the Ham’s paradise.”

Someone else can be Secretary of the Berkshire Brasspounders after this. I’m through.

—Bub McGut, 1ARE.

Lower-Loss Inductances

The flatwise wound inductance is becoming more and more popular both in commercial and amateur circles, and there is a reason. The main point of apparent superiority of the flatwise inductance over the edgewise wound type lies in the fact that the former has a much lower distributed capacity. This in turn makes it much easier to change clips to get the best efficiency without knocking the wavelength helter-skelter. It also allows one to use a shunt capacity across a portion of the coil for all wavelengths, making the shunt capacity lumped instead of having to rely upon the distributed capacity to furnish coil tube, and lead capacity to furnish the necessary circuit capacity.

The pretty coils shown in the illustration are wound on glass spacers with strip a quarter of an inch wide, spaced a quarter of an inch. The end rings are of bakelite. The primary and secondary coils are furnished with glass “coupling rods” provided with mounting ends. Primary and secondary coils have the same number of turns.

The coils are supplied for 20-meter operation and even on this wave the shunt condenser can still be used. The 20-meter coils are 3 inches in diameter and contain 11 turns. For 40 and 80-meter work the coils are 5 inches in diameter, 40 meters being hit with a small shunt capacity across part of the coil and 80 meters with a larger capacity. When it comes to the 150 to 200-meter band two primary coils are provided. These should be connected in series. If one desires to go up to 200 meters with the same coil that is used for 80-meter work, a shunt condenser around 1,000 µfd. will turn the trick.

The primary coils are supplied with five clips that are easily attached and that stay put. The secondary has two. Altogether one of the prettiest jobs we have seen in a long time. The Radio Engineering Labs. of New York City make ’em.

—J. M. C.
Amateur Wavechangers

By J. K. Clapp*

The band system of amateur wavelengths assignment calls for a transmitter that can jump rapidly from one hand to another and still be sure where it will light. With such a transmitter one can make full use of the duplex reception system described last month. Tech Ed.

The problem of developing a satisfactory wavechanging arrangement for amateur transmitters is a difficult one, involving, as it does, the maintenance of high transmitter efficiency at all of the wavelengths used, accompanied by the demand for a minimum of equipment and consequent expense. None of the methods here discussed can be considered as a wholly workable solution of the problem; it is hoped, however, that other experimenters may expand and develop them to a point where it will be possible for every up-to-date amateur to install wave-changing equipment for operation in at least two of the amateur bands.

The Possibilities

In a general way, the subject may be divided into three main parts as follows: the classification is based upon the amount of equipment which is duplicated in providing for transmission on additional wavelengths:

I. Separate transmitters, complete.
II. a. Separate antennas and primary circuits but same tube. b. Separate antennas but same primary circuit and tube.
III. a. Same set all thru, returning each time wave is changed. b. Ditto, applied to loop transmitters.

Now before considering the actual circuit arrangements, let us briefly go over the factors concerning each of these classifications: In the case I: the cost of equipment is prohibitive. Separate transmitters can only be maintained by the fortunate amateur or by reasonably well-equipped laboratories. Under IIa we find a possible solution, since the cost of antenna circuit, tuning coils and tuning condensers, even for transmitters, is not so far out of the reach of the average transmitting amateur. Here, the same tube and power supply is used for transmission on each wavelength. By a suitable arrangement of switching, it should be possible to cut over from one wavelength to another, carrying along the proper operating adjustments for the tube, and the proper tuning for the wavelength desired and for the best output, without the necessity of making any adjustments whatever other than throwing the change-over switch. This represents a highly desirable condition, in that the station will be heard at either one of two wavelengths (or more if desired) but always at the same ones.

Under IIb we have a fair possibility, but one which does not give the positive operation of IIa. We provide separate antenna circuits for each wavelength, as well as suitable tube adjustments, but have to readjust the primary circuit condenser in changing from one wavelength to another. Even with a vernier dial, careful setting to a scale mark will not land the transmitter.
at the same operating wavelength for each change to that wavelength. True, with careful adjustment, the variations will be small, so that the variability of transmitter frequency may become an unimportant factor; but the change takes more time than with the arrangement IIa.

Finally we come to the last classification, part (a) of which is now used by practically every amateur station. The same equipment, throughout, is used on each wavelength; the time required to change wavelength varies between half a minute and three weeks, depending upon the skill of the operator and upon his satisfaction concerning the results obtained on the new wavelength as compared with the last. The impracticability of adjusting to the same wavelength two times running, the time required to make a shift even is one wavelength band, let alone from one band to another, and the eternal tendency to "fiddle" for the last and final adjustment, make this method unsatisfactory in actual operation, save in a very few and exceptional cases.

Loop transmitters appear to be used but little by amateurs, though they are eminently suitable for certain types of work. It is possible in the case of a loop transmitter to change wavelength by means of a single pole single throw switch, and an additional tuning condenser, all other adjustments remaining fixed. Operation in any adjacent bands, from twenty meters upward is thus easily handled.

Two Primaries and Two Antennas

In Figure 1 is shown the hook-up for two wavelengths, utilizing an inductively coupled Hartley circuit transmitter. Details of the filament and plate supplies are omitted. Separate antenna circuits are provided, each with its tuning coil; separate main tuning coils are used, with separate tuning condensers, L1, C1 and L2, C2. Between the coils L2 and L1 is mounted a three pole double throw switch, which may easily be rigged up by the amateur. The switch (Fig. 2) is a "five-and-ten" glass towel rod, on which are clamped three switch arms approximately two inches long made of light brass or copper strips, about % by 1/16 inch. The stationary switch contacts may be of the usual spring type, mounted on individual pillar insulators, or carried on a single strip of hard rubber. The distances between the switch arms should be several inches, three to five inches seem satisfactory. The arrangement of apparatus indicated in the figure may well be used where the equipment is mounted "board" fashion. Each station owner has his own ideas on this question, so that details will here be omitted.

In arranging the equipment for operation say at 20 and 40 meters, place the switch in such a position that the length of the leads on the twenty meter side is as small as it is possible to make it; an inch or so on the leads to the tube on the 40 meter side will have but little effect. If desired, the vacuum tube may be elevated from the baseboard, the switch rod placed vertically, parallel with the axis of the tube, and very close to the tube, with the result that the length of the leads with the wavechange switch in position may be no more than when no switch is used.

With the switch in one position we proceed to tune the circuit as we normally do, spending anywhere from an hour to several weeks in getting it "just right." Having once attained that final and most wonderful adjustment, we may throw the wavechange switch to the opposite side, and proceed to do the adjusting all over again, but on another wavelength. In the meantime, if it is desired to use the transmitter on the first wavelength, throwing the switch back again puts everything into shape for the first wavelength. As long as operation is contemplated in different wave bands there will be little likelihood of much interaction between the two tuned circuits. There is no reason why a careful check with an idle receiver cannot be made to keep from adjusting one of the wavelengths to an exact multiple of the other, so that the second harmonic of the 40 meter side, for example, will not fall on the fundamental of the 20 meter side. In allowing for, or hunting for, reaction between the circuits, it must be remembered that the wavelength of the idle side is much less without the tube connected than when the tube is connected.

One Primary and Two Antennas

Now as to the possibilities under IIb. Here a double pole double throw switch may be used, for the coupling between the tuned circuits caused by a common filament lead will not bother us—as we have only one primary
circuit. The antenna coils may be placed at either end of the primary inductance as shown in Fig. 3. One of the antennas is to be used for one wavelength, the other for the second wavelength. The problem now reduces to that of so tuning the primary oscillating circuit, with regard for the position of the tube clips, that the two wavelength desired may be obtained without changing the position of the condenser clips. It has been found unsatisfactory to provide switching contacts in the main primary oscillating circuit (indicated by the heavy lines) because of the introduction of a relatively high variable resistance. For operation on two wavelengths within a given band, the adjustments are easily arrived at; but for operation in adjacent wave bands much "cut and try" will be necessary. A ratio of approximately two-to-one in wavelength may be obtained, with good output from the tube, if one is patient enough. It is somewhat easier to start with the shorter wavelength and adjust so that the tuning condenser is at approximately one quarter of its maximum capacity. With the switch on the a contacts adjust the position of the clips until satisfactory operation is obtained on this wavelength.

Having adjusted for the shorter wavelength, throw the switch to the b contacts and bring the primary condenser to approximately full capacity. The range of adjustments is now limited to the positions of the clips "b-1" and "b-3," with only slight variations, relatively, in the value of the tuning condenser capacity. To change wavelength it is now necessary to change the position of the switch and to place the tuning condenser on one of two definite settings. There will be little likelihood of reaction of the idle antenna system on the active one, unless it happens to be tuned to a multiple of the wavelength in use. At the short wavelengths now commonly used such a condition would be reached only by chance, and is easily prevented by tuning either of the systems to a very slightly different wavelength.

From the viewpoint of time required to make the shift, and also as regards the accuracy with which it is possible to return to a given wavelength, this method is not as good as the one described above. However, it requires but little equipment, and would bring a great improvement into amateur operating if it were widely used.

Case IIIa only requires the addition of switch contact in the antenna circuit is in

![Fig. 4](screenshot.png)

**Fig. 4.** This practice meets with the same objections as were mentioned for placing the contact in the main primary oscillatory circuit, but has the advantage that the effect of the contact resistance is less pronounced, owing to the relatively higher resistance of the antenna circuit.

This arrangement does not give very good efficiency, for if the antenna system is made as large as possible for operation on the shorter wavelength (fundamental operation only is considered) then it is necessary to use a relatively large number of turns in the antenna coil for operation at approximately double the wavelength, which will be the condition for operation in adjacent bands, 20 meters and above.

The method of Fig. 3, utilizing separate antenna systems makes it possible to use large structures, with minimum loading for each of the wavelengths.

**Loops**

A special case of wave changing is found when a loop transmitter is employed. By placing the tuning condenser in the position to give the shorter wavelength desired, the longer wavelength may be obtained by adding a second tuning condenser in parallel to the first by means of a single pole, single throw switch, as shown in Figure 5.

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1—A way out of this difficulty is suggested in a short article appearing in an early issue (possibly this one) under the title "Choosing the Transmitting Antenna."—Tech Ed.
Experimenters' Section Report

By the time this reaches the hands of the members a number of the new outlines will have been mailed. It is now possible to put some time into the work of this section and the first job has been to go through the card files in detail, weeding out the problems that have become "dead wood". We are now, for the first time, in a position to go ahead actively and to make some of our ancient plans turn into facts.

Each member of the Section has received a form to be used in bringing his enrollment up to date. Accompanying this is a "membership increase" form to be used in adding more men. We have been unable to do this previously because we were unable to serve the existing membership well enough.

Our Aims

Again—we do not pretend that this Section will undertake large problems; our purpose is mainly to provide contact with men working on the same problem, so that all may work more effectively and with more pleasure and profit. This end may be secured by following the tabulated list below.

A—Lists of members and problems they are working on.
   The list is revised at intervals and goes to all members. This enables members to establish radio or correspondence touch with others working at the same problem.

B—Correspondence from this office supplementing the list.

C—Information on problems given by letter from this office, wherever we are able to supply it directly or indirectly.

D—Outlines suggesting the way of attacking problems.
   These are furnished only on the problems for which the member is enrolled. Otherwise the cost would be excessive.

E—Publication of results in the shape of QST articles.
   Much of this has been done the past 18 months.

The Micromicrofarad Again

The discussion of the possible improvement of the awkward term "micromicrofarad" has taken a humorous quirk. It has been suggested by several people that QST is in danger of revising electrical terms on its own account. This is rather funny, we couldn't do it if we tried—and we have not the least intention of trying. The making and changing of electrical terms is in the hands of the national engineering societies and the inter-society committee on standardization. Such a complex arrangement moves very slowly. It can be helped by suggestions and information—and that is what QST is collecting. Nothing has been said, done, or thought, to suggest that we are in any way inclined to usurp the position of the A.I.E.E. and the I.R.E., of which organization several of us at H.Q. are members. The present writer is, in fact, working on the membership committee of I.R.E. and has the profoundest respect for A.I.E.E.

—R. S. K.

An Excellent Tuner Chart

Mr. R. H. Barclay, to be addressed at 194 Crafts St., Newtonville, Mass. has devised a particularly convenient curve-sheet for the design of tuners covering the range of wavelengths from 25 to 1800 meters. The chart considers coil diameter, spacing of turns, etc., completely. All "calculations" are made by the use of a straight-edge. Standard V.C. sizes are shown directly and others can be inserted easily. Inductances can be read directly and by a little extra arithmetic distributed capacities can be found from the coil chart and wavemeter readings. The chart is well printed, on good paper, on a good scale and sells for 50c. It is a labor-saver.

—R. S. K.

The South Schenectady Tests

By C. J. Young*

With the active co-operation of amateur radio experimenters in this country and abroad, the radio engineers of the General Electric Company are conducting a comprehensive and exhaustive investigation of transmission phenomena.

For several months a great volume of data has been accumulated on radio transmission, both code and broadcast, on a variety of wavelengths, on variable amounts of power and under widely different conditions. Much work remains to be done but it is confidently believed that an analysis of this data will lead to a solution of much that is now unknown, confirm or disprove some things now accepted as theory and enable the engineer to forecast transmission under all conditions.

Experimental transmitter work, except in the field of observation, is beyond the scope of the amateur and the average individual experimenter, because of the space and equipment required and the almost prohibitive cost of establishing and maintaining a great laboratory. The General Electric Company, with its existing facilities for

* Radio Engineering Labs., General Electric Co., Schenectady, N. Y.
research has already appropriated a great deal for thorough investigation of radio transmission.

As part of this investigation the company has equipped a 54-acre laboratory on which several transmitters and a variety of antenna structures have been erected. Hand in hand with the men who are working on the design and testing of transmitters and antenna systems are the field observers who are collecting data on transmission. Associated with those working out of Schenectady are many volunteer observers located throughout the United States and in countries abroad. The assistance of these men is enlisted solely because they are interested in radio and because they recognize in the research of the General Electric Company a great forward-looking work which must advance the science.

Over a period of several months a crew of two engineers has worked out of Schenectady in four directions, north, east, south and west and as they traveled with receiving and measuring instruments installed on a truck, they recorded observations on the propagation of radio waves on the following wavelengths and power: 15 meters, 600 watts; 20 meters, 600 watts; 41.9 meters, 1000 watts; 80 meters, 1000 watts; 109 meters, 5000 watts; 214 meters, 5000 watts; 379.5 meters, 5000 watts and 1560 meters, 20,000 watts. The western trip took the crew to Buffalo, 235 miles. The men traveled north as far as Canton, N. Y., a distance of 135 miles. The third journey to the east was made to Boston, approximately 153 miles from Schenectady. The last trip, recently concluded, took them to Jacksonville, Fla., a distance of 1000 miles south, and the return trip was made via boat. Transmitters working on 15, 20, 80, and 214 meters were used on code only. The observers were M. L. Prescott and L. M. Grow.

In addition to the work of Messrs. Prescott and Grow, special observations were made by A. H. Turner, of the General Engineering Laboratory of the General Electric Company. Mr. Turner made a trip to Panama and returned on a Grace Company vessel. He carried the same equipment used by the land observers.

A great many independent investigators and radio experimenters have volunteered their assistance to the General Electric Company and they have already contributed much to the increasingly large mass of information. KGO and KOA, the Oakland, California and Denver, Colo., stations respectively, have made frequent measurements on the signals of the Schenectady transmitters, and stations of the Radio Corporation of America in this country, France, Buenos Aires and Hawaii have been heard from, as well as listeners in New Zealand.

The thoroughness with which the General Electric Company's investigation of wave propagation is being made is illustrated in the equipment carried by the roving observers.

On the first three trips, that is, those to Buffalo, Canton and Boston, transmis-
capable of covering the necessary range was available, four receivers were constructed so as to make one adaptable to each wavelength range. These were superheterodynes of the Radiola 28 type, specially modified for portable usage by being built in small cabinets. An external battery box, connected to the receiver by a three foot length of flexible cable, contained the necessary A. B. and C. battery supply. Loop reception was used exclusively. These arrangements facilitated the making of quick set-ups when necessity demanded; in fact, it was demonstrated on several occasions that a receiver could be unpacked and put in operation within five or six minutes.

A fifty watt transmitter provided a means of communicating with the South Schenectady plant. No unusual features are incorporated in its construction. An “X” license permitted the observers to use any desired wavelength but certain factors made it necessary to stay within the limit of 35 to 90 meters. In order to insure against difficulties that might arise due to “skip distance,” 80 meters was used for short distance work. When it was desired to work greater distances 37 meters was employed with very satisfactory results during the daytime and the early evening hours. After about 9 p. m. the signal usually became too weak to be copied through the heavy QRM that is ever present at the South Schenectady plant. In this way it was possible to keep informed from day to day of any changes made in the transmission schedule and of special tests that were to be run. At the beginning of the third trip some additional apparatus was included and, in order to make room for this equipment, it was found that the transmitter would have to be left behind. Later, it was found that a QST sent out each day served nearly as well in keeping the men posted regarding changes in schedules.

As these road trips extended over a period of almost four months, when the General Engineering Laboratory was constantly developing and improving equipment, the observer found it essential at the beginning of the fourth trip to replace the old equipment with new and more suitable apparatus. Accordingly, the four superheterodynes were discarded and a universal super heterodyne capable of tuning from 14.7 to 1650 meters was used. This receiver, known as the Type Y-1 was designed for the sole purpose of receiving signals transmitted by the developmental stations of the General Electric Company at South Schenectady. It consists of two separate and distinct units, each self-contained in a mahogany cabinet. The tuning unit contains interchangeable tuning coils (six antenna and five oscillator) the signal frequency oscillator, and the intermediate frequency oscillator which is used for producing a beat note for the reception of C. W. signals. A battery operated “clicker” device also contained in this cabinet provides a means for checking the over-all sensitivity of the receiver so that possible errors arising from this source can either be compensated for or entirely overcome.

A ground connection and a short indoor antenna provide sufficient pickup for “DX” reception. The modified Radiola 28 shown on the right and connected to the tuning unit by flexible leads serves only as an amplifier of intermediate and audio frequencies.

It may seem that this arrangement is somewhat complicated and difficult to operate, but in reality operation is quite simple. For example, assume that it is
desired to measure the field strength of a
41.9 meter signal. Phones are inserted in
the second stage jack of the modified
Radiola 28, two tuning coils covering the
desired wavelength are placed in their
respective sockets and the wavelength chart
consulted to determine the dial settings at
this particular frequency. The filaments
are then adjusted to their correct values by
means of voltmeters. Before tuning in the
signal the sensitivity of the set should be
checked by means of the clicker in order to
insure operation at normal conditions.
After the signal has been brought in satis-
factorily, the output or volume control tube
voltage is then lowered until the threshold
audibility (when the signal is just audible)
is reached. This voltage is then recorded
and from it a definite inverse relation to
field intensity can be obtained.
Most of the field strength measurements
on WGY were made with the field intensity
meter. With this rather elaborate piece of
apparatus quite accurate measurements are
possible over the band from 220 to 550
meters. A collapsible loop, snap-on panel
covers, and leather carrying handles made
this set particularly adapted for portable
use.
Investigations evidenced many of the
same puzzling phenomena surrounding high
frequency transmission, that other experi-
menters have noticed during the past two
years. The considerable amount of data
has not been thoroughly analyzed, but in
general, it appears to confirm recent
theories that have been advanced after
making certain reasonable assumptions as
to the number and distribution of the free
electrons in the upper atmosphere, from
which a calculation of the path taken by
the radio wave has been made. In this
way "skip-distances" and the ability of a
low powered transmitter to send over
eormous distances can be accounted for
and perhaps predetermined to a first ap-
proximation.
As an example of the peculiarities of
short wave transmission, the experience ob-
tained with a 20 meter 500 watt transmitter
may be described. Here the signal rapidly
decreased as the observers left the trans-
mitter and reached its lower useful limit
at 4 miles. The men now continued from
the transmitter and the signal re-
mained out until 400 miles was reached,
when it came in strong again. Continuing
to a greater distance a gradual falling off
in intensity was recorded but this was so
slight that the signal was still quite strong
at 2500 miles. This case applies to the
reception made during a winter day along
a north and south direction. In this in-
stance a skip distance of 400 miles was
noted. Meager experimental data seems to
point out that this distance is a minimum
in the middle of the day and a maximum
on a winter night, the summer night value
being somewhat less than the winter night
skip. The data seems to verify the state-
ment that the skip distance for a given
time of day or night decreases with in-
creasing wavelength.
Severe fading on all of the shorter wave
lengths may be expected. It has not been
definitely determined if this phenomenon is
a function of the frequency, but observa-
tions indicate that such may be the case.
Below about 60 meters fading will in-
varily be present during both day and
night transmission unless the observer is
within a few miles of the transmitter. Such
factors as the power used, ground absorp-
tion, and the degree of ionization of the
upper atmosphere probably play quite an
important part in regulating the fading
characteristics of a signal, but before any
definite conclusions along this line can be
made it will likely be necessary to secure
additional experimental data.
This brief summary has not dealt with
the wavelengths observed in the broadcast
band and above. These were purposely
omitted because it is believed that their
characteristics are not of such great in-
terest to the average amateur or experi-
menter.

SCHEDULES FOR QST

During the month of April the General
Electric Company is conducting another
series of short wave propagation tests and
they are anxious to obtain the cooperation
of a large number of the amateurs. To
this end, log sheets will be distributed to
those who feel they can assist fairly regu-
larly and who will so notify the Radio En-
gineering Department of the General Elec-
tric Company at Schenectady.

The special transmissions will begin
April 3 and end April 29. Two 24 hour
schedules will be run each week: from
Wednesday to Thursday noon, and from
Saturday to Sunday noon. The first four
schedules are as follows:

April 3-4 Sat. and Sun.
2XAW 600 Watts 15 meters or 20000 KC
Self Excited
2XAD 1 KW 26.4 meters or 11370 KC
Crystal Controlled
2XAF 10 KW 32.79 meters or 9150 KC
Crystal Controlled
2XAC 10 KW 50.2 meters or 5970 KC
Self Excited
2XK 10 KW 65.5 meters or 4580 KC
Crystal Controlled

April 7-8 Wed. and Thur.
Same as for April 3-4.

April 10-11 Sat. and Sun.
Same as above except that 2XK will
operate on 109 meters or 2750 KC instead of 65.5 meters, or 4580 KC.

There will also be changes in the types of antennas used which will be announced during the transmissions.

April 14-15 Wed. and Thurs.

Exactly the same as for April 10-11. During the transmissions, the WGY programs will be broadcast during the times when they are regularly on the air on all waves except 15 and 50.2 meters, which are adapted for C.W. only. At other times L.C.W. will be used on 26.4, 32.79, and 65.5 meters. Transmission will be continuous, or during the first 20 minutes of each half hour when comparative tests are desired. Announcements of the details of each schedule and of further schedules during the month will be made on each wavelength every six hours beginning at 12:00, 6:00, etc.

Standard Frequency Schedules

The frequencies in kilocycles indicated below (corresponding approximate wavelengths in parentheses) will be transmitted Friday nights from u1XM, the experimental station of the Massachusetts Institute of Technology Radio Society acting in cooperation with the M.I.T. Communications Laboratory.

We have received so many complaints of QRM that we will have to request all stations to QRX while we are sending the frequencies nearest to that on which they are working; it's only a few minutes, om, and if your meter is OK perhaps the other fellow's isn't.

All transmissions will be by unmodulated continuous wave telegraphy. This service will probably be discontinued for the summer May 23th. The seven minutes of each transmission will be divided as follows:

3 minutes—QST QST QST u1XM 1XM, 1XM, etc.

3 minutes—half-minute dashes broken by "1XM".

1 minute—Announcement of frequency being sent.

Since schedules will appear in QST the announcement of the "approximate next frequency to be sent" will hereafter be omitted.

Reports will be appreciated from all stations using this service whether the distance is large or small. Regular reports every week showing approximate audibility on each frequency are especially solicited, and after being entered on our records will be forwarded to the Experimenter's Section of the A.R.R.L. Drop your card to Standard Frequency Committee of u1XM, M.I.T. Radio Society, Cambridge, Mass., U. S. A.

u1XM Standard Frequency Schedules

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<thead>
<tr>
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<tbody>
<tr>
<td>9:00—9:07</td>
<td>16000 (18.7)</td>
<td>6500 (46.1)</td>
<td>7500 (42.6)</td>
<td>7500 (42.6)</td>
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<td>9:16—9:18</td>
<td>15000 (20.0)</td>
<td>7500 (42.6)</td>
<td>7500 (42.6)</td>
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<td>9:26—9:29</td>
<td>14000 (21.4)</td>
<td>6500 (46.1)</td>
<td>7500 (42.6)</td>
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<td>9:38—9:40</td>
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<td>6500 (46.1)</td>
<td>7500 (42.6)</td>
<td>7500 (42.6)</td>
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<td>9:44—9:51</td>
<td>8000 (37.5)</td>
<td>8000 (37.5)</td>
<td>14000 (24.1)</td>
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<td>9:58—10:02</td>
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<td>10:06—10:13</td>
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<td>7500 (40.0)</td>
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<td>10:17—10:21</td>
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<td>7500 (40.0)</td>
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<td>10:40—10:45</td>
<td>4000 (70.0)</td>
<td>7500 (40.0)</td>
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<td>10:50—10:56</td>
<td>3500 (87.7)</td>
<td>6500 (46.1)</td>
<td>7500 (40.0)</td>
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</table>

u1XM To Transmit Standard Frequency Schedules For Australia and New Zealand

On three Sundays, April 18th and 25th and May 2nd, station u1XM will transmit Standard Frequency signals especially for points beyond the International Date Line from the United States where our usual weekly Friday night Standard Frequency schedules are probably inaudible on account of the intervening daylight. Through arrangements with Radio (Australia) and New Zealand Wireless and Broadcast News these schedules will be published in Australia and New Zealand, but are here given for the benefit of any others who may wish to use them.

<table>
<thead>
<tr>
<th>Time (PM)</th>
<th>Characteristic</th>
<th>Frequency Wave for</th>
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<tbody>
<tr>
<td>5:30 AM</td>
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<td>6:00 AM</td>
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<td>12:00 PM</td>
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<tr>
<td>12:30 PM</td>
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</table>

Each transmission will last for ten minutes, and then five minutes will intervene while the transmitter is being adjusted to the next frequency. Each ten-minute transmission period will be divided as follows:

3 minutes—QST QST QST u1XM 1XM 1XM, etc.

7 minutes—Repetition of "characteristic letter" broken occasionally by "u1XM" and statement of frequency.

1XM apologizes for missing the Standard Frequency schedule of March 12th due to the simultaneous breakdown of three condensers on the Standard Frequency transmitter.
Some Low-Power Records

INDOM of 8GZ-8ZG read the story of Colonel Foster's 9CK low power work, told in the January number of QST, and decided to go out and break a few of 9CK's records. He did—and although we haven't the slightest desire to start a scrap and we do not want to spend the rest of our days trying to figure up "miles per watt" we believe that he has set a few records that are hard to beat. He has done a lot of "high power miles per watt" over comparatively great distances, while most of the other fellows have been talking of miles per watt records where the communication was over a much shorter distance. It is comparatively simple to set up 8GZ-8Z started out on low power with a UV-201-A tube operating in the circuit shown in Fig. 1. With 75 volts on the plate of the 201-A and 4 milliamperes plate current he had no trouble in working A2LB, 8BG, 9AD0, 8ALY, 2CTQ, 9DK, 8PL, and others closer being communicated with easily. Windom decided that it was too easy to work the gang with so much power, so a UV-199 was placed in the transmitter. With the 199 tube the DX work continued. With 75 volts on the plate, and a plate current of 5 milliamperes a number of "U" stations were worked and communication was carried on with 8BG, 8A6N, and 8CG! Ohio to Australia and South Africa on a UV-199!!

The low power set is mounted on a maple base 24 x 14 inches. The inductance consists of 8 turns of No. 5 wire, the turns being 4 inches in diameter. The grid and plate leads are short and are of heavy brass strip. A 2,000 μfd, blocking condenser and a 250 μfd, grid condenser are used. The tuning condenser is a 23 plate, single bearing affair, insulated by means of a glass end-plate.

![Fig. 1 - The Low Power Circuit](image1)

![Fig. 2 - The Transmitter, UV-199 in Place](image2)

![Fig. 3 - Complete Layout at 8GZ-8ZG, Big Transmitter at Right](image3)
The R.F.C. consists of a 100 turn coil of No. 26 D.C.C. wire on a 2½ inch tube. Plate voltage is supplied by four small and ancient Burgess 22½ volt blocks, giving voltages from 25 to 105. Windom finds that the UV-199 has proven the best low power tube, giving a much better signal with less input. Every station who has worked “low power” SGZ thinks the set crystal controlled. While some of the low-power work at 8GZ has been done after preliminary contact was secured by means of the 204 transmitter, much DX has been done with the UV199 alone.

The antenna at 8GZ is a Hertzian affair supported between two 70-foot drain-pipe masts. The masts are guyed by wires broken every 20 feet by porcelain egg insulators. The mast at the station end is insulated from the ground and used as a receiving antenna.

The activities of 8GZ are not confined to UV-199 transmission as a lot of us know. The big set (at the right of Fig. 3) uses a three year old UV-204 normally operated with an input of 550 watts. Most of the high power work has been in the 40-meter band, although 20 and 80 have been used occasionally. On 40 meters 464 out of a possible 514 foreign stations were worked during 1925. On 20 meters two-way daylight communication has been carried on with Brazil, England, France, Italy and Mexico while the 20-meter signals have been heard in Europe, Africa, South America, Asia, New Zealand, Hawaii and Australia.

The receiver at 8GZ is the “standard Schnell” type. The set is mounted on a glass base and the coils are of the “plug-in” type. The detector’s base has been removed and the tube is mounted on four small binding posts which serve as terminals. The receiver covers all waves between 9 and 125 meters.

—J. M. C.

A Non-Microphonic Socket

In oscillating receivers it is almost a necessity to use some form of socket that is spring-supported, and in non-oscillating receivers it is highly desirable to use this form of socket. Usually receiving sets become very noisy when the socket is bolted tightly to the sub-base. To obviate this difficulty the Benjamin Electric Company of Chicago has, for some time, had a spring-supported socket on the mar- ket. The latest form of Benjamin socket is designed for use with all types of receiving tubes, both old and new, with the exception of the UV-199. Four springs support the socket, floating it above the sub-base. The springs make a side wiping contact with the tube pins. The contact springs, the “floating springs” and the soldering terminals are all in one piece, thereby eliminating any chance of a high resistance joint between these connections, and obviating the usual trouble of having the terminal binding post turn and work loose after a while. The socket is of moulded black bakelite and the metallic parts are heavily nicked. A thoroughly satisfactory job.

—Strays—

8ZO’s 100-watt tone pushes heart sobs to his Toledo Y. L. nearly every night. The local B. C. L.’s love to listen to it!

One fellow writing to us about Calls Heard says it is the only part of QST he reads. Honestly, gang, QST isn’t that bad, is it?

9CAN also says that 9CXC holds the distinction of being the only ham to work Australia when the shack was full of visiting hams.
Communications Department Elections

At the meeting of the Board of Directors of the A.R.R.L., held in Hartford, February 26-27, the Constitution and By-Laws of the League were amended. (Amendment 15, By-Laws 5, 6, 6A, 6B). A complete reorganization of the Traffic Department was authorized. On February 27, this Department became known as the Communications Department with a Communications Manager at League Headquarters, appointed by the Board.

The amendment provides changes that will somewhat reduce the time required for handling reports. Reports printed in QST will be more up-to-date. Fewer field officers will make possible better contact between the individual stations and Headquarters. The amendment provides that the operating territory of the League shall be apportioned into sections. The sectionalizing shall be determined by the Communications Manager and Director of each Division working together.

Section Communications Managers shall be elected by the members residing within each section. Their office shall be for a term of two years. These Section Communications Managers shall have authority over the Communications Department in their section. They shall be responsible to, and report to, the Communications Manager except in Canada where their report shall be sent to the Canadian General Manager.

Whenever a vacancy occurs in the position of Section Communications Manager, in any section of the United States, its island possessions or territories, or the Republic of Cuba, the Communications Manager shall announce such vacancy and call for nominating petitions signed by five or more members of the Section in which the vacancy exists, and naming a member of the Section as candidate for Section Communications Manager. The closing date for the receipt of such petitions shall be announced. After the closing date, the Communications Manager shall arrange for an election by mail. Ballots shall be sent to every member of the League residing in the Section concerned, listing the nominees in the order of the nominations received. The closing date for receiving ballots shall be announced. Immediately after this, the Communications Manager shall count the votes. The candidate receiving a plurality of votes shall become the Section Communications Manager. The Canadian General Manager similarly shall manage such an election for a Section Communications Manager whenever a vacancy occurs in any section of the Dominion of Canada, Newfoundland or Labrador.

NOTICE

All A.R.R.L. members of the Atlantic, Central, Delta, Midwest, New England, Pacific (including Hawaii), Roanoke, South-eastern, (including Cuba, Porto Rico and the Isle of Pines) and West Gulf Division:

1. You are hereby notified that an election for A.R.R.L. Section Communications Managers for a two-year term of office is about to be held in each of the above Divisions in accordance with the Constitution.

2. The election will take place during the month of May and June on ballots which will be mailed from A.R.R.L. Headquarters. The ballots for each Section will list the names of all eligible candidates nominated for the position by A.R.R.L. members residing in the Section.

3. Nominating petitions are hereby solicited. Five or more members living in any Section have the privilege of nominating any member of the League in their Section as a candidate for Section Communications Manager. The following form for nomination is suggested:

Place
Date

Communications Manager,
A.R.R.L. Headquarters,
1711 Park St.,
Hartford, Conn.

We, the undersigned members of the A.R.-RL residing in the .......... Section of the ................. Division, hereby nominate .............. for .......... as candidate for Section Communications Manager for this Section for two years from the date of the close of the election.

(Signatures)

The signers must be League members in good standing. The nominee must be a League member in good standing. His complete name and address should be given. All such petitions must be filed at League Headquarters, Hartford, Conn., by noon of the 15th day of May, 1926. There is no limit on the number of petitions that may be filed, but no member shall sign more than one such petition.

4. The Sectionalizing of territory in the Divisions named is as follows: Atlantic Division (four sections):

Western New York—comprising St. Lawrence, Lewis, Oneida, Madison, Chenango, Broome counties and all counties in New York west of these.

Eastern Pennsylvania—comprising Tioga, Lycoming, Union, Snyder, Juniata, Perry,
Cumberland, Adams counties and all counties in Pennsylvania east of these.
Western Pennsylvania—comprising Potter, Clinton, Center, Mifflin, Huntingdon, Franklin counties and all counties in Pennsylvania west of these.
Delaware, Maryland, District of Columbia.
Southern New Jersey—comprising Burlington and Ocean counties and all counties in New Jersey south of these.
Central Division (six sections):
Illinois, Indiana, Kentucky, Michigan, Ohio, Wisconsin.
Delta Division (three sections):
Louisiana, Mississippi, Tennessee.
Midwest Division (four sections):
Iowa, Kansas, Missouri, Nebraska.
New England Division (seven sections):
Eastern Massachusetts—comprising Essex, Middlesex, Suffolk, Norfolk, Plymouth, Bristol and Barnstable counties.
Western Massachusetts—comprising Worcester, Franklin, Hampshire, Hampden and Berkshire counties.
Pacific Division (three sections):
Southern Section—comprising San Luis Obispo, Kern, Tulare, Fresno, Madera, Mariposa, Tuolumne, Alpine counties and all other counties in Southern California, including Catalina Island and the state of Arizona.
Northern Section—comprising Monterey, San Benito, Merced, Amador, Stanislaus, San Joaquin, Calaveras, Eldorado counties and all the rest of Northern California, including the state of Nevada.
Roanoke Division (three sections):
North Carolina, Virginia, West Virginia.
Southeastern Division (three sections):
Georgia, South Carolina, Porto Rico, Cuba, Isle of Pines, Florida, Alabama.
West Gulf Division (four sections):
Northern Texas—comprising Shelby, Nacogdoches, Cherokee, Anderson, Freestone, Limestone, Falls, Bell, Coryell, Lampasas, Mills, Brown, Coleman, Runnels, Coke, Mitchell, Howard, Martin and Andrews counties and all other counties in Texas north of this boundary.
Southern Texas—comprising Sabine, San Augustine, Angelina, Houston, Leon, Robertson, Milam, Williamson, Burnet, San Saba, McCulloch, Concho, Tom Green, Sterling, Glascock, Midland, Ector, Winkler, Loving, Culberson, Hudspeth, El Paso counties and all other counties in Texas south of this boundary. Oklahoma, New Mexico.

In other Divisions nominating petitions will be solicited later when the Sectionalizing work has been finished.

5. The established organization will continue to function until superseded by the new arrangement.

6. This is your opportunity to put the man of your choice in office to handle your Section. Where there are particular officers already serving you faithfully in the field, there will be little difficulty in making a choice. Members are urged to take the initiative and to file nominating petitions immediately.

F. E. Handy, Communications Manager.

Plug-In-Coil Tuners

We believe that almost everyone is sold on the idea of interchangeable coils in a short wave receiver, and we hope that almost everyone will use the "plug-in" method of changing coils. For short wave reception several manufacturers have brought out very good plug-in-coil tuners designed to cover a variety of wavelengths with comparatively small tuning condensers. The coils and mountings shown in the first illustration are being made by the Radio Engineering Laboratories of New York City. The coils are the familiar Lorenz or basket-weave type mounted on bakelite strips to which are attached one piece plugs. The plugs fit the mounting block shown at the left. This block is of bakelite and is mounted high and clear of the baseboard by means of brass collars provided with the coils. The coils come in two types; one is the antenna inductance which is not tapped and the other the combined secondary-tickler in one coil with taps taken out for the Reinartz circuit in which the tuning condenser is connected across only a portion of the secondary. With a shunt condenser having a maximum capacity of 100 μfd. the coils will tune from 9 to 590 meters, fourteen coils being needed to cover this band of wavelengths. If a larger shunt condenser is used (in the broadcasting band) the upper
wavelength limit will be higher. With a 250 μfd. condenser and a 125 turn coil the maximum wavelength that can be reached is 861 meters. The R.E.L. coils were designed with the idea of using a separate antenna coil when the wavelength of the secondary is changed materially.

The next group of coils are those of the Aero Products of Chicago. The coils are wound on narrow bakelite strips bolted together. The wire is bare in the case of the secondary and very small insulated magnet wire is used in the tickler. Secondary and tickler coils are assembled in one unit, equipped with four General Radio plugs. The primary is wound self-supporting and is mounted on a bakelite rig in such a manner that its position with respect to the secondary can be changed. This allows one to use one size primary coil for all of the amateur bands, it being only necessary to change the angle of the primary in case the coupling is too close. With a S.E.L. condenser having a maximum capacity of 140 μfd, the three coils shown in the illustration will tune from 15 to 133 meters.

Shown in the third photo are the Bremer Tully Company's coils and mounting. There are four coils of which three are illustrated, covering a waveband of 12 to 200 meters with a 125 μfd. variable condenser across the secondaries. The coils are wound on cut-away bakelite tubes, secondary and tickler being on the same tube. The secondaries (for short waves) are wound with bare wire wound in very shallow notches in the bakelite and the ticklers are of insulated wire held in place with some binding material. The largest coil (not shown in the illustration) is wound with green insulated wire. The “baseboard” is of clear bakelite. The primary is wound on a bakelite tube and is arranged to rotate so that the coupling can be changed. Only one primary coil is used for all wavebands.

—J. M. C.

Signal Corps Training in Citizens’ Military Training Camp

Any readers of QST are doubtless familiar with the Citizens’ Military Training Camps which are conducted every summer in all parts of our country. It is desired to invite attention to the signal Corps camp which will be held at Fort Monmouth, New Jersey, from August 6 to September 4, 1926. Instruction at this camp is progressive, four courses being offered each year, known as the Basic, Red, White and Blue. The Basic Course is open to men between the ages of 17 and 24 years who have had no previous military training, but who have had some technical training in radio, telephone or telegraph communications. Men who pass the Basic Course successfully may return in following years to the more advanced camps. The Blue Course is for specially selected men who are considered proper material for commissions in the Signal Reserve Corps of the United States Army.

Men attending this camp receive no pay but are reimbursed for traveling expenses from their homes to the camp and return. While at the camp they are fed and clothed by the Government.

Fort Monmouth is the center of radio development for the army. The central station of the army amateur radio net (2CXL) is located there. This camp should appeal to any young man who is interested in radio or other forms of communication and who also wants to do his part towards preparation for national defense. There is plenty of time for recreation—the ocean beaches of Long Branch and vicinity are only a few miles distant.

Attendance at the Fort Monmouth C.M. T.C. is limited to men living in the following states:

New York, New Jersey, Delaware, (apply through C.M.T.C. Officer, 2nd Corps Area, Governors Island, N. Y.).
Pennsylvania Maryland, Virginia, District of Columbia (apply through C.M.T.C. Officer, 3d Corps Area, Baltimore, Md.).

—TOM C. RIVES
Captain, Signal Corps (Station 2CXL)
Concerning Electrolytic Rectifiers

The following is quoted from a letter of Mr. Clayton Tanner of 9DCR at Champaign, Illinois:

"While at the convention I talked to a number of the fellows about electrolytic rectifiers, and was surprised to find about all of them were still using borax. At 9DCR it caused so much trouble, and ate up so much aluminum, that I threatened to get 'S' tubes or Kenotrons. Thought I would try all the solutions mentioned in QST, and Ammonium Phosphate proved great. All the stations here use it now. The only way to get it is to have the druggist or radio store order some, because chemical houses don't sell retail. The pure Ammonium Phosphate costs about $1.25 a pound. This is too much, so we get the commercial product, which is 40c a pound and works just as well. Found out from a University of Illinois instructor that the impurities in the commercial product are helpful. Some are phosphoric acid combined, etc.,—all good stuff. Anyway it works.

"Advantages:

% lb. Amm. Phos. to a gallon of water.
Any kind of water can be used from tap (city water) to distilled. Plates stay white and do not eat full of holes as with borax.
"The plates 'form' on the first shot.
"Antenna current doesn't drop off after the key is pressed a few seconds (like borax).
"Black oxide does not form where the aluminum plates come out of solution.
"All plates glow all the time. In borax some glow and sparkle one nite and others another nite.
"Bridge circuit works best in my station.
"Have used a set of aluminum plates here for 7 month and they are as white as the day I put them in. Change solution about every 2 months as it wears out."

Sulphur as an Insulator

Mr. Harrison Brown, of Laplata, New Mexico, calls attention to the fact that sulphur is an excellent insulator at radio frequencies and has the advantage that it can be cast to any desired shape and will hold metal inserts. The casting had better be done while the family is away, for the atmospheric effects remind one of a Kansas lead smeltery. The insulation is absolutely permanent, can be machined, has a dielectric constant around 4 and remarkably low losses, both inside and over the surface.

These Rough Notes

Most amateur transmitters these days are of the variety in which there is a tuned primary circuit inductively coupled to the antenna. If such a transmitter is adjusted for the largest antenna current it is almost sure to be unsteady. The unsteadiness may consist of having the wave jump around so that the note is uncertain at the receiving end or else the thing may wabble between two wavelengths at such a high speed as to put a buzz or growl on the transmitted wave.

Most difficulties can be gotten rid of (unless there is some other cause) by tuning the primary off wave until the antenna current drops 10 or 15 per cent. Don't let the smaller ammeter reading worry you; the thing will transmit better just the same.

Tubes in Parallel

When several tubes are used in parallel it is often hard to make them run cool. The reason may be in unequal lengths of wire to the different filaments, grids and plates. The way to do this thing right was shown in IGV's article on page 37 of the February, 1924, QST.

Sometimes the trouble is in very high frequency oscillation between the tubes. Such a performance may go on at 10 or
Here are 86 licensed amateur stations in Rochester. Of this number, half are on the air occasionally, and 20 consistently. Most of the stations use one 50-watt tube, two use 250-watters and the balance 5 watts. Many of the stations are using gutter-pipe antennas; a 30 to 35-foot length of common galvanized iron conductor pipe, mounted vertically on the roof on a heavy bottle which serves as an insulator. The guys are made of paraffined rope and are broken by 18-inch glass towel bars. The capacity at the top is increased by soldering on a wire about 18 inches in diameter. Total cost—$5.00, and they do work. The following countries have been worked from Rochester: Canada, Mexico, Porto Rico, Cuba, Canal Zone, Hawaii, Brazil, Argentina, Chile, New Zealand, Australia, Japan, Tasmania, Samoa, Egypt, Morocco, Czechoslovakia, Bermuda, Finland, Holland, Switzerland, Sweden, Scotland, India, So. Africa, Italy, England, France, Belgium, Spain, Denmark, Cape Verde Islands, WNP, WJS, KFUH, NRRL, etc. All of the operating amateurs belong to the Radio Club of Rochester. This club has been going strong for twelve years!! The officers are E. Handler, 8KT, President; R. Ruscke, SAFN, Vice-President; R. Lucia, 8BEN, Secretary; H. Judd, Asst. Secretary, and C. Sage, 8CHR, Treasurer.

8PZ, Radio Club of Rochester

Now a 50-watt transmitter, using Exide B-battery supply is employed. The photo shows the set (at the left), as it was in the Rochester Exposition. No QRM at all caused to many BCL receivers all around set. Receiver is a Reinartz and one stage audio. The relic at the right is a 1-KW rock-crusher, and bears the following placard, "Discarded by Amateurs to Reduce Interference". F.B. While at the Exposition the set performed splendidly on an indoor cage 30 feet long. Over 125 messages were handled.

8DQA, 9 Diamond Place

The transmitter by Ray Jobes consists of a UX-210 in the Hartley circuit. Inputs from 15 to 150 watts are used! The high voltage is chemically rectified and well filtered, giving a good D.C. note. The wavelengths are 40 and 80 meters. The receiver at the left is a low loss 3 circuit tuner, covering all the amateur bands. Phone is often used and 8DQA is fast becoming a rival of the local B.C. stations.

8BGN, 1593 N. Clinton Avenue

OWNED and operated by K.J. Gardner. The transmitter uses a single 203-A with 200 watts input on 37.5 meters. Inductances are self-spacing copper tubing.
All leads are as short as possible. The combination of "S" tubes and a large brute force filter results in a good D.C. note. The whole transmitter is mounted on valve springs to eliminate vibration. In the photo from left to right are battery charger for Edison A and B batteries, honeycomb coil set with detector and two stages of amplification, (the set tuning from 150 to 25,000 meters), battery switch for different receivers, short wave Reinartz and 1 step using C-199 tubes, Browning-Drake B-C receiver, and a wavemeter on the shelf. Antenna is a 30 foot gutter-pipe, with a 15 foot lead-in. Counterpoise is a single 15 foot wire, 10 feet high. Receiving antenna is a single 75-foot wire, 30 feet high. Break-in is used. DX—worked all continents. Much traffic is handled by this station.

8CYI, Clay & Dewey Avenues

This outfit is manned by the Hertzberg Brothers. The receiver is a 3-tube Reinartz with tuned primary. The condenser on top of the cabinet does the tuning (with the help of the operator). Usually only 1-stage of amplification is used for traffic handling. The transmitter is a coupled Hartley using two 203-A tubes. A 500-watt, 1,000-volt, Esco M.G. furnishes the plate supply. The normal input is 450 watts. A spiral pancake coil is used in the primary circuit, and a solenoid type in the secondary. The antenna is a 40-foot gutter-pipe on top of the gas station in which the radio apparatus is located. The counterpoise is 10 feet high, and 40 feet long. The key is an old time "Boston". For fast traffic work the bug is resorted to.

8BRD, 356 Seneca Parkway

This station has been in operation for the past three years. It is run by Paul and Homer DeWitt. When first on the air 300 volts of Tom Edison's B-battery were used, then a motor generator, and finally R.A.C. The present power is 5 watts (??) in a Hartley circuit, inductively coupled of course. The transmitter operates on 40 and 80 meters. The aerials are, a single wire 40 feet high for 40-meter work, and a 60-foot one for 80 meters. The counterpoise is a two wire fan. The DX includes all the U.S. districts and three Canadian districts. The transmitter has been heard in Mexico and Scotland.

8BEN, 109 West Chestnut Street

R. Lucia is responsible for this nice looking transmitter. It uses one UV 203-A with an input of 185 watts in a L.C. Hartley circuit. Normally two wavelengths are used for transmission, 38 and 42 meters. Plate supply comes from an R.C.A. transformer through a 60-jar chemical rectifier and lastly through a filter consisting of a 30-henry choke with a 4 µfd. condenser. The inductances are the old style R.C.A., with the wooden base removed and the remains mounted on glass towel bars. Left of the transmitter is an accurate wavemeter with a 25 to 50-meter range. The receiver is a copy of Schnell's NRRL tuner and uses two C-299 tubes. The antenna is a vertical gutter-pipe 35 feet high. Counterpoise is 1 wire 20 feet long, 15 feet high. Lucia is the Secretary of the Rochester Radio Club and has turned in some nice DX.
8KS, 20 Arklow Street

This outfit was built and is operated by C. E. Dengler. From left to right in the photo, can be seen the transmitter whose normal input is 150 watts. A single 203-A is used. Inductances are pancake type. Under the operating table is the primary rheostat which consists of a Dimlite and a 50-watt lamp. Next to the right, on the table, is a honeycomb coil receiver covering waves from 150 to 30,000 meters. The short wave receiver is a Bremer-Tully, low loss coil detector, and two stages of audio frequency amplification. The set tunes from 20 to 200 meters. On the right is a Western Electric power amplifier and Magnavox to make all the signs R-9! The aerial is a cage supported by a gutter-pipe mast A-La QST. A single wire counterpoise is used.

We wish the photo had been better. It would have let you, too, see the nice layout A. Balling, has at his station. The receiver is a Reinartz with one stage of audio. Next to it is a homemade battery charger, and next to that the transmitter. One UV-203-A with an input of 175 to 200 watts is used. The circuit is the loosely coupled Hartley. High Voltage comes from a H.V. transformer, through a brute force, consisting of a 30-henry choke and lots of µfd. The change-over switch is a strictly low loss affair, and has a two foot "handle" on it so that the operator does not have to get up from his seat every time he switches over, hi! Another 30-foot gutter-pipe antenna is used here. The transmitter operates on either 20, 40 or 80 meters; although 40 is used most often. Balling is a past president of the Radio Club.

8DSI, 478 Maplewood Avenue

Bernard C. O'Brien was licensed in June, 1924, to operate a one inch spark coil on 178-200 meters. This was quickly junked in favor of a C.W. set. The present transmitter uses a lone 5 watt with plate supply from a 200-watt, 550-volt, Acme plate transformer. The supply is rectified through a 28-jar chemical rectifier. The transmitting inductances are homemade from No. 12 D.C.C. wire. The coils are 4 inches in diameter. The transmitter covers all bands used by amateurs except the 150-220-meter one. The 40-meter wave is used mainly. The antenna is a single wire 25 feet long, and 30 feet high. The antenna extends in the opposite direction and is a single wire 18 feet long and 30 feet high. The latest receiver is a detector and I stage of audio, modeled after 1ARE's in October, QST.

We are deeply indebted to Mr. Lucia for the photographs and descriptions of the above stations. This form of "Amateur Stations" is new in QST. Don't you like it?

Strays

The Radio Broadcast $500—prize receiver contest, described in our February issue, has been extended to close on April first instead of March first.

8DMZ concocted the sturdy low-loss idea shown in the illustration. No comments needed save that if the copper tubing is heavy enough the glass rod at the top is not required.
NOTICE
To Members of the I.A.R.U. Residing in Argentina and Italy
Nominations Solicited for National Presidents

The members of the International Amateur Radio Union residing in Argentina and Italy are hereby advised that the minimum required number of members has been received from the countries and that national sections of the Union in each of these countries are hereby declared existent.

In accordance with Article III Section 3, of the Constitution, a National President is now to be elected in each of these countries, to serve for a term of two years. His powers and duties are outlined in the Constitution. You are invited to nominate a member of the Union from your country to become your National President. Article V, Section 10 specifies that in order to be eligible the nominee must not be commercially identified with the radio industry and that he must be a member of the Union. All nominations must be received by May 15, 1926, immediately after which ballots will be prepared, listing all the eligible names placed in nomination, and mailed to you for the actual voting. Address your nominations to International Amateur Radio Union, 1711 Park St., Hartford, Conn., U. S. A.

—K. B. Warner, International Secretary-Treas.
March 3, 1926.

The Other Way 'Round!

THE ultimate in DX communication does not lie in the mere working of a station at our antipodes. We used to think, in the days long gone by, that when we pulled off this antipodes stuff we were ready to close the books and say that the world's record had been made—and that's that. We know different now.

By virtue of their signals travelling the "long way around" and taking the dark path in preference to the shorter daylight one, a goodly number of hams all over the world have exceeded our old idea of what the world's record really could be. Wentworth of 60I is the latest fellow to pull down some super-hot DX. We say Wentworth, but we certainly are not neglecting the other end of the link, our friend Mayer of g2LZ. On the morning of January 3rd, at 7:40, P.S.T., these two stations were QSO. Contact was held for about half an hour. Figure this up: Stanford University, California to England, signals travelling not across the U. S., but over the Pacific and Asia! Some DX!

Later a message was received from England by Mr. Maxim, our A.R.R.L. President, via g2LZ and pilHR, to 6BJX. After this many other messages came "the long way around". Fine business OM's.

British Section

"We have recently passed through a spell of unusually bad DX conditions, and consequently there is not a great deal of important work to report. At the time of writing, conditions have improved greatly, but the gang do not seem to have realized the fact, judging by the small number of stations on the air. Our friend Goyder, g2SZ, is now on the air with a very useful crystal-controlled transmitter on 45 meters. This is probably the first successful crystal-controlled set in regular operation in Europe. It certainly puts out a note which is a pleasure to hear, and it must be a revelation to some of the gang who used to think their Q8B was D.C.C.W. The signals from this outfit are reaching out very well, most of the world having been worked already, on both key andfone. Some parts of Canada say it is the first British signal ever heard. For the last three months g5QV has been running a test schedule with 4G7T in order to try to get the G's QSO Canadian 4's. No contact at all has ever been established, though one morning g2S2 heard 4G7T calling g5QV, and took a message for him but could not QSO. These difficulties are curious as the stations concerned put out good hefty signals and can easily work the Zedders. Western U. S. A., Central and West Canada, are the most difficult places in the world for a British station to work. g6LJ does not seem to be on the air much now, but he has worked 88QQ in Indo-China and has been heard in Calcutta. Two of our low power hams, g2GO and g6QB, are now on the air often and are reaching out splendidly. The
star Irish station, 5NJ, cannot find time to work except at week-ends, but when he does operate he is QSO to, z, o and various places south of Panama. g5BV complains of so much "QRM work," that he hasn't been on the air for some time. He has just received some "S-toobs" so will probably manage to come on some day to see what they sound like. H! g2LZ works a daily schedule with p1HR. g2OD has worked o6BN and o4AZ, besides QSO on phone, to GFUP in China, and AD2J at Manila, Philippine Islands."—Hugh N. Ryan g5BV, Acting Secretary.

Our friend Lewer, of g6LJ sends in the following notes regarding British communication: "Hams in Canada seem to be waking up again now. This is the first we Britishers have heard of them since the 100 meter days. Reid, c8AR of Newfoundland, makes a big noise over here. p4JF seems to have worked every station on the air. c29X in the Canal Zone recently was QSO to, g5BV. The RSN at one QSO on phone, is often heard very QSA in Great Britain. A new Philippine Islander recently heard p1BNR. In Palestine, p6ZK is doing heaps of DX work. f8QQ at Saigon, Indo-China, has been working a large number of G's. In Egypt, e1DH and eGEM, are both working DX now. e1DH is ex m1DH-GHH-GHH1. A ham at Tomsk, Siberia, has a transmitter operating on 17 and 27 meters, using the call TU. He can be QSL'd via g6LJ. A good call book containing calls of all Europeans, South Americans, South Africans, Indians, Australians, Zedders, etc. is published by The Wireless World, Tcliffe & Sons, Ltd., Dorset House, Tudor Street, London, E. C. 4, England!"

New Zealand

Through 5ZAI and 9ZT we have received the following dope from New Zealand, via z2XA: "z2BX has been QSO to, 11RM and 11ER with normal input to a 5 wattter and was reported R-4. This is after z2BX has been trying for months to get QSO the U. S. Zedders are still maintaining daily QSO with Europe in spite of the fact that this is the mid-summer season in New Zealand, and QRN has been very bad. z4AA, our old time friend Bell, has recently married, and all the Zedders are in deep mourning at the loss of the pioneer amateur operator in New Zealand. Mr. and Mrs. Bell have left for a tour of Europe. The senior op at z2XA, Mr. E. A. Shrimpton, is Chief Engineer of the N. Z. Posts and Telegraphs, and Supervisor of Radio. Shrimpton retires from the latter position in March. 2XA will still go on as usual and it is hoped that the power will be increased in the near future. The time has come for the A. R. R. L. Headquarters to collect data for around the world, and international, relay routes. Since there is no organization at all, messages for all sorts of foreign places are handed to Zedders. z2XA has handled messages from "hu" stations for Cuba. Many hams appear ignorant of the geography of New Zealand and often have the idea that it is a part of Australia. New Zealand is a separate self-governing country of one and a half million people; more than 90 per cent are of English descent. There are no cannibals, as some of the U. S. hams are want to think!! We have street cars, telephones, autos, soda fountains, speed cops, and everything except prohibition. We are four days journey by fast boat from Australia. AQE, the whaling ship, Sir James Ross, will be leaving soon. Those who desire to work both poles should get busy and connect with AQE. She is out of the ice barrier and expects to arrive at their first port of call, Fluff, N. Z., early in March. If you want to address QSL cards to this ship write the operator, Leif Jensen, care the Sir James Ross, care Radio Awarua, Fluff, N. Z. To think of Syd Strong adds that 2ZC has been raised to the peerage, and should now be addressed Sir Ivan O'Meara. Despite this 2AC is reaching out in fine shape and has been doing some splendid DX lately. He kept a 100% perfect nightly schedule with SGC, the m.s. San Francisco during the last trip of SGC between Beunos Aires and Sweden."—z2XA.

Australia

Via radio through 5ZAI we received the following data from a2YJ: "For the last few weeks QRN has been very bad and DX hard. Most sigs are weaker than during last months of 1925, and weather has been too warm for staying indoors. a2YJ has been QSO three British Warships in Asiatic waters. The QRA's are m.s. Concord GFUP, h.m.s. Hermes GECQ, and h.m.s. Durban GFUP. At least two Australians are trying voice on 37 meters. a6AG and a2BL are broadcasting from Sydney. 6AG tests at 9:20 p. m., Sydney time and 2BL goes on at about midnight each night with 1 K. W. input. Australian radio amateurs are delighted to hear of Schnell's promotion. The Wireless Institute sends official greetings. The A.R.R.L. and Schnell have set a splendid treat for signal aimer the world over. Little 20 meter activity has been accomplished in recent months. It is hoped that a2YJ's tests will revive interest in this wavelength. 5 and 10 meter tests are still in progress. Great interest is being shown in forthcoming tests. The Pacific test is being organized by the Wireless Institute (Note — see I.A.R.U. News for March for complete dope, and cooperate with 'em OM — J.M.C.). Complaints have been received from many Australian hams that the U. S. gang is sneaking down into Australian wave bands. This is proving a decided handicap to international work."—a2YJ.
A NEW INTERNATIONAL BRASS POUNDER'S CLUB

One of the most famous DX men in the country has proposed the formation of the W. A. C. Club—a club primarily international in its purpose and mode of operation; a club composed of brass pounding ether burners; an aggregation of key punchers collected from all parts of this old world. The Worked All Continents Club, hereafter known as the WAC Club, will serve to furnish some more adequate means of recognition for the gang of International DX hounds. The requirements for membership are few and brief. To become a member the applicant must have carried on two-way communication with at least one station in all six of the continents: Australia, Africa, Asia, Europe, South America and North America. In addition to having done the work a letter or card should be sent to A.R.R.L. headquarters from each continent showing the date of QSO. Merely send in QSL cards from these countries. The cards will be returned together with the Official WAC certificate endorsed by the Grand High Wacker himself. Until the WAC members get as thick as hen’s teeth, the list of members of the club will appear in the I.A.R.U. News section each month. Hop to it, gang. Here is some high class wallpaper! Address The WAC CLUB, care A.R.R.L. Headquarters, Hartford, Conn.

Brazilian Section

“Brazilian amateurs are licensed for transmission on 80 to 85, 40 to 45, 18 to 24, and 4 to 6 meters. At present the only useful band is the 43 meter one. The 80-meter band is good only for South American work, one Brazilian station being the only one in this country to QSO America, and he is bz1AC. The general level of U. S. sigs on 80 meters is R-2, while on 40 meters it is R-4, varying of course on individual receivers. On the 20 meter band not enough work has been done to determine conditions, but it may be mentioned that during summer in the U. S., the 20 meter signals come in here much better. bz1AB maintained a schedule with u1CMX on 19 meters. Sunday schedules with amateurs in all parts of the world to determine the best daylight wavelength below 25 meters are welcomed. The “bz” stations are actually on 38 to 39 meters with very few exceptions. By this practice we avoid QRMing European and American stations who keep in their bands. Licenses are granted only to Brazilians, but foreigners may have and operate a station, if a Brazilian is responsible for the operation of the station. A ten word per minute code examination has to be passed in order to obtain a license, and a written examination covering a half dozen elementary principles is also given. Power input up to 500 watts is allowed. Spark and I.C.W. is not permitted, but fone work is allowed. Fortunately little work has been done on fone in the 40-meter band and we hope that the fone friends will stay on a separate band. There is an unconditional silent hour from 7 to 11 P. M., local time. Up to the present writing, this silent hour has not been enforced. There are about 50 licensed stations and plenty more coming on. Powers range from receiving tubes to 50 watts, with some 204-A’s. We have found, however, that a 203-A puts a readable signal in any part of the world at the proper time of day. General reception is as follows: 20 to 22 G.M.T. Europe, Palestine, South Africa and the Far East (Antipodes, Philippines, China and French Indo China); 21 to 07 G.M.T. U.S.A. and Canadians; 4 to 6 G.M.T. Italy; 6 to 8 G.M.T. France and England; 7 to 11 G.M.T. Japan, Phillipines and New Zealand. Australia has been heard only twice in Brazil. The antipodes are heard and worked frequently by bz1AB, bz1AF, and bz1AC. One of the events of December, was the working of the Seventh U. S. District by bz1AC, bz1AB, bz2AB, and bz2AF. This district has been heard here only once before. u7DF turned the trick.”—C. G. Lacombe, bz1AC, President Brazilian Section. The above was transmitted to us via bz1AC and u4SI—int. Over 500 words! F. B. OM’s. 5ZAI informs us that bz1AB’s call has been changed to bz1IB.
Correction

On page 52 of the March I.A.R.U. News Section we published the British Section report and through an error signed it by Marcuse as President of the Section. Simmons of 20D is President of the British Section and Marcuse is vice-president of the Union.

Singapore

A new country has been worked! Colonel Foster u6HM connected with a station signing ss2SE (QTA ss2SE) on January 24th. There followed two hours and forty minutes of perfect rag-chewing. This station is run by Colonel Earle, R.E., Harbour Board, Singapore. This is the first contact with this country. P. B. and welcome to the ham ranks 2SE.

The first message come through from x2BG was addressed to A.R.R.L. Headquarters and was handled by 601.

North Borneo

Wentworth of 601 connected with GECQ, giving his QRA as in North Borneo, on the morning of February 7th. He reports 601’s sags as R-7. Complete QRA unknown but will follow shortly.

French Section

"The licensed French stations are going back to the old 200 meter band which is not so bad for interior work. f8BP, f8DU, f8FC, f8GH, f8GM, f8HM, f8ID, f8IM, and others are operating regularly in this band, and they are being encouraged by the Journal des 8 and R.E.F. Everywhere, tests are being made in an effort to learn more about wave propagation. It is hoped that before summer we will have some useful information on this subject. The great difficulty has been in finding a sufficiently large number of listeners. Finally, contacts are being formed in the Colonies. In Morocco we have station MAJO (the first "y") in this country) and also TZ at Morocco. f8JL and f8LB are in Saigon, Indo-China. f8DP has added a new country to his list in working BER in Bermuda. He has accomplished 51 two-way communications with "u" stations during the month. The new amateurs in Saigon are QSOing France, first via p11HR and 22AC, then directly by f8YOR. The Military station, f0CMV located near Paris, is making transmitting tests on short waves from 20 to 45 meters and will be very glad to receive QSL’s, also to get in communication with foreign amateurs. Andrew, of f8CA is at the station. All communications or QSL’s should be addressed to, Chef du poste OCMV, 2 Bataillon du 8 Genie, Mt. Valerien par Sursene, France."—R. Schlumberger.

Hawaii

Via radio from hu6AFF and u9ZT, we have the following: "Hawaiian hams here have been having good results with this high frequency dope on 40 meters. All hams here who have a moderate power input have been QSO as far east as the east coast of the U. S., as far as Alaska and the end of China, part of the Philippines, Australia, New Zealand, South America, and of course all over the United States. We are always ready for traffic. We have been mighty lucky to have a place out in the ocean, and can form one of the main relay points for messages to the East and South. I believe that Hawaii is justly deserving of the name, "cross roads of the Pacific". Being located in the middle of the Pacific, we are in a position to be of immense value to the hams all over the world in QSRing in all directions."—hu6AFF.

The WAC Club Certificate. When do you get yours, OM?

Africa

We are showing a photo of oA4L manned by R. Oxenham of Cape Town, South Africa. Mr. Oxenham is one of the pioneer short wave men in S. Africa and has one a lot of international DX. The apparatus at the left of the photograph includes a number of broadcast and long wave receivers using honeycomb coils. At the right is the short wave transmitter, short wave receiver and a 200 meter phone outfit, rarely used. A4L normally operates on a wavelength around 40 meters. He is editor of the S.R.R.L. News which is found in the South African Weekly. The S.R.R.L. is the beginnings of the A.R.R.L. of South Africa. oA4L has been QSO six Argentine stations, four in Brazil, ch2LD and several "u's".

Austria

All communications to Austrian amateurs should be addressed to Oesterreichischer Versuchsinternederverband, Klubsaal des Hotel de France, Schittenring 3, Vienna, Austria. The Austrian amateurs are using two letter calls with the intermediate o (— — — — — ).

W. R. Burne of the well-known g2KW has been appointed Editor of the Irish Radio Journal. Ham radio in Ireland is not at a very flourishing state at present and we believe that Burne can and will do lots to help it along.
HERE IT IS, GANG!

All right, fellows, you win! The Calls Heard Department is back after a brief rest of one month. It comes back with the same DX rating as formerly—1,500 miles. No calls should be sent in unless they are at least 1,500 miles from you. The lists must be prepared correctly or they cannot be used. Improperly prepared lists have to be re-typed and rearranged. The rules are few and simple. Read and heed them!

1. Use typewriter or pen and ink.
2. Use double spacing between lines.
3. Write on ONE SIDE of the page only.
4. If hand-written for the luv o' make 'em readable. (PRINT THEM)
5. The calls should be in CAPITAL letters, and in alphabetical order.
6. Outside of the U. S. calls the intermediate of the country should be put in small letters, followed by the call in capital letters: c4AB z1AA pi1HR.
7. Do not put a comma after each call; merely leave a space.
8. Have your list at Headquarters before the first of the month.
9. Again, lists calls only 1,500 miles or further from you.
10. Cut this out and stick it in the shack. Here is a sample of a correctly prepared list:

1ZZA, I. Makem Wright, 122 South Street, Cambridge, Mass.

40 meter band

3ZO Parksburg, Pennsylvania.

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3ZO Parksburg, Pennsylvania.
In our March issue a very regrettable and stupid error was made in Figures 21 and 22 on pages 19 and 20 of Mr. Clemons' article on shielding. The inductances of the coils in these figures were given in microhencrys, but this is obviously foolish— the values being in microhenrys using the correct values being in microhencrys using the same figures. The fault is not that of Mr. Clemons.

The diagram shown below should have appeared in the upper left hand corner of page 47 last month. Take a look at it's interesting.
Stay Where You Belong, Gang!

Icarahy-Nictheroy, 
E do Rio, 
Brazil

Editor, QST:

It is surprising to note that a great number of U. S. amateurs are operating out of their legal so-called 40-meter band, thereby causing unavoidable QRM to our working the U. S. A. Brazilian amateurs, and most South American stations, operate on a band comprised of the wavelengths between 32 and 37 meters. Despite this, our QSO's with the U. S. are often spoiled by the U. S. hams working right in our band, totally disregarding the 37.5 meter termination of their 40-meter band.

Our two way communications with the U. S. are getting to be a tiresome job under such conditions, and we frankly are getting very disgusted hearing the other fellow come back and say "Nd QRM QTA" or the like, whenever we attempt to chew the rag with him for a while. If the U. S. amateurs persist in QRMing us, we will have to quit working with them and shall look to Europe and other foreign countries for our contacts. We stand much better chances of holding QSO's with these amateurs, who stay on their assigned wavelengths, and who do not come back "Nd QRM, etc".

We have been told by a number of U. S. hams that those who get down below their regular band think their signals will get out better on the lower wave; others say the reason is the lack of properly calibrated wavemeters, or no wavemeter at all. Either reason is inexcusable inasmuch as the 35 and 40 meter signals come in just the same down here, and also there are a number of O. W. L.'s from whom points can be taken for wavemeter calibration or checking.

By the way, the poor fellow who happens to fall within our 32-37 meter band will have a hard time to QSO South America for his signals will be lost in our own QRM. So, go back to your own band, Om, hi!

As you know, the legal band for Brazilian amateurs is 40-45 meters, but we are camping on the lower band of 32-37 and expect to alter the allotted band to conform to this practice. You will seldom hear a "bz" above 37 meters as we are making an effective effort to bunch them on the above mentioned band.

We are always anxious to QSO U. S. hams. Here is hoping for both of us, but please stay above 37.5 meters! We realize the difficulty and size of the job of the Radio Inspectors, but from the number of stations off the band, we can only wish "more power to them".

—Alvaro S Freire, bs1AB. 
—C. G. Lacombe, bs1AC. Pres. 
Brazilian Section, I. A. R. U.

Ford Radio Apparatus

1018 West 5th Street, 
Dubuque, Iowa.

Editor, QST:

Remote controlled transmitters have been suggested as the solution to the problem of the cold outdoor shack or the summer-hot attic. Remote controlled transmitters are O. K. but the relays necessary in such an arrangement are costly. Those on the market are out of reach of the average ham's purse and the ordinary run of home brew relays is not dependable. Re-vamped Morse sounders are all right but the average static room does not boast such things. The best substitute I have yet found is the generator cut-out on a Ford. They're quite cheap—in fact worn out ones can be had for the asking at most Ford service garages. It may be necessary to root in the junk pile for them, tho.

There are two windings on the core of the magnet; a heavy series winding and a fine shunt winding. The heavy winding is of no value and can be removed. The fine winding is used to energize the magnet. It has a D. C. resistance of about fifty ohms and will pass 100 milliamperes continuously without heating. The action of the armature can be regulated by bending the clip that holds the tension spring. In this manner the relay can be made to close the breaker points with the terminal voltage at the magnet coil as low as one volt. By various spring tensions and resistances in the line as many as four of these relays can be operated in a non-selective arrangement by shortening out the resistances to close the different relays; thus but two wires are necessary to control four circuits at a distant point.

It is much nicer to sit in a room of "human" temperature than to bake or freeze in an isolated static room.

—C. M. Smith, 9BYA.
Alpha Sigma Delta
Mass. Inst. of Tech.,
Cambridge, Mass.

Editor, QST:

With the approval of the Grand Secretary, Mr. Green, I inserted a "stray" in February QST regarding the Alpha Sigma Delta Radio Fraternity. The main purpose of this stray was to let hamdom know that such an organization existed, and so that we might get acquainted with similar bodies if any, or perhaps combine forces if it seemed desirable. From the number of inquiries I have already received and the character of some of them, it is evident that my original stray was unfortunately worded, and gave a "free for all" impression. In addition to the radio requirements for membership, our Grand Council must be satisfied that the character of the petitioners is such that they would be acceptable to a regular social fraternity.

-Killian V. R. Lansingh

Coil Construction
41 North 6th St.,
Hudson, N. Y.

Editor, QST:

Recently, while constructing a coil in accordance with the scheme outlined in "Celuloid Supported Coils", on page 21 of the February 1925 issue of QST, I discovered a little kink which should prove helpful in making coils of this type. In the article mentioned it is directed that after the spaced winding is complete, collodion should be applied along the strips of celuloid to bind the turns to the strips. In order to hasten the drying of the solution the coil and form were placed in a fairly hot oven for a few minutes. This had the desired effect of hardening the collodion quickly, and further, immediately on removal from the heat, the coil due to expansion of the wire turns, was found to be quite loose and easily removed from the form.

This simple stunt makes unnecessary any special preparation or mutilation of the form as indicated in the article already referred to, and further, the coil is ready for use with minimum delay. If it offers no other advantage, this type of coil is certainly free from macerated insulation and disarranged turns; faults common to basket-weave or pickle-bottle coils.

Close wound inductances of this type are practically as easy to construct as the spaced variety. In making the former, it is only necessary to apply collodion to the celluloid strips just before placing the turns, as the winding progresses, and a second or third application of the solution over the strips after winding is finished.

It is always advisable to place a wrapping of waxed paper around the cardboard cylinder before placing the celluloid strips, as a precautionary measure against an excess of solution spreading. The wax paper will permit the coil to slip off the form even though the collodion is used too generously. The paper, in turn, can be removed easily after the coil has been taken off the form.

-L. R. Hennessy

Non-Chattering A. C. Relays
34 N. Washington Ave.
Battle Creek, Mich.

Editor, QST:

I was interested in the article in the February issue of QST, by Harold P. Westman on "A. C. Relays". I have been devoting considerable time to this subject, and I believe I can give a few tips. If, instead of complicating the construction by adding weight and springs to make the armature hold over the zero part of the cycle, a shallow slot is sawed in the pole face as shown in the diagram, and a closed copper loop is pressed into the slot the armature will not chatter. This is due to the copper ring setting up a field which is out of phase with the exciting current.

If the experimenter will go to the meter department of the local power company, he can usually have for the asking some of the handiest articles imaginable, that is coils and cores. I have found that the cores from the sangamo and G. E. poly-phase meters are the most useful. There is one type which requires only two tips of the tin shears to yield very fine laminations for small shell type transformers. I usually saw out the middle tongue and put the coil over one outside leg (all of the laminations being assembled one way) and make several magnetic contactors, holding tight enough on A. C. (with the shading coil spoken of before) so that the armature cannot be pulled off with the fingers.

I have made up several Tungar transformers using these laminations for cores.

-Roy S. Hayes
In the Backwoods

100 Main Street
Orono, Maine.

Dear Eddie:—

I've just had a string of experiences in the backwoods, and I would like to pass them along. I recently went to work in a mill town back about seventy miles from the firing line of civilization. An old friend of mine was there ahead of me so I sacked along about half of the radio stuff I could find in a hurry around the Queen City Radio Club, in order to build a transmitter. I found the town with a microscope and discovered it to be, without reservation, the coldest and dumbest spot on earth. My friend 1ARV was vainly trying to uphold the reputation of the A. R. R. L. with a single 201-tube. Outside of that, the radio world was represented by about fifteen B. C. L.'s of all degrees of rabidness.

Everybody knows the kind of town; a circle of 50 yards radius drawn around the town pump will take in all the business section and the residences of most of the leading citizens. It was rumored about the time I got there that some radical had purchased a bathtub, but I never saw it. The barber operated between two tables in the billiard hall where the town druggist and photographer were also located. From the table which supported the telephone office, five steps would take you to the blacksmith, or the dry-goods counter, or the grocery store, and almost as far as the "puss-office."

We rigged up about 40 feet of Wm. B. Duck's model 1914 aluminum wire against the ceiling for an antenna and used the bed-springs for a counterpoise. That made it impossible to go to bed if the other operator was working the set because the person getting in bed would throw the antenna system out of tune. Of course we began to work most of the world on forty 111eters. Naturally howls began to come from the B. C. L.'s the next day. Two or three days after we started operating, a white bearded old gentleman met me on the street and seriously requested me to stop sending because as soon as I started all other waves around town had to stop. Another patriarch has been trying for several weeks to get me to replace the tubes in his neutrodyne, claiming that they all blew up the first time I pressed the key.

Kent, 1ARV, and I had about despaired of ever educating the townspeople into realizing that they had just as much trouble before we hit town, when we conceived a brilliant plan. We posted a notice in the biggest store and in the Post Office and passed the word around verbally. Then one night after the town was all prepared we ripped out the rectifier and filter, went up on 199-meters and set out to show the town what real interference was.

From seven to eight we ran a string of code speed tests. We explained the next day that we were perfectly within our rights but the natives could not decide whether to lynch us or beg us to lay-off. When this attitude of mind was reached we seized the opportunity to locate and eliminate a little power leak which had been bothering everybody. That turned the balance. The result is now an interesting lot of B. C. L.'s and probably a few potential hams in the "—Radio Club".

—John A. Pierce, "J. A."-IEB

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We have just received a shipment of beautifully made 8 volt transmitting tubes. Price, 35.00 ea. Parcel post extra.

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VT. 1.

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Commonly Known as the J Tube
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Old Friends—

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This particularly because of the well-known insistence of the amateur on good material. He demands the best—and will take nothing else.

The new Taper Plate type E Receiving Condenser is designed to be practical rather than theoretically perfect. Its Tuning Characteristic shows straight frequency over the lower half of the dial and between straight frequency and wavelength over the upper half. Full size plates, far heavier than ever used before, assure positive permanence of calibration.

The type C gives a modified straight wavelength.

<table>
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<tr>
<th>Type “C”</th>
<th>Type “E”</th>
<th>Capacity (Mfd.)</th>
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This book, written for the U. S. Navy, first appeared in 1907, the author being Lieutenant (now Admiral in command of the U. S. Fleet) S. S. Robison, U. S. Navy. This edition has been revised and brought up to date by Commander S. C. Hooper, U. S. Navy, Radio Officer of the U. S. Fleet during the past year. A review of this book appeared in the December issue of QST, in which it was stated this is perhaps "The Best Radio Book That Ever Came To This Desk"

"The famous 'manual' has, in its 6th edition, risen to entirely new heights. This last edition ranks with the very best of all published radio matter and adds to its usefulness the excellent printing and binding that has marked the earlier issues.

Never have we seen a book that so well followed out the plan of starting with simple theory but always keeping in mind that the reader was interested in the application of the theory, and cared nothing about the theory itself. Therefore the text progresses rapidly to the actual apparatus and discusses the modern types clearly, rapidly and usefully.

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7. Radio Instruments
8. Radio Transmission
9. Radio Reception
10. Theory of vacuum tubes
11. Vacuum-tube transmitters

Part 2—Practical application of apparatus and measurements
1. Practical application of apparatus
2. Radio measurements

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2. Mathematics (Arithmetic, Algebra, Geometry, trigonometry) etc.
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Described Particularly for Short Wave Work

Karas has taken the lead in developing condensers to meet the exacting requirements of short wave work. Karas builds the only 140 mfd. condenser on the market. Karas Orthometric 5 and 7 plate condensers were built at the suggestion of Lieut. F. H. Schnell and have been enthusiastically approved by him.

How many short wave experimenters appreciate the extremely exacting condenser requirements of a short wave set? How many realize that many condensers, satisfactorily adapted to the broadcast range, will prove quite worthless in short wave reception?

At 10 to 40 meters, radio energy performs many queer tricks. The dielectric MUST neither leak nor absorb energy. It must be highly efficient as a dielectric, and be placed well without the effective electro-static field. The plates must hold the charge without variation. All these things are well accomplished in the design and construction of Karas Orthometric short wave condensers. They are as nearly perfect both electrically and mechanically as it is possible to build condensers.

The accurate straight frequency line characteristics of Karas Orthometrics are vitally important in short wave work. Think of it! There are as many channels of 10 kilocycles separation between 60 and 60 meters as there are between 200 and 500 meters.

Mechanical accuracy is vital. Slight variations in plate spacing that might be immaterial in broadcast work would upset frequency control at the tremendously high frequencies with which the short wave set has to deal. The spring pig tail connections on the 5 and 7 plate condensers are insulated to prevent contact noises at extremely high frequencies.

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<tr>
<th>Plate Size</th>
<th>Max. Capacity</th>
<th>Min. Capacity</th>
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<td>0.00001 mfd</td>
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<td>0.00014 mfd</td>
<td>0.0000105 mfd</td>
</tr>
<tr>
<td>11 plate</td>
<td>0.00025 mfd</td>
<td>0.000015 mfd</td>
</tr>
</tbody>
</table>

Also—Karas Orthometric Condensers for Broadcast Receivers.

<table>
<thead>
<tr>
<th>Plate Size</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 plate</td>
<td>$7.50</td>
</tr>
<tr>
<td>17 plate</td>
<td>$7.00</td>
</tr>
</tbody>
</table>

Karas Harmonik Transformers, price $7.00.

KARAS ELECTRIC CO.
Manufacturing Plant: N. Rockwell St.
Offices: 1074 Association Bldg.,
Chicago, Ill.

Order Through Dealer or, Direct on This Coupon

Karas Condensers in the 23, 17 and 11 plate sizes are generally sold by good Radio Parts Dealers in most cities. They are sold subject to our regular 30 day guarantee of “Satisfaction or your Money Back.” Due to the scattered demand for condensers built for short wave work, the 5 and 7 plate sizes are not so widely stocked by dealers. Orders will be filled direct, or may be placed through your dealer and his jobber. If you prefer to order direct, use this coupon. Send no money. Just pay the postman the price plus a few cents postage.

Karas Electric Co., 1074 Association Bldg., Chicago.

Please send me... Karas Harmonik Transformers and... Karas Orthometric Condensers, as ordered below. I will pay the postman the price plus postage upon delivery. It is understood that I have the privilege of returning these condensers and transformers for full refund any time within 30 days if they do not prove entirely satisfactory.

...5 plate: ...7 plate: ...11 plate: ...17 plate: ...22 plate:

Name ...........................................
Address ...........................................

If you send cash with order, we'll ship condensers and transformers postage paid.
THE BUG SUPREME

The Bunnell "Gold Bug" is known the world over for its simplicity of operation and ease of adjustment. Made, guaranteed and sold on a money-back basis by us, manufacturers of telegraph instruments for over forty-five years.

Has fewer parts, is easier to adjust and has the best carrying qualities of any semi-automatic transmitting machine on the market.

PRICE ONLY $12.50
Complete with Cord and wedge
Carrying Case $3.50 Extra

BUNNELL DOUBLE SPEED WIRELESS KEY

Half the motion does the work—an easy, rocking motion does the trick. No danger of cramp—brings back speed and style to operators who have been so affected by use of ordinary keys. Simple, attractive, guaranteed on a money-back basis by the manufacturers of the best telegraph instruments on earth.

ONLY $9.50

J. H. BUNNELL & CO., INC., 32 Park Place, NEW YORK, N. Y.
ESTABLISHED 1879—HEADQUARTERS FOR TRANSMITTING APPARATUS

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,

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.
**Build a Practical “B” Eliminator**

**Type 386 FILTER CHOKE**

Price $10.00

**Type 365 Rectifier Transformer**

Price $10.00

---

*Wiring Diagram for “B” Eliminator*

The above diagram shows the arrangement of parts and connections for an efficient “B” battery eliminator using the new General Radio Type 365 Rectifier Transformer and Type 366 Filter Choke. These Transformers give very satisfactory results in a plate voltage supply unit when used with the new Raytheon rectifier tube or other tubes of similar characteristics.

For further description refer to page 9158 of our new Bulletin 923-Q or write for our circular, "Instructions for Building a “B” Eliminator."

**GENERAL RADIO CO.**

CAMBRIDGE 39, MASSACHUSETTS
C. W. and Phone Transmitter
20 Watt C. W. 10 Watt Phone

Model ET-3619

This is a real opportunity to purchase one of the finest constructed, complete, compact tube transmitters which has ever been built for amateur use, designed along the lines of commercial apparatus, rugged in mechanical detail and having high electrical efficiency.

Designed to work on 150 to 200 meters but can be used on 40 and 80 meter bands with slight changes. Designed to be used with model ET-3620 Power unit but can be used with any other power supply.

Either 5 or 71/2 watt tubes can be used.

This transmitter lists for $235.00 with tubes, microphone and key.

New in original cases.

Extra Special Price less above accessories $18 ea.

AMERICAN SALES CO.,
21 Warren St., N. Y. C.

KENOTRON POWER UNIT
Model ET-3620
Complete with 4 UV-216 Kenotrons

This power unit will give full wave rectification from a 110-Volt A. C. supply. Will deliver 150 milliamperes at 460 volts, pure D. C., for plate supply, and 10 amperes at 71/2 volts A. C. for filament supply. This unit contains suitable filter condensers, reactor, combined plate and filament power transformer, etc.

This equipment has been designed to operate in connection with Model ET-3619 Transmitter but can be used with any transmitter.

New in original cases.
List price $180.00. Extra Special Price $28 ea.

AMERICAN SALES CO.,
21 Warren St., N. Y. C.

SHORT WAVES
REL Plug-In Coils are used extensively in most short wave stations throughout the world.

COVER EVERY WAVELENGTH
From 10 to 110 Meters.
$4.50 COMPLETE

(AT YOUR DEALER OR DIRECT)
RADIO ENGINEERING LABORATORIES
27 Thames St.
New York, N. Y.
"The Low Loss Coil Pioneers"

A&B Battery Charger ONLY $2

Charges any type of storage A or B battery, or auto battery, using a few cents worth of ordinary house current. Cannot injure battery and lasts for years. Complete directions enclosed—anyone can operate. No "Extras" to buy. Satisfaction Guaranteed

Why pay $10.00 to $18.00 for a charger when you can get this splendid GUARANTEED R. B. Charger by mailing us two dollars cash, money order, check or stamps. Charger will be sent postpaid. If not satisfied, return in 5 days and we will refund your money. Act at once. TODAY.

R. B. SPECIALTY COMPANY
Dept. 25, 308 East Third, Cincinnati, Ohio
For intermittent service

such as is required on radio apparatus, men who know recommend Ray-O-Vac batteries

It isn't just batteries that the radio amateur requires. What he wants is batteries especially designed for radio use.

Radio sets use batteries intermittently. The drain varies with different sets. Yet a smooth, uniform voltage is absolutely essential for the best results in both transmitting and receiving.

Ray-O-Vac batteries are especially designed for this type of service. The individual cells are so constructed as to give both smooth current and long life.

These batteries have abnormally low internal resistance—far lower than most other batteries on the market. The resistance remains lowest during discharge, too. That is why Ray-O-Vacs deliver signals free from distortion.

Men who know radio and who demand the most of radio batteries, recommend Ray-O-Vacs without qualification. Dr. Lee de Forest, the father of radio broadcasting, says "they most nearly approach my standard of requirements."

If you are not now using Ray-O-Vacs, equip your apparatus immediately with a complete set for all A, B and C current. Use No. 2151 or 5151 BP for detector tubes; Nos. 2151, 2301 or 2303 for drains from 4 to 15 milliamperes; and No. 9303 for drains above 15 milliamperes. They will give you a new idea of battery service.

There are Ray-O-Vac dealers everywhere, but if you don't find one, write us for the name of the nearest jobber or dealer who can supply you.

FRENCH BATTERY COMPANY, Madison, Wisconsin
The Cause

of distortion, scratchy sounds and muffled reproduction is principally due to the inability of the audio tubes to carry the load of the audio transformers.

Poor tone quality is often blamed on the loud-speaker when it should be attributed to the unbalanced relation of the audio transformer to the vacuum tube.

The Remedy!

Remove from your receiving set your old fashioned audio transformers and use in their place.

G. I. Variable Audio Transformers—Type 101

By simply turning the variation knob to the point of smooth reproduction, you have matched the audio transformer to the characteristics of the tube and thereafter you have

Perfect Tone!

First replace your second stage and note results; then the first stage. Should you wish to add a third stage of audio amplification, you can do so with certainty of no distortion.

The new receiver you build should not be without a pair of G. I. Variable Audio Transformers.

General Instrument Corporation
Manufacturers of Laboratory Equipment

477 Broadway
New York City

Price $10.50 each
At your dealer's, otherwise send purchase price and you will be supplied postpaid

Bound Volume IX of QST

We now have a limited number of copies of Bound Volume IX of QST. Vol. IX comprises the entire 1925 series of QST. This volume is made up of two books or sections, each containing six issues of QST. This volume is handsomely bound in red cloth and with gold imprint. The complete volume is priced at $5.00, postpaid.

Better act quickly—only a few copies left.

QST, 1711 Park St., Hartford, Ct.

50 WATT SOCKETS

Model UT-541

These Porcelain Sockets are ideal for use in short wave work on account of their low specific inductive capacity and their high insulating quality.

NEW. You can afford a few extra sockets at
OUR SPECIAL PRICE $1.10 ea.

AMERICAN SALES CO., 21 WARREN ST., N. Y. C.
The outstanding receiver development of the season, in which is combined the genius of two of the most distinguished radio engineers. A receiver for the home builder that will represent for several seasons to come a far greater value than any other design available.

Several outstanding features place the design in a position far in advance of anything available or contemplated. Unlimited wave-length range, with interchangeable antenna and detector coils; marvelously improved audio transformer; a special self-contained wiring harness; but one tuning or station selector control are special features.

Over-all design is rugged and solid. Adapted to practically any standard cabinet, any standard tube, any battery or eliminator source of supply, outdoor antenna or loop.

Only a screw driver and pair of pliers necessary. The set can be built at an extremely low cost and parts are readily available at all radio dealers.

**REPRESENTED MANUFACTURERS:**
- Belden Mfg. Co.—S-C Wiring Harness
- Poster & Co.—Drilled and Processed Front Panel and Drilled Sub-Panel.
- Vaxley Mfg. Co.—Rheostat, Jacks, Switch.

Get the hand-book at your radio dealer’s, or clip the coupon and send with 25 cents to

**S-C MERCHANDISING COMPANY**
111 So. Wabash Avenue, Chicago

SAY YOU SAW IT IN QST—IT IDENTIFIES YOU AND HELPS QST
Item 35. Two unit four bearing set. Furnished with ring oiled or ball bearings. Motor to suit local supply. This "ESCO" set delivers 1000 volts, 300 watts for plate supply and 12 volts, 150 watts for filament supply. This set driving two 50 watters will make a good consistent station.

ELECTRIC SPECIALTY COMPANY

Manufacturers of Motors, Generators, Motor-Generator Sets, Dynamotors and Rotary Converters for all radio purposes. Have you got your copy of Bulletin 237B and ESCO Filter facts? If not write for them.

TRADE "ESCO" MARK

225 South Street
Stamford, Conn.

Get an "ESCO" Maximum Miles per Watt POWER supply and you'll need a globe for your records.

YAXLEY

Special Switches for the Radio Set Builder

Any spring combination from One Pole, Single Throw to Eight Pole, Double Throw. Send a rough sketch and write for price or ask for complete descriptive catalog.

YAXLEY MFG. CO., Dept. Q
217 N. Desplaines St., Chicago, Ill.

HERE THEY ARE GENUINE

Faradon
Mica Condensers
Model UC-1014

.002 μfd. 3000 Volts

Used as a grid, radio frequency by-pass or blocking condenser. (New in Original Cartons)

WHY BUY SUBSTITUTE?
OUR SPECIAL PRICE $1.10 ea.

UC-1015 Mica Condensers
Three capacities .0003, .0004, .0005, 90c each.

AMERICAN SALES CO., 21 WARREN ST., N. Y. C.
ONE HALF the world always wants to know what the other half is doing. To get only half the stations with your radio means getting only half the fun of radio reception.

Tests at Harvard University show that the Browning-Drake Receiver can get more stations from a given point than any other receiver on the market today, because the slot-wound radio frequency coil designed by Glenn H. Browning combined with re-generation gives a higher amplification factor than any other commercial receiver. And the Browning-Drake Receiver gets distant stations with a remarkably pure clear tone, because the radio-frequency signals come in so loud static is at a minimum.

The Browning-Drake Junior is a 5-tube receiver incorporating 3 stages of resistance-coupled amplification with provision for a power tube in the last stage. Price $95.
Every HOYT moving-coil meter has a hand calibrated scale, made by comparison with accurately maintained laboratory standard meters. Each meter, from the 2" Type 17 for flush mounting to the large table type instruments, has jeweled bearings, accurately shaped and polished pivots and high resistance coils, running approximately 70 ohms per volt.

HOYT instruments for Radio cover the full range of Radio requirements. The HOYT Company has been making meters since 1904.

Send for booklet "Hoyt Meters for Radio."

BURTON-ROGERS COMPANY
26 Brighton Ave., Boston, Mass. - National Distributors

Western Electric Microphones with Desk Stands
TYPE 323 BW
These desk microphones are of the highest quality and are complete with four-foot cord with tips.

NEW AND PACKED IN ORIGINAL CARTONS
List Price $15.00 Special Price 4.75
AMERICAN SALES CO., 21 WARREN ST., N. Y. C.

KEEP LOSS DOWN
Dust on the plates of an otherwise good variable condenser will increase losses as much as 50%—especially noticeable when you are working on the shorter wave lengths.

You can keep your set at highest efficiency by using the

Little Marvel Radio Bellows
with the special soft rubber tip. Air is the only safe way to clean your set. Order today. Price only $1.50. Sent Postpaid anywhere in U. S. A. Money refunded if not satisfactory.

Size of Bellows 16 inches long.

J. C. CHRISTEN MFG. CO.
123 Dock St. St. Louis, Mo.
To Jobbers and Dealers: Write for our proposition.

IT IS READY
The Wimco Type B Wavemeter is now in production. Built to meet a popular price demand without sacrificing accuracy. Made in ranges from 15 to 200 meters.

Send for literature
Canton, Ohio

MAY 1923

FAMOUS "B H" TRANSFORMERS

BH Vivaphonic (Registered)
A Straight-Line-Frequency Distortionless Transformer. Test curve made at McGill University shown in catalog. A full line of Transmitting Transformers. Ask your dealer for our literature or write us.

JEWELL ELECTRICAL INSTRUMENT CO.
1650 Walnut St. - Chicago

"MORE MILES—PER WATT"
Contest Closes May 1st. Have you copy of Rules and a Log-Sheet to fill out?

See our announcement in last issue of QST
JEWELL ELECTRICAL INSTRUMENT CO.
1650 Walnut St. - Chicago

SAY YOU SAW IT IN QST—IT IDENTIFIES YOU AND HELPS QST
Your filter condensers must be right!

One of the most popular types of home-built "B" battery eliminators uses the Raytheon tube as a rectifier.

As in every other type of plate supply unit, lasting satisfaction and safe operation depend on the use of proper filter condensers. Due to the high voltages impressed on the filter circuit by the input transformer, only condensers especially designed for this work will give permanent service. Ordinary By-pass condensers should not be used in filter circuits.

Dubilier Filter Condensers, Types 719 and 720 contain all capacities necessary for constructing a Raytheon plate supply unit. These condensers were specifically designed for this circuit.

You can't build right unless your parts are right!

Insist on getting DUBILIER Filter Condensers. If your Dealer cannot supply you write directly to

Dubilier
CONDENSER AND RADIO CORPORATION
4377 Bronx Boulevard, New York, N. Y.
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.

American Radio Relay League,
Hartford, Conn., U. S. A.

Being genuinely interested in Amateur Radio, I hereby apply for membership in the American Radio Relay League, and enclose $2.50 ($3 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? ..............................

............................................................

1926

SAY YOU SAW IT IN QST—IT IDENTIFIES YOU AND HELPS QST
"This is Station 2-L.O. London—12 Midnight"

When listeners-in on this side of the Atlantic first heard the voice of the British announcer, and then a program of music from the famous Savoy in London, they experienced one of the real thrills of radio.

To get everything that is on the air—the faint signals as well as the strong ones—effective insulation of all radio parts is a prime essential. The best way to make sure that a radio set or parts are well insulated, is to buy those in which Bakelite is used.

Bakelite is used by 95% of radio set and parts manufacturers. It is the standard material for front and base panels, dials, knobs, tube sockets and bases, fixed and variable condensers, rheostats, plugs and other radio accessories and parts. Write us for a copy of Booklet No. 27, "Bakelite in Radio"—it's a helpful guide in buying radio equipment.

BAKELITE CORPORATION
247 Park Ave., New York, N. Y.
Chicago Office: 636 W. 22nd St.
BAKELITE CORP. OF CANADA, LTD.
163 Dufferin St., Toronto, Ont. Canada

BAKELITE
THE MATERIAL OF A THOUSAND USES

SAY YOU SAW IT IN QST—IT IDENTIFIES YOU AND HELPS QST
He didn't need new tubes!

SANGAMO
Accurate
Condensers
(Solidly molded in impervious Bakelite)

saved $15

FOR several weeks his receiving set had been disappointing. Previously, it had been a constant delight, but now programs came in so weak his family had to use headsets— thev couldn't hear the loud-speaker clearly. Nothing but local stations. Friends said he needed new tubes, new batteries, new aerial, new this-and-that; all with a fine friendly disregard for the cost.

Then a real radio expert gave him good advice. "Trouble may be in your fixed condensers. Moisture creeps in at exposed edges and changes their capacity. This upsets the electrical balance; there is resistance where there ought to be exact capacity, and your reception is spoiled, both in quality and volume.

"Try Sangamo Mica Condensers. Their accuracy is guaranteed, and the solid, seamless bakelite jacket prevents the capacity from ever being affected by moisture, fumes, soldering heat, or any other cause of condenser troubles."

Putting in these accurate Sangamo Condensers increased volume, cleared up reception, brought in DX and saved a waste of money for new accessories. Such a little, inexpensive part—but tremendously important! Any real expert will tell you so.

APPROVED BY ALL NATIONALLY RECOGNIZED RADIO LABORATORIES

Sangamo By-pass Condensers are also accurate—and surge will not break them down. They last longer.

Sangamo Electric Company
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—Asahi Engineering Co., Osaka, Japan
ELECTROSTATIC CONDENSERS
For All Purposes
Since 1907 the Wireless Specialty Apparatus Company has devoted its resources to research and development in the Radio Field, specializing in the improvement, production, and application of electrostatic condensers.
Not until a product had successfully passed exacting final electrical and mechanical tests was it considered worthy of the FARADON trade mark.
Each FARADON can be confidently relied upon for thoroughly satisfying service. There are over 200 Models of Standard Faradon Condensers ready for immediate delivery.
Should your dealer not have just the condensers you require, advise us.
When writing, please mention QST.
Wireless Specialty Apparatus Co.
JAMAICA PLAIN, BOSTON, MASS., U.S.A.
ELECTROSTATIC CONDENSERS FOR ALL PURPOSES

We Have Succeeded
in constructing a variable air condenser using
QUARTZ
for insulation so that this finest of all condensers can now grace any man's receiving set.
In the manufacture of Bureau of Standard type of primary standard variable air condensers, we use quartz only for insulation.
In our own laboratory we use variable condensers insulated with quartz only.
The most accurate operating variable air condenser demands quartz for insulation.
Fused silica quartz is the most expensive insulating material and it is the only insulating material in existence that is electrically permanent and of lowest dielectric loss.
All obstacles to adopt fused silica quartz for insulation in commercial condensers have been conquered, and

We Have Succeeded!
Concentric Straight Line Frequency
Type 87
Insulated With Quartz
Maximum Capacity Price
87N .000035 $ 9.00
87D .00005 10.00

Type 80
Insulated With Pyrex
Maximum Capacity Price
80N .000055 15.00
80D .00005 6.00

At your dealers, otherwise send purchase price and you will be supplied postpaid.

General Instrument Corporation
Manufacturers of Laboratory Equipment
477 Broadway, New York
Here's Another Pacent Triumph!

THE PACENT TRUE STRAIGHT LINE FREQUENCY CONDENSER is the result of 18 months' intensive research and experiments on the part of Pacent Engineers to perfect a precision instrument to really solve the problem of quick, certain tuning.

Compact and sturdy. Electrically and mechanically right—meeting all requirements for low loss design. The Pacent True Straight Line Frequency Condenser is a remarkable instrument that amazingly improves the selectivity of any set.

Our illustrated catalog describes, in detail, this precision condenser and other Pacent contributions to radio efficiency. Ask for YOUR copy TODAY!

Pacent Electric Company, Inc.
91 Seventh Ave., New York

Improved Vibroplex
The World's Greatest Sending Device

Get Yours Now

This is the HUG everybody is talking about. Sends clear, clean-cut signals—the kind you like to hear, simply by pressing the lever—the Vibroplex does the rest. Enables the "ham" to send with the skill of an EXPERT. Used by over 100,000 Morse and Wireless Operators. No radio station complete without an Improved Vibroplex.

Special model equipped with Specially Constructed Contact Points to break high current without use of relay .................. $25

Sent anywhere on receipt of price. Money order or registered mail.

THE VIBROPLEX CO., Inc.
825 Broadway, New York

RAJAH SOLDERLESS SNAP TERMINALS

Instantaneous in Operation—Positive Contact. For Panel, Ground and Battery Connections.

Patented—Sept. 22nd, 1924.
The Base Stud is tapped and furnished with 8-32 screw and washer. This fits all "B" Batteries with screw posts.

RAJAH Ground Connection

Used on Tungar, Rectigon, Philco and Exide.

Terminal complete, either style .....

Extra Base Studs .....

RAJAH AUTO SUPPLY COMPANY
Bloomfield, New Jersey

SAY YOU SAW IT IN QST—IT IDENTIFIES YOU AND HELPS QST
The Bradteyohm is used as standard equipment on the Acme B-Power Supply and most other B-Battery eliminators provided with voltage control. Silent voltage control is thereby assured.

How to Get Extra Voltage Taps from Your B-Eliminator

MANY radio receivers are provided with several B-Battery terminals for detector, amplifier and radio frequency tubes. To provide the extra voltage taps from B-battery eliminators, such as the Acme B-Power Supply unit, is a simple matter. The diagram below shows the method of connecting the necessary Bradteyohms and condensers.

A Bradteyohm No. 10 for the 67-volt connection and a Bradteyohm No. 5 for the 90-volt connection provide marvelously smooth control over a wide range for these terminals. The condensers may be larger if desired, especially when used with audio-frequency taps. The standard Bradteyohm in the eliminator gives sufficient range for the detector plate voltage. Your dealer can supply you with Bradteyohms and condensers. Try these connections tonight and improve your receiving set.

Mail the Coupon for Literature

ALLEN-BRADLEY COMPANY
277 Greenfield Avenue
Milwaukee, Wisconsin

Please send me literature on Allen-Bradley radio products including the Bradteyohm.

Name:

Address:

SAY YOU SAW IT IN Q S T—IT IDENTIFIES YOU AND HELPS Q S T
THE SUPER-SYNC
The Synchronous Rectifier That Can Be Filtered

The Super is the only synchronous rectifier that gives a pure D. C. with ordinary type of filter. This rectifier is adaptable to both high and low power sets as it easily handles up to 4000 Volts.

The commutator on the Super is eight inches in diameter and by reason of its large diameter it can handle higher voltages without breakdown. Eight brushes mounted in pairs ninety degrees apart serve to conduct the current. These brushes are mounted on a rocker arm so that they can be adjusted for proper commutation.

The Commutator is turned at a synchronous speed by a ¼ H. P. 1800 R.P.M. Motor. This motor can be supplied for either 110 or 220 Volts 50 or 60 Cy.

PRICE $75.00 F. O. B. ST. LOUIS, MO.

MARLO ELECTRIC CO., 5241 Botanical Ave., St. Louis, Mo.

EAGLE
All That's Best in Radio
Eagle Owners have the satisfaction of knowing they have the best Radio Receiver made, regardless of cost.

Ask Your Dealer

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

have you tried the NEW MAGNAVOX TUBES

RECORDS of unusual distance from the new non-microphonic Magnavox tube are coming to us from short wave experimenters in all parts of the country. Its internal capacity is only 4.5 MMF and it oscillates freely at low wave lengths without unbasing. Use it for either detecting or amplifying.

THE MAGNAVOX COMPANY
Oakland, California
In the radio business since 1911
The NEW NATIONAL EQUICYCLE Condenser

It has the following features:
1. The novel shape of the plates spaces the station groups at equal intervals of 10 kilocycles (as specified by the U. S. Department of Commerce) in a true straight frequency line.
2. The useful range of rotation has been increased from 180° to 270°.
3. No gears, cams or levers are used to accomplish this result—consequently no back-lash exists and none develops with use.
4. Its greatest dimension is only 4¼ in.
5. The same electrical efficiency and mechanical ruggedness that have always characterized NATIONAL DX Condensers have been embodied in the new NATIONAL EQUICYCLE Condenser.

Write for Bulletin 111-QST

It changes a mob into an orderly procession and lengthens the line of march!

Get the Genuine. Insist upon NATIONAL COMPANY'S RADIO Products. Your dealer appreciates your patronage and will gladly get them for you. Write for Bulletin 111-QST.

NATIONAL COMPANY, Inc.
110 Brookline St. W. A. Ready, President Cambridge, Mass.
The AmerTran r 1 eLuxeis made in
two types, a first
and second stage,
price, either type, $10.00.

A New Standard of Excellence
in Audio Amplification

The realism of this new audio transformer
is outstanding. Realism of this kind results
from the uniform amplification of the funda­
mental tones of the lower register. The
AmerTranDeLuxemakes possible the natural
reproduction of not only the Overtones,
but all of the transmitted Fundamental tones.

AmerTran
Power
Transformer
type PF-45.
Price $15.00.
type PF-52.
Price $18.00.

The reality of this new audio transformer
is outstanding. Realism of this kind results
from the uniform amplification of the funda­
mental tones of the lower register. The
AmerTranDeLuxemakes possible the natural
reproduction of not only the Overtones,
but all of the transmitted Fundamental tones.

AtnerTran
Transformer
type J'F-45,
Price $15.00,
type PF-52,
Price $18.00.

A Good Audio Amplifier

Requires enough plate and grid bias voltage
on its tubes to prevent them from being
overloaded by the signal voltage.
The AmerTran PF-45 or PF-52 with the
half wave high voltage rectifying tubes now
available and suitable condensers and re­
sistances—together with threeAmerChokes
Type 854 will furnish these proper voltages.
This combination will give real quality
loudspeaker volume. AmerTran Power Trans­
formers also supply A. C. filament current
for the last audio tube.

AmerTran Audio
Transformers type
AF6 (turn Radio 5)
and AF7 (turn ratio
3:1) are the leaders
in their class. Price,
either type, $5.00.

Write for booklet describing these and other
AmerTranProducts—with recommendations
on their use. It’s free on request. All prices
are F. O. B. Newark, N. J.

AMERICAN TRANSFORMER CO.
178 Emmett Street, Newark, N. J.

"Transformer builders for over twenty-five years"

Sold Only at Authorized AmerTran Dealers.

The Best Condenser for Short Waves

1. It stands 7,500 volts.
2. The insulation is sulphur and mica.
3. Eleven different capacities make close tuning easy.
4. No capacity variation to change your wave.
5. Universal for blocking, by-pass and tuning.

Make your set the best with these condensers. Only
$1.25 each, postage prepaid anywhere in U. S.

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The closing date for HAM-ADS is the TWENTY-FIFTH of the SECOND MONTH PRECEDING THE DATE OF ISSUE. For example, all HAM-ADS for the June issue must be in this office no later than April 25.

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QST’S INDEX OF ADVERTISERS
IN THIS ISSUE

Acme Apparatus Company .................................................. 86
Advance Electric Company .................................................. 78
American Apparatus, Inc ................................................... 84
All American Radio Corp .................................................. 88
Allen-Bradley Co .............................................................. 84
American Radio Specialties ................................................ 53
American Radio Equipment Co ............................................ 94
American Transformer Co ................................................... 81
A.R.E.L Recommendation Blank ........................................ 76
Alligator Corp ................................................................. 67
Barstow Co .......................................................... 77
Barnes Mfg. Co .................................................. 64
Barmax Mfg. Co .......................................................... 66
Bosse Battery Co .......................................................... 84
Burt-Boose Co ........................................................... 74
Allen, J. & Co ............................................................ 83
Carter Radio Co ............................................................ 57
Central Radio Laboratories ................................................ 71
C. T. Christensen Mfg. Co ................................................ 74
Central Glass Works ........................................................ 81
Creston Radio Supply Co ................................................... 78
Charley Radio Corp ........................................................ 84
E. T. Cunningham, Inc ...................................................... 73
Toone C. Deutschmann .................................................... 82
Dunbar Condenser & Radio Corp ....................................... 87
Davis Radio Co ............................................................ 82
Emerson Radio Institute .................................................... 86
Electric Drains Equipment Co .......................................... 79
Electric Specialty Co ....................................................... 73
Eppin .......................................................... 82
French Battery Co ........................................................... 89
H. H. Frost, Inc ............................................................. 84
General Instrument Co ..................................................... 58
General Electric Co ......................................................... 67
G. H. Grebe & Co. .......................................................... 71
J. Greer & Co ............................................................. 88
Hudson Division Convention ............................................... 76
Holland Hughes Elec. Elec. Co ......................................... 76
W. W. Hull Co ............................................................. 79
Jewell Electrical Instrument Co ........................................ 74
Kees Co .......................................................... 65
Kees Co .......................................................... 65
The Magnavox Co ........................................................... 82
Marco Electric Co ........................................................... 82
Mayer Radio Tube Corp .................................................... 71
National Carbon Co ........................................................ 83
National Co .......................................................... 83
Parent Electric Co, Inc ..................................................... 80
QST (Round Volume) ........................................................ 70
Radio Electrical Works ..................................................... 76
Radio Engineering Labs ................................................... 62
Radio Auto Supply Co ..................................................... 68
R. H. Kelly Co ............................................................ 68
Reichmann Co .............................................................. 71
Samson Electric Co .......................................................... 70
Scientific Radio Service Co ................................................ 73
S. M. Birmingham Co ....................................................... 73
Silver Marshall, Inc ........................................................ 75
Stromberg-Carlson Telephone Mfg Co ............................. 76
Tobr Engineering and Sales Co .......................................... 88
Tooridian Electric Mfg. Co ................................................ 84
T. S. Novelty Co ............................................................. 84
Tubby Radio Co ............................................................. 87
Vibracraft Co .............................................................. 80
Western Electric Mfg. Co ................................................... 64
Wireless Mfg. Co ........................................................... 74
Wireless Specialty Supplies Co ........................................ 84
Wizland-Wiand Co ........................................................ 88
X-L Radio Laboratories .................................................... 74
Yaker Mfg Co .............................................................. 72

94

SAY YOU SAW IT IN QST—IT IDENTIFIES YOU AND HELPS QST

HERBERT H. FROST, INC.
"Your radio is always top notch. What do you do to keep it so full of pep?"

Keeping your "B" batteries full of pep, without frequent renewals, is simply a matter of using the right size Evereadys for your particular set with a "C" battery*. The rule which determines the right size "B" batteries to use is simple, and once learned definitely settles the question of "B" battery service and economy.

On 1 to 3 tubes—Use Eveready No. 772. On 4 or more tubes—Use the Heavy Duty "B" Batteries, either No. 770, or the even longer-lived Eveready Layerbilt No. 486.

On all but single tube sets — Use a "C" battery.

When following these rules, No. 772, on 1 to 3 tube sets, will last for a year or more; and Heavy Duties, on sets of 4 or more tubes, for 8 months or longer.

These life figures are based on the established fact that the average year-round use of a set is 2 hours a day.

A pair of Eveready No. 772's for a 5-tube set instead of 2 Eveready No. 770's or 2 Eveready Layerbials No. 486—looks at first glance like an economy because of lower first cost. But in a few months the 772's will be exhausted and have to be replaced. After the same length of time the Eveready No 770's or the Eveready Layerbials No. 486 will still be good for many more months of service.

We have prepared for your individual use 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.

*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. Manufactured and guaranteed by NATIONAL CARBON Co., Inc., New York San Francisco Canadian National Carbon Co., Limited, Toronto, Ontario.

Tuesday night means Eveready Hour—9 P.M., Eastern Standard Time, through the following stations:

WEAI—New York WCR—Cincinnati
WANE—Providence WBBN—Cleveland
WSSB—Baltimore WWJ—Detroit
WTAG—Worcester WOH—Chicago
WIP—Philadelphia WOO—Dayton
WIR—Buffalo WDQ—Kansas City
WJO—Pittsburgh WOC—St. Louis
WIL—St. Louis

Pacific Coast, Eveready Program
KEO—San Francisco, 8 to 9 P.M.
A New Cone Speaker—
Companion to the No. 601 Receiver

To the epic achievement of Stromberg-Carlson's No. 601 Receiver is added that of their announcement of the New Cone Speaker. Produced after exhaustive research and experimentation, this speaker embodies an idea, old to the master creators of musical instruments, but new to the radio trade—that of a soundboard.

The soundboard which functions the same on the new cone speaker as on piano or violin—accomplishes the same purposes—that of giving true pitch and modulation to notes over the entire musical register. Whether it is reproducing the majestic roll of the organ, or the piping of the flute, this soundboard liberates the true beauty of intonation and phrasing which the music lover desires and appreciates.

Standing unobtrusively against a wall or in a corner the Stromberg-Carlson Cone speaker so fills the entire room with music that it is difficult to tell from where the sound is coming. In addition, it is as ornamental as a Mahogany Tip-Top Table which it so closely resembles.

STROMBERG-CARLSON TELEPHONE MFG. CO.
ROCHESTER, N. Y.
Announcement

AMERICAN RADIO RELAY LEAGUE CONVENTION
Hudson Division
New York City, May 13-14-15
First Hudson Division Technical Meeting
Activities Devoted Exclusively to Amateur Radio

On May 13th, 14th, and 15th there will be held in New York City what probably will be the most unique gathering of radio amateurs ever held in the world.

In the first place, the exhibit part will be in the hands of manufacturers invited by the League because of their consistent support of the amateur and our League, by the manufacture of parts for the transmitting amateur and their advertising of these products in our magazine, QST. These manufacturers have already responded and are going to put on educational exhibits of their products that will be solely of interest to the transmitting amateur and experimenter.

The technical side of the meeting will consist of a program so arranged as to be a resume of the best we have had in QST during the past two years, and comprehensive enough to include every worthwhile advancement in short-wave communication and amateur work generally. It is the purpose of the Committee to make it worthwhile for every transmitting man in the United States to come to New York for the three days.

The meeting is not open to the public, but only to the members of the A.R.R.L. and their friends. There will be prizes awarded in a contest that will be arranged to test the amateur's all-round radio knowledge, including transmission, reception, League traffic practices, etc., but it will not stress the ability to copy code.

This type of amateur meeting has the approval of our President, Mr. Hiram Percy Maxim; the Secretary of Commerce, Mr. Herbert Hoover; the Chief Signal Officer of the Army, Major General Saltzman; Secretary of the Navy Wilbur; the Director of Naval Communications, Capt. Ridley McLean. So let us all get together and make this a turning point in the League history of amateur conventions.

The price of admission will be very small. Announcement of details will be made in the May issue of QST. For further information, address

Hudson Division Convention Committee
480 E. 19th Street
Brooklyn, N. Y.
Contributors to your radio entertainment

Very probably hidden away in the cabinet of your receiving set, the batteries you use are nevertheless surrendering their power unseen and unheard.

And to be able to contribute their energy and to add to the complete efficiency of your receiving equipment, those batteries must combine every desirable factor and formula known in the electro-chemical field.

Such Batteries are Burgess—products of the Burgess Laboratories—products which have been used by practically every famous explorer, the majority of amateurs and the leading radio engineers.

That's why when you use Burgess Radio 'A,' 'B' and 'C' Batteries you are using batteries which assure the utmost dependability, longer life and complete satisfaction.

Burgess Battery Company
General Sales Office: Chicago
Canadian Factories and Offices: Niagara Falls and Winnipeg

BURGESS RADIO BATTERIES
WARNING!!

Have you checked your wavelength recently? Are you sure that you are operating within one of our amateur bands?

The Navy Department have cooperated freely with us. From time to time they have operated transmitters expressly for the purpose of testing with amateurs. These experiments have been made using stations working within our amateur bands. Naval stations handling Government traffic have been carefully adjusted to work on their assigned frequencies, not in our amateur bands.

The Department operates in bands right below and adjacent to our 40- and 80-meter bands. The Navy also uses the wavelengths right above our 20-meter band.

Through March QST, through bulletins and broadcast, we have tried to point out the necessity for carefully checking our transmitting sets and keeping them within bounds. NVA, NAR, NAW, and NKF have been badly jammed by amateur stations carelessly operating using wavelengths below 87.5 meters. NKF has been working and notifying off-wave amateurs, asking them to cooperate in this important matter of using legal wavelengths.

The Navy Department have a transmitter on a frequency just above 8,000 kilocycles (87.5 meters), which tests at noon and midnight, Eastern Standard Time, for our benefit. If your frequency is higher (wavelength lower) than the frequency of this transmitter, you are probably within the Government band and causing interference to the Navy stations and the foreigners who work there.

The U. S. Naval Research Laboratory (NKF) is cooperating in every possible way to bring about better conditions. If you can get in touch with NKF they will be glad to check your frequency within 1/8 of 1% accuracy. The Navy Department is anxious to help as much as possible, settling this interference question in a friendly way. They are justifiably, however, in reporting persistent offenders to the Department of Commerce and recommending that licenses be suspended and cancelled.

If you haven't a good wavemeter, get one at once and check it, using the standard frequency transmissions or OWLS service announced in QST for calibration. There are plenty of good wavemeters on the market, so there is no excuse for being without one. Prompt action is required to avoid certain trouble. Just take heed before it is too late, OM.

ARMY-AMATEUR NOTES

Each month we want to chronicle the outstanding work in these columns. Therefore the new heading above shows its face for the first time. Interesting news that is sent in which comes under the above heading will be included here from month to month. We hope to see this section growing steadily as the work gets under way.

Last month we showed a picture of the Army-Amateur certificate in this part of the magazine. Under the cut were the words, "If you haven't received your certificate, it is because we haven't had your application." A lot of the gang took this wording literally, so this month we must explain more in detail. Before any appointment certificate can be issued, it is essential that the station concerned be designated, to serve a specific National Guard or Reserve unit. A number of certificates have been issued, but there are an equal number of stations on file whose certificates are being held pending designation.

A slow but sure policy of enrolling Army-Amateur stations is being followed. Appointments are being made every day as fast as the applications and information from Army units can be co-ordinated.

There is still room for hundreds of additional stations in the Army-Amateur organization that is being built. An appointment certificate will be forwarded to every station designated just as soon as the designation is made.

You are not asked to work day and night handling hundreds of messages for the Signal Corps. Some periodic relays are held that give you an opportunity to show your stuff, though. When the enrollment is completed, there will be some special and very interesting activity. You will want to get a crack at it. Don't wait until it is too late, but send us your application today. Get lined up while the opportunity is still good. Take another look at that certificate which was shown last month and then write Headquarters for more dope.

Radio nets for all National Guard and organized Reserve units in the First Corps Area have been developed. Arrangements also have been made to furnish a daily Army-Amateur Radio Station service for the Corps Area recruiting officer between Boston and Providence, New Haven, and Springfield. One highly successful Governor's Relay was held in February. We look forward to definite reports which list the stations who did the best work.

2SC, of Governors Island, is the amateur radio control station at the Headquarters of the Second Corps Area. 1XC and 2SG regularly send Ediphone code practice messages broadcast. Amateurs picking up these messages should copy them accurately and turn them in to the Corps Area Headquarters for a check on the speed and accuracy of the copy. This is FB11! We want to include a complete list of these stations with their schedules as soon as such a list is available.
Traffic Briefs

An American girl is in Paris studying art. Her glasses become broken. The prescription for grinding the lenses is 8,000 miles away in Montclair, N. J. Problem: what to do? The need is urgent.

No time must be wasted!

u5BIR gets the prescription over the telephone and shoots it in a message to an English station for forwarding to Paris. The glasses are quickly made up and delivered by amateur radio.

Weeks later the mailed verification arrives. u5BIR handled the message with SPEED and ACCURACY. Every single word and figure had to be transmitted and copied CORRECTLY. Otherwise the message would have been wasted. In our message handling world accuracy should always come first. More power to 2BIR! We want to hear of more like him. FB!!!

This isn’t the Traffic Department now—the Board of Directors change the name to Communications Department. Read the report of the Annual Meeting of the Board. You’ll find it elsewhere in this issue. Some interesting results took place. We remember once when the secretary was calling the roll on a "yes" and "no" vote. When he came to Gravely, (3BZ) u5BIR and shouted, "Alabama casts 19 votes for Underwood." Gravely, the demo-cratic national convention was held some two years ago.

--

RJ. H. A. Snow, Tuscaloosa, Ala., wins the NRRL 50 watter! He guessed that we would receive 714 cards up to noon of March 5th, and hit it right on the nose—we received exactly 714 cards. Miss Dorothy Menk (who works at W2BCF) checked them and we are sure the count is ok. The 50 watter was tested by F. E. Handy and found ok with 1800 watts on the plate. No doubt it is perking at 6ARI by now. Congratulations, OM!

Cards were received as follows: Holland, 5; Belgium, 1; Alaska, 1; Sweden, 1; Mexico, 1; Casual Zones, 1; France, 1; England, 10; BCL-11; Canada, 1st, 6; 2nd, 2; 3rd, 4; 4th, 3; 5th, 5; U. S. Ist, 6; 2nd, 2; 3rd, 4; 4th, 24; 5th, 62; 6th, 62; 7th, 23; 8th, 114; 9th, 149.

The prettiest cards were turned in by 1AOE, 2CRP, 3DW, 4JF, 5ON, 6CAQ, 7NT, 8ER, and 9CA. It must be borne in mind that this is the opinion of an individual and represents nothing. Each and every amateur believes he has the prettiest card—and we agree he has. Some of them are more practical than others and contain information of value. There are cards and cards and we urge you not to regard our opinion too highly as it is your opinion which counts.

The intermediate "AU" has been assigned to Alaska, temporarily. It will be used the same way as the Hawaiian amateur license "HH." When a Hawaiian station calls a mainland station the complete intermediate should be "UHUU" and when a mainland station calls a Hawaiian station, the complete intermediate should be "HUUI." When an Alaskan station calls a mainland station the intermediate should be "UAUU."

Now gang, this is the last Traffic Brief or Traffic Grief of the old Communications Manager. The time you hear from "W2BCF" it will be from C. F. Burgess Laboratories, Madison, Wisconsin where 9EK-9XH are located. Anybody want any post cards? We’ll be glad to send them and we are sure the count is ok. The 60 watter beam transmitter operated on SCHEDULES once exchanged between the station at Fort Shafter, Honolulu, Hawaii and the station at Washington, D.C. The intermediate "AU" has been a wonderful clearing point for international traffic. Page Radio Central!!

pICW keeps schedules with stations in Portland, Oregon, and Denver, Colorado. Australia and New Zealand traffic is cleared out of the intermediate "AU." This will be used the same way as the Hawaiian code "HU." It will be used to keep in touch with the old gang on the air. No, I’m not going into the commercial game—I’m going to stay right with the A.R.R.L. and amateur radio 73 and CUL-B. H. S.

c6GO established what is thought to be a new world record when he worked AQE, a whaler exploring the Antarctic and carrying short wave radio apparatus. A 37-meter wavelength was used. We shall be pleased to record any further useful traffic handling with AQE in these columns.

H6DCF (FX-1) recently held a 25 minute conversation with G-AAD. On February 12, messages were exchanged between the station at Fort Shafter, Honolulu, T. H., and Johannesburg, South Africa. On February 14 h6DCF clicked with HVA in Indo-China. We expect that further details of this wonderful international work will be available for our IARU News Department by next month. What’s next?

6BIX reports that his schedule with p5HR is still going strong. This makes the fifth month without a break. What a "traffic jump" has been missed during the entire time! F. B. III! We also observe that 6BIX stands well in the Brass Pounders’ League. Can it be that there is some connection between irregular schedules and good message totals? We guess that the rules of cause and effect are responsible. Try it and see for yourself!

Next month we are going to put some additional figures on our "score board." In the Traffic Summary we will include the percentage of Official Relay Stations that filled in each column. The number of messages handled by each section of the country can be compared directly with the first figure to show our strongest and weakest communication Section. Perhaps further changes in the "score board" will make it even more useful in showing us how our state and Division compare with others. Comments and suggestions are invited.
WHO GETS THOSE MESSAGES?

By L. R. Huber, 9DOA

A look at the traffic figures for the last few months will convince 'most anyone that a great many of the messages started in our stations never reach their destination. There are several plausible reasons for this, but the one most obvious seems to be that somebody evidently does not care whether he relays messages or not.

We assume that all ORS are on the lookout either to relay traffic within 48 hours or forward by mail, telegraph, etc. So much for that. There is little reason to believe that any ORS would violate this trust. But the messages do become lost, strayed or stolen. There must be a reason for it.

There are two reasons, for it, and both are real and in evidence. The first is as one station of another ORS, it takes in a message and holds it, and the second is the one that we can do something about.

There is the logical remedy for the present unsatisfactory system, and it is a simple and effective one. After all, the idea of ORS is to get the messages handled, or nearly all, start at RELIABLE stations. It follows that somewhere enroute, some UNRELIABLE stations get hold of the messages. There are probably more RELIABLE stations than you would think so too. This is because the logical remedy for the present unsatisfactory situation is needed. We need only to work it out.

There is a way of doing this, and it is for the RELIABLE stations to refuse to let the UNRELIABLE ones handle the messages. Then the receiving station will only ask, 'Is this a message from RELIABLE ORS?' And the transmitting station only asks, 'Does this message come from RELIABLE ORS?' It is as simple as that.

The first step is to have a list of RELIABLE stations, so that stations will know which ones to use. The second step is to have a list of UNRELIABLE stations, so that stations will know which ones to refuse.

The Chicago Radio Traffic Association have a desk with one stenographer who is busy every day taking messages for free transmission by amateur radio to different points. The Association keeps a complete record of the success of the message-handling service for these columns next month. A report on the percentage of different types of messages, on the number of messages DELIVERED, and on the speed and accuracy of handling them will prove enlightening. A list of the active stations and their schedules will show who is doing the real work.

The Chicago fellows want to call attention to the fact that the messages are being promptly handled. As we know, there are always some additional schedules. So far much of the traffic has been "applause" traffic for different distant broadcasting stations. A good part of the reason for this is the ability of the receiving station to originate good traffic can be duplicated in many other sections of the country to good advantage. Stations keeping schedules with Chicago should see that they cooperate and DELIVER traffic. Once making this work effective. The Chicago public are invited to assist by supplying messages for handling.

Listen for Salvador 2WR on 77 meters. This station is operated by Dr. Wm. Reuwick, Fiscal Representative, Chatham Phoenix National Bank, San Salvador, Central America. Another new station open for traffic is DGI on 86.5 meters. Address Mr. Colin Gatby, Room 604, Nicolau & Co., Nicolau & Co., Ltd., Calle Cangalls, 800 Buenos Aires, South America. The station is located at Bernal, 15 miles south of the city. This is the first station in the useful citizen radio traffic routes with Central and South America.

Here are four good points observed by the best amateur stations (Official Relay Stations).

1. Operate WITHIN the assigned amateur wavelength limits. If you do not own an accurate WAVEMETER—use a home-made one.

2. Use a good plate supply. Eliminate key clicks with a suitable "thump" filter. A slightly (20%) modified couple, or enough to reduce the frequency, is best to reduce the noise. The modified note is broad and causes undue interference.

3. A steady note is most important. Use a primary (a high plate voltage, or a high reactance for inductance) especially on the shorter wavelengths. Normal or slightly sub-normal plate voltages make the note steady. Loose coupling (few turns in the antenna coil relatively far from the primary circuit) is necessary if the frequency is to be nearly constant while sending.

4. Avoid unnecessarily long calls. Use judgment in all operating. Arrange schedules enough to move traffic accurately and quickly in the right direction. Work break-in when possible.

How does YOUR station rate on these four points?

OFFICIAL BROADCAST STATIONS

Changes and Additions

Local Standard Time

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** 84 meters, voice at 7:15 pm on Tues., Thurs., and Sat.
** Tues. at 10 pm and Sat. at 12 m on 80 meters.
** 20 meters, 1 pm Sat.-40 meters 6.00 pm Wed.
** 6 pm, Fri., Sat., Sun., Mon.—99 meters.

QST FOR APRIL, 1926

III
TRAFFIC SUMMARY

DURING January—February there was slightly less message-handling activity than during the previous month. The figures show a slight improvement in percentage delivery. However, but 60% of the messages originated during the "message month" got delivered during the same period. This is a serious condition to observe but one which can be improved if each station owner who reads these words will do his part.

The problem of message RELAYING and DELIVERY must get some serious attention if our general service is to be one of which we are proud. The reports show that messages going over regularly scheduled routes get through with the desired speed and 100% accuracy. The figures show that there is plenty of traffic to be handled. More individual responsibility regarding prompt relaying and delivery will bring the results we want.

Messages received should always be delivered immediately (a) by telephone, (b) in person, or (c) by mail if no other means of effecting delivery are available.

Never accept messages which cannot be handled or delivered without informing the chap filling the message of the circumstances.

Keep the hook clear by handling traffic on schedule daily.

The different Assistant Division Managers are listed below. Are you doing your part to keep your State and Division a leader?

If every station owner who reads these words will see that every message he handles is delivered or passed along promptly and report his good work, we will be able to show 100% delivery in the National Association of Stations in a short time. DO YOUR PART IN IMPROVING RELAYING, OM.
MAINE—Every Friday the Queen City Radio Club holds a red-hot session. The following officers for 1926 were elected: Geo. R. Brown, Vice-Pres.; Sumner H. Fillifer, Sec.; A. G. Malvin, Treasurer; S. B. Craven, Reporter. G. L. Clements. Plans for a summer convention are being actively discussed. A committee of six will conduct a preliminary study of the convention situation. Details plans will be presented at the first meeting in March.

Feb. 24 meeting was held at the University of Maine. A paper entitled "The Ideal Ham Station" was presented by S. B. Craven. Discussion of the various points cut out in the talk followed. This Hangman Club's membership is growing steadily. This Hangman Club's activities are stimulating an increasing interest, especially among the BCL group. Fine business! Come and learn to talk.

A traffic trophy is offered by the Club to the member handling the largest number of messages each month. Reporting competition results. This month it goes to...U. I.

MANITOBA—The Winnipeg Radio Traffic Association are publishing a monthly bulletin of Division and Club news. It is furnished to the clubs at a cost of 5c per copy. It is a live, newy ham paper. The boost it alone and get some interesting dope by sending to us a "ham-qfy" for your traffic.

MINNESOTA—Sixty hams attended the TCH Old Timer's Banquet, January 22nd at the Minneapolis YMCA. The meeting was called to order by 9SE, 9CMB and 9CHY made the program really enjoyable. SIG auctioneer, disposed of a hundred trick novelties during the evening, each sale swelling the Club's treasury from 10c to a dollar. "IG's" "wireless",alpha was the gang who parted with their money. G. M. Janzky, Jr., Dakota Division Director, gave a report on the 1925 Radio Conference, of which he was a delegate. Wallace, 9E7T, acted as a very able auctioneer.

In St. Paul, the St. Paul Dispatch-Pioneer Press inaugurated a radiogram service. The St. Paul Amateurs' Club plans to make stations at places in different parts of the city where the public may file messages for transmission via ARRL. Messages are collected at intervals and started from St. Paul Official Relay Stations. Bill G. White, President, has charge of the message service. This service is given public notice in the St. Paul paper. It is hoped that a similar service will be established in the near future by the ARRL. A blank form for the message is shown. On the back both the ARRL Communications Department and the work of the newspaper are explained.

NEW JERSEY—Feb. 4th a reunion of the Radio Club of Irvington, N. J. was staged at the Elks Club House. About 30 members attended a monthly meeting at which plans were made to meet once a month for a good time. The Club is one of, if not the oldest radio organization of its kind in the country. It was organized before there were any radio laws, when there were no wavelength or power restrictions. The club idea helps in reducing QRM. The exchange of ideas is valuable. This club has passed down thru the era of "watts per mile" to the day of "miles per watt.".

OREGON—The Jefferson (High School) Radio Club is putting up its station. 7ALA. A whole crew of operators are in training. Edwin Daucherty is one of the YL's due to become a "ham." HAM.

Pennsylvania—The Lehigh Valley ORS Club postponed the February meeting at 51Y on account of bad weather. The meeting will be held later at 59RN. The Amateur Transmitters' Association of Western Pennsylvania are holding monthly "ham-fests." Interest in the meetings holds up well. There are 48 active members—all breast-rounderers!!!

RHODE ISLAND—Every station is active about Providence Radio Association Headquarters. The Convention promises to be a great one and the time and good time is promised for all. GET READY GANG.

TEXAS—The Dallas Radio Club held an amateur "hamfest" March 27 at the Hilton Hotel, Dallas, Texas. A big feed and blow-out was staged! About 200 Texas hams were coverted from all accounts. Good talks, stunts, music, and rag-chewing made it hard for the gang to drag themselves away from Dallas after the fun was over.

DIVISIONAL REPORTS

ATLANTIC DIVISION

B. R. Duval, Manager

These fellows who have been complaining about reports not appearing in this department will have to say that this Division's reports are "berries," for completeness. We have all sections of the Division with us this time even Delaware who has only contributed a radiogram service. The St. Paul Amateurs' report is stimulating an increasing interest, especially among the BCL group. Fine business! Come and learn to talk.

Traffic; 3PS 47, 3RF 5, 3LG 12, 3LIL 9, 3BLU 6, 3CCG 2, 3GT 2, 3GJ 4, 3ASA 3, 3WA 29, 3HG 16, 3APV 7, 3DW 6.
DELAWARE—ADM, 3AIS—It has been hard for the ADM to make reports up from no material. He is certainly grateful for the interest in holding what little together he could to make a report this month. He has lost DX and is now being reported R5 by Australian A-1999, a receiving ham. 3AIS is on but three nights per week and is the only station operating in Wilmington. 3S5, QRA Silverside, Dover, has sent word that sugar is down, but he has no word from his spark coil CW work but ND so far. There is some prospect of having two new stations at Dover, D", at the YLs are doing a bit better on the coast, Canada Zone and France.

3ATV is having trouble working on 40. 3DH, at Princeton, Univ., has had better luck this time, working G-2QB and being reported Rn by Australian A-1699, a receiving ham. 3SOH is on but three nights per week and is the only station operating in Wilmington. 3S5, QRA Silverside, Dover, has sent word that sugar is down, but he has no word from his spark coil CW work but ND so far. There is some prospect of having two new stations at Dover, D", at the YLs are doing a bit better on the coast, Canada Zone and France.

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I LLINOIS—Dist. 1—9BET continues to work Africa and Australia every A. M. 9DGA is very QRV in 90 meters. 9BHS has quit the air. 9QLJ has taken over a new watter, 9DLT is now on 60 watts. 9CN has quit the air. 9NO is moving to town. 8BVM, a broadcast station. 9CTF is out of commission. SDX has worked France, SVJ has worked G-

DISTRICT REPORTS

CENTRAL DIVISION

C. E. Darr, Manager

Traffic: 8AYB 2. 8UL 14. 8QB 5. 8SBF 7. 8DFK 25. 8RZU 16. 8ALY 2. 8MC 10. 8KS 11. 8BEN 6. 8SGN 25. 8APO 4. 8KV 28. 8HJ 5. 8VW 3. 8WV 14. 8CNE 25. 8CNH 49. 8DX 8. 9AHK 31. 9AMR 18. 9DKT 30. 9ARL 20. 9BZU 8. 9CNX 97. 9AXA 9. 9BN 45. 8CTL 35. 8BQK 37. 8DRJ 18. 8DHX 30. 9APY 144; 9QD, 116; 9NV, 108; 9IX, 90; 9BNA, 73; 8PU, 50. 9DWH, 45; 9DLG, 48; 9SCX, 42; 9AYB, 39; 8BVF, 28; 8GEE, 32; 39M, 30; 8BDG, 29; 8ALX, 28; 8RK, 38; 8US, 24; 9JK, 22; 9CRL, 21; 9GCLZ, 18; 9CLJ, 14; 9DAP, 13; 8VJ, 13; 9AJJ, 12; 9DGA, 12; 9DYD, 12; 9DGU, 12; 9AAE, 11; 9EIN, 10; 9BGC, 10; 9DCG, 10; 9ELR, 10; 9DDE, 8; 9BFA, 8; 8AES, 8; 9KN, 8; 9DAY, 7; 9P1, 7; 9DL0, 6; 9NDC, 6; 9MAD, 6; 9AAW, 4; 9AFF, 4; 9ALM, 4; 9ARM, 4; 9BZ1, 2; 9DYL, 2; 9VV, 2; 9BWS, 1.

WISCONSIN—Dist. 1—9DOL is in line for an ORS. 9DQI says traffic moves nicely. 9ALQ has increased his antenna current from .8 to 1.25 amps. 9CKU moved here from Menominee Michigan and is QRV for traffic on 40 and 80 with one wire. 9BH bird is a Liver. 9BRR has trouble. 9VJ has the air. 9DQI has trouble with 20 watts, 9APZ, rebuilding transmitter and still a staunch Naval Reservist. 9ATQ hopes to be on the air most of the time on 40, 20 and 80. 9SLD, back operating, is QRV. 9WZG, 9CLH says selling out—already gone dry. 9DTK handled 234 mags. this month.

Dist. 2—9DKA has worked A-BBD and HU-6CLJ. 9AYA's new ORS is oh, oh, oh, a most magnificent. 9APX is down on 40 with ten watts. 9BVA is the only active station in Amherst. 9ANL has received his appointment as ORS. 9DNM, that school work and YL keeps him from putting station up at Madison.

Dist. 3—9AZN's mags handled shows a considerable drop from last month's total. 9DCX has schedules with 9AZN and others not having much time for DX. 9BOS is coming back again strong. 9BLF has again started up. 9FPH, a new station at Colby. 9GAV is also a new station at Alma Center Jackson County. 9PJ has applied for tone. 9DLH has got permission to use 40. 9FNI is on the air. 9RA is not on duty and DX QRM. Since the News Department has been dis~~3~inated from lack of funds and the necessity for economy, the DS says that he will handle more time to DX and all hams will be rounded up and started brass.

The BADGER ARRRL NEWS founded by 9VD and published in the interest of Amateur Radio and distributed free heretofore, will be published in the future by the Milwaukee Radio Amateur's Club and will be the official organ of that organization. All amateurs interested in receiving this publication should communicate with Secretary John Meyer, 9BKR. 888 44th St. Milwaukee. The subscription price is a dollar a year, which includes membership in the Club to those residing outside of Milwaukee.

9NUN, formerly of 9NUP, is now located at 325 Farwell Ave., Milwaukee, Wisconsin. Traffic: 9DOL, 101; 9EHM, 21; 9BWO, 18; 9CCKU, 15; 9FE, 15; 9BKR, 9; 9SLF, 7; 9GAV, 4; 9CIB, 2; 9DFK, 5; 8DKA, 5; 9CGL, 5; 9EMD, 7; 9BVA, 7; 9ANE, 5; 9AZN, 67; 9DCA, 54; 9BOS, 10; 9BHF, 18; 9SHI, 5.

KENTUCKY—9CVR is on 80 meters. 9IX is in business but handles a few when he can. 9WU works spasmodically. 9DTT has several 80 meter schedules. 9MN is troubled with X-ray QRM. 9EP and 9BDE are on 40. 9DQY has 90 watts. 9CVJ is a new station at Centre college, Danville, Ky. 9PBP is going to get a big tube. 9EB is having trouble. 9GCI has just got his fifty going. using a Hertz antenna with induction. 9GCI is always improving. 9NV has plenty of ops and handles lots of traffic. 9AMJ and 9APS are accepting new stations. 9AMJ has 25, 93: 9PU, 15; 9BFA, 15. 9BLF, 7; 9AUB, 8; 9JF, 9.

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from foreign stations. 9AJS and 8HXX are off, waiting for a new tube.

Dist. 3—8HMK's in the lead as far as traffic is concerned. 8DAE ran second, and both should be in the brass pounders league, only they haven't their 75 watt report. 8QJ should be mentioned for good work. The message business looks better. Reports show that the boys with lots of messages have been working on a new schedule. Figures prove it was a good while. 8DAE added Brazil and Italy to his list. 8ADA is doing his usual DX. 8HPL, 8ACY and 8COK are adding a number of foreign stations. 8BRX has added an aerial to the house. 8ATW is in this location. SDPN and 8AXW have had little time to pound bureau traffic. 8CBJ is sick. The Dayton fellows are at the top. 8BZJ is another new station. 8AIB got a 250 watt as a present. 8CWR has an H tube. 8SOI hands in a good total. He'll make a good ORS. 8DNY turned in a good message report. The Army-Amateur and PRR work has been going good. There is a new station 8KJF that has been working out. It hasn't been on much due to school work. 8TJ is in Florida.

Traffic: 8DBK, 1; 8DDG, 2; 8DDH, 3; 8CBE, 7; 8DHI, 2; 8SATZ, 11; 8CLB, 4; 8JKM, 16; 8AYW, 100; 8ARJ, 58; 8BPL, 19; 8ACY, 18; 8DNP, 9; 8BNN, 4; 8KC, 4; 8AYO, 3; 8CMG, 3; 8AWX, 2; 8APA, 2; 8SLN, 2; 8DRH, 2; 8DBZ, 5; 8BBW, 5; 8BN, 6; 8BYJ, 52; 8CWI, 67; 8DVM, 9; 8EL, 1; 8PL, 4; 8CPB, 4; 8CBI, 14; 8DSY, 8; 8ALW, 3; 8CAU, 69; 8ANB, 6.

ININDIANA—Dist. 1—9DBJ burned up his plate transformer while trying to thaw out the rectifier. 9AEP is off, but don't much about it. The evenings on account of a BCL in the same house. 9AAI has a fine phone going on 84 meters. 9DVP is experimenting and is ready to send. 9QTW has a new BCL in the house. 8DLN has a 400 volt storage battery plate supply. 9EGC worked all districts with a "fiver." 9JKL has an H tube sending out a wicked signal on 80. 9GZ is still working out. 9DARH is on 40 meters, but doesn't do much work. 9BEC has worked a number of foreigners while trying to thaw out the rectifier. 9CSW has added Brazil and Italy to his list. 9DAM is in fine shape. 8BRX is another new station. 8AIB has a 250 watter as a present. 8CWR is on 40 meters. 8DAW turned in a good message report. The Army-Ama­ tore and PRR work has been going good. There is a new station 8KJF that has been working out. It hasn't been on much due to school work. 8TJ is in Florida.

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SEVERAL amateurs from other districts, have been visiting in the Dakota Division of late, among them being 8DHE; both father and son.

Professor C. M. Janesky, Jr., our Dakota Division Director, attended the ARRL South Dakota Convention. He reports that about 50 were present and that the convention was highly successful.

The college station, 8DDEP, keeps in constant touch with his family, and other affairs in Minneapolis, via 8XI, 8XT and others. In some cases, messages were returned in less than 5 minutes to particular radiograms sent.

The convention itself was divided into interesting sessions and included interesting concrete information on quartz oscillating crystal and picture transmission. One of the features of the convention was that everyone present received prizes, in all, hundreds of dollars worth. It was a great success.

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but will be on 80 aooner or later. 2BQN and is experimenting a great deal with crystals. using .. S.. tubes. He still sticks to the high waves bank account recovers. good is back. on a.ir again after many moons and seems to like meters for rag chewing. 2AQN is learning the range.

ELMSFORD—2APQ has an “H” tube, but hit a BCL with his car and bent a fender so has to make good to the OM. He promises to be on when his back will set a very good score. Dist. 2—2AGM is off with flying colors now having worked France and the west coast. 2CDH has worked a lot of DX and is heard heard in England. Complains of its being hard to get tfo into N. Y. C. 2BM has been QSO 1-1AS. Other records are NZ, C, QRA to 146 Third Street. 2AOM has an “H” tube and is getting thins in shape to make it perk out. 2AI is still ill but has a receiver going and is doing some to 2AOI is a new station in Troy using a UX-210.

Dist. 4—2AKH says his small report is due to his transmitting being on the blink, but hopes to have it fixed soon. 2BKJ is a large plate transceiver, and is now using a chemical rectifier. 2CMY has been QRW so not on much during past month. 2CXQ is very QRW and hopes to have a larger report next month. He is making some improvements on his 2MK, the new station at Central Valley, has worked S. Africa, N. Z. and appears to be doing very well. 2AOD got an “H” tube and is getting thins in shape to make it perk out. 2AI is still ill but has a receiver going and is doing some to 2AOI is a new station in Troy using a UX-210.

TRAFFIC: 2AOI 11, 2COV 3, 2CMY 1, 2CQG 3, 2CHH 5, 2AGM 5, 2CXY 2, 28C 2, 2CM 2, 2AW 4, 2AOI 6, 2AAN 13, 2BG 9, 2C9 4, 2TIF 6, 2B 10, 2BG 7, 2C9T 4, 2CNS 19, 2DDZ 2, 2LA 7, 2GZ 137, 2AAS 58, 2AIS 44, 2KX 11, 2AGL 10, 2AAX 8, 2BPH 18. 9DZ is now working to 146 Third Street. Newburgh, 29. N. Y. 2LA has moved to 55 Glen Road, Larchmont Woods, New Rochelle, N. Y. 2PQ is QRW now and reports a fifty watt crystal. 2AHG on schedule. 2CGH, our star station at Delmar, is off the air for a while because something BCL complained to the R. L. 2CGJ is now using a huge set with 1-KW in the antenna. He works Sweden, Denmark, Switzerland, Italy, etc. with ease. 2AGS is now one of the operators at 2AKQ dist. 2. He gets his QSO 20 to 2AGS is still experimenting with antenna systems. 2BG has been having tube trouble, but is QSO the 2AOI with no trouble. 2BAS is in the same boat as the above. 2C9X is using an antenna that would put any BCL to shame (not an inch over 22 feet high), yet there isn’t a QRM of BCLc. 9BNU is heard occasionally on the high man of Kansas this time. Nebraska’s honor traffic: 9DBH 89, 9KM 7. 9BXG 59. 9CZV 10 9AEY 95, 9BOS 14, 9CM 18, 9CZG 112, 9EKK 2, 9BH 38, 9DMS 32, 9BEK 5, 9GUS 22. MISSOURI—Dist. 1—Traffic has increased, these reporting showing larger totals than last month. Crystal oscillators are the rage in St. Louis, 9BEQ, 9BVQ and 2AOT have reported it. 9BQEQ says he is getting a wad messages with big checks. 9PW is working with him. 9DXN is QRT for some time. 9DLP is getting many messages but reports no details. 9NC has been heard on lots handling traffic but don’t report figures.

Dist. 2—9DAE is off the air outside interests. 9AYK is working back on 80 with good DX. 9EAO is working a tone. 9DX reports QRW. 9ASB is not shut down but 9AUB is not using a large number of stations are on. 9DKY has been QRT a lot of time. 9BKV has been irregular due to QRM. 9DPS blew a 50 and went back to 201A. 9BEQ is a new station at Butler. 9CVO has been appointed ORS in the 4th Dist. 3—9OBQ is using a huge set with 1-KW in the antenna. 9BEQ has been QRT with good DX. 9TJ still minus tubes. 9ELT got busy trying to get back inside the 40 band again. 9FW 99 still on high waves. 9US 97 reports QRW. 9DR and 9COP have the code very well learned, in fact all he can get he gets and “dah-dah-dah” without any “dit.” in between. 9ACF is still burning up 50 watts. 9BDN ran a race with 9BEZ for DX honors. 9BEZ also put over some mags. 9CZG is using DC on a 23. 9AKX is on with 100 watts.

TRAFFIC: 9IAU 92, 9BEG 4, 9AOT 42, 9BHH 16, 9AJW 35, 9CQW 16, 9DOV 15, 9DVA 16, 9AEO 8, 9AYK 8, 9ARA 8, 9BD 110, 9DVS 18, 9AID 2, 9HUR 2, 9BD 4, 9FK 4, 9BND 4, 9OCZ 46, 9EEZ 43, 9AAX 1, 9ACA 4.

KANSAS, Iowa and Nebraska (with the exception of Omaha) are very prompt with their reports this month, and the DM away attending the Board of Directors meeting at Hartford, too! Fine spirit of cooperation, boys! Thanks.

MISSOURI—The best report this month. Almost everyone reported! If gratitude was breakfast food, you would be up to your ears in oatmeal! 9DBH is the key station of the month. 9DKY’s honor goes to 9DXY. 9BKV takes Iowa’s honor.

KANSAS—Kansas City gang going strong. 9DBH reports many messages from Chile. Detroit, 9DBH has a kink to kill AC hum in capacity coupled sets by winding a Dry cell coil with No. 24 wire and grounding antenna through same. 9RXG reports working 2BCLc. 9CMY is having trouble getting 9AOU to the air. 9CZG is always one of the best stations. 9DXL is a new station in Butler. 9GK reports no details. 9CZC third. (IBKV’s schedules are working line. 9DIX reports QRW. 9AOB is working a tone. 9BNU is working a tone. 9CMY is listening to the gang. 9BEQ hopes to be 9CZG is still experimenting with antenna systems. 2BG has been having tube trouble, but is QSO the 2AOI with no trouble. 2C9X is using an antenna that would put any BCL to shame (not an inch over 22 feet high), yet there isn’t a QRM of BCLc. 9BNU is heard occasionally on the high man of Kansas this time. Nebraska’s honor may be on around the first of the month.

The following stations have been appointed ORS: 1LS. 1BAT, 1ALP, 1BBJ, 1AMZ, 1CDS, 1AMS. We welcome all newcomers, and hope they will work in some capacity. New stations still to be appointed. These stations have been cancelled for inactivity: 1MC, 1AEX.

The ORS appointments are on the increase. How about yours, OM? Any good station owner who handles traffic regularly and will report same, will be welcomed to the relay traffic conference.

NEW ENGLAND DIVISION R. F. Cushenberry, Manager.

THE Official Relay Stations are now reaching their stride in New England. We should stand the second best division in the United States and the second best division in the United States in the amount of traffic handled. If every ORS will originate ten messages each month, it is suggested by ADM, the number of messages will be a large number of stations are on. 9DRL and 9DBF were off for some time because of QRW of BCLc. 9BRN is heard occasionally on the 30, 40 and 80 bands. 9DIO has been on using AC on the plate, but has completed a new rectifier. 9AJJ and 9DUB are new ORS in Omaha. 9BYG reports no traffic, and his station is off. 9DR. 9HFG has been irregular due to QRW. 9DPS is inactive as far as traffic is concerned. 9AWS hands in a very good report. 9CJT is on regularly and maintaining one schedule.

TRAFFIC: 9DR 86, 9DUO 2, 9AJJ 11, 9BFG 107, 9BNU 8, 9BL-CDH 64, 9AWS 78, 9CJT 9, 9DXY 5. IOWA—Traffic honors are now going to 9C2K, and 9C2Z third. 9BKV’s schedules are working fine. 9DOA is second high man, and schedules are kept with 9DXT three days a week. 9CBS is on 80, and QRM is out of sight. 9BFP is again operating 9LC. 9BDH, the station of the HDQTS Troop 14th Cavalry at Ft. Des Moines, is getting lots of American DX. 9K3K says that 9DOA is on again with schedule and other stations may be on soon. 9DMS is on the air almost every morning from 15:30 to 2 am.

TRAFFIC: 9HK 12, 9DAU 74, 9AXQ 3, 9EFS 14, 9DOA 154, 9AXD 6, 9CS 3, 9AED 6, 9BOS 14, 9K3K 185, 9CZG 112, 9EKK 2, 9BH 38, 9DMS 32, 9BEK 5, 9GUS 22.

Q S T FOR APRIL, 1926
Dist. 2—IAAV reports terrible month, QRN power leaks, X-ray, bat chargers, punks "wax," storms and a few "250's." 1ALD has a "250" in the hands of the West Coast. 1SO worked 6BCC and handled 5 msgs. concerning the international tests. IFV is going around still. 1BNL rebuilt his set and sent plenty of space of power to the builders of 2600, FJ2 and 7AF building a new 10-watt set. 1JKQ and 1ASW have decided that two ops are better than one. 1IFQ, 1CLN and 1KAH have new sets and many good QSO's. Their totals are picking up since the fellows started keeping schedules.

Dist. 3—Bangor gained a flock of new stations this month. Altho no new ORS have been assigned, their efforts deserve comment here. 1UL using a 200 with 200x volts B-battery, "cooped" the Club trophy twice. 1ALK and 1LW are doing business. 1UW is limited to week-end operation on account of college. 1CDV is struggling with an old "250." 1AEK is trying to get his set going by picking up a "250." 1ATR is trying to get his set going on 40. 1AXN has a pet set going again on 40 meters. 1CLT is snowed under with college studies. 1ILQ has new four-foot antenna in the west coast. 1SO worked 6BCC and handled 5 msgs. concerning the international tests. IFV is going around still. 1BNL rebuilt his set and sent plenty of space of power to the builders of 2600, FJ2 and 7AF building a new 10-watt set. 1JKQ and 1ASW have decided that two ops are better than one. 1IFQ, 1CLN and 1KAH have new sets and many good QSO's. Their totals are picking up since the fellows started keeping schedules.

Dist. 4—During the last snow storm 1YC lost a 150-meter antenna. 1AIR is using a Hertz antenna. 1OGF follows two rules, but what they are he doesn't say. 1AYV handled the traffic. 1ALF has a good 20 and 80-meter work. Attention Brass Founder's! 1ABA with a UV-301A and 180 volts plate juice is curing himself with a "250". Oh, he'll be back with ns soon. 1RW will soon be on with his set going again on 40 meters. 1CTT is snowed under with college studies. 1ILQ has new four-foot antenna in the west coast. 1SO worked 6BCC and handled 5 msgs. concerning the international tests. IFV is going around still. 1BNL rebuilt his set and sent plenty of space of power to the builders of 2600, FJ2 and 7AF building a new 10-watt set. 1JKQ and 1ASW have decided that two ops are better than one. 1IFQ, 1CLN and 1KAH have new sets and many good QSO's. Their totals are picking up since the fellows started keeping schedules.
F.B. 1BIH who has his set at R. I. State college is going to handle a tackle for a gang that was snow-bound during one of the blizzards. IAWE using a UX-210, worked Italy and the Canal Zone. He now has an H-tube. 1PB is rebuilding. 1LD is getting a new "H"-tube. He is bringing old ex-OUT back into the service 1AB is hanging away as per usual. 1BI is using a "500" but can't get it to set out. 1AEL has not been on much due to rebuilding. He says FFL is light. Watervelt—Dist. 1—ICS is the only new ORS, using 2 "fivers" in the M. O. P. A. circuit. 1BVQ was on the sick list this month. The rectifier froze up and he lost 28 jars. 1,AP is doing good work. He is usual. 1HPB is "fivers" in the Pacific. Marlin, COO!, and Lincoln counties should report to the other stations but his "ow" makes him come home. 1WE is using 450 volts of DC on a "fiver." 1ALD is getting an "H"-tube. He is bringing old ex-OUT back into the service. 1AB is hanging away as per usual. 1BI is using a "500" but can't get it to set out. 1AEL has not been on much due to rebuilding. He says FFL is light. 

Traffic: 1BQD 18, 1BIE 3, 1BPB 10, 1ALD 15. 1GAB 7, 1CCB 1, 1BGR 16, 1AF 28, 1BBF 4, 1IB 24, 1ABF 36, 1BHH 9, 1BBO 9, 1BSE 57. 

NORTHWESTERN DIVISION 
Everett Kick, Mgr. 

THREE stations qualified for the Brass-Pounders' League. Only one will be mentioned for sending his complete dope for c.q. When your traffic totals go over 100 send them to the DM for recount if you want to be included in the Branch-Pounders League. Issued the past month were: 7OY, 7ABF, 7MP, 7MZ, 7NL, 7VL, 7AFN and 7FL. 

WASHINGTON—FD, ADM—7BB and 7VL passed the hundred mark but didn't send in messages for recount. "H" tubes are popular with the gang. 7NL, 7NG, 7GY and several others report "H" tubes working with varying results. Mail order report with local contact on 40 meters. 7NH, 7WQ, 7NG, 7AQD, 7OT, 7AFO and 7GB are among these. 7DC, 7G, 7GM, 7YJ and 7AEK are doing good "DX." 7NO, 7OT, 7OTY? 7NS, 7WA and others are busy with school work. 7TT is going to college next month. 7PM and Mason are keeping 7BH and 7UU, have gone north with the Wilkes Arctic Expedition. Get QSO gang! 7TU will be operated by John Waskie. 7NL is busy at Mason's Shop. 7AQA is an ORS and 7GB handles lot of traffic at WSC. 7UL is on with a "50." 7MZ, 7VL, 7CY, 7AFN, 7ABF, 7NL and 7MP are new ORS. 7ABF, 7TAQ, 7AM, 7G and 7TD have new equipment. 7IJ has a YL, 7BY, 7KO, 7OR and 7BO are coming along nicely. 7EK x 7ABB worked A, N, P and is busy with school work. 7SE is in getting reports thru on time. OM!'s 7MP is at Leavenworth. 7VN tried to remove the base from his "fiver." The pliers slipped 1!!! Moral: "Try again!" 7BT is on 7LFQ 42, 7TMZ 27, 7DF 30, 7TQ 29, 7CY 19, 7AFO 18, 7FQ 18, 7WQ 17, 7ABF 14, 7AG 14, 7TQ 14, 7SK 12, 7SG 9, 7VM 8, 7BO 4, 7TT 3, 7NL 2, 7VT 1, 7OY 1. 

OREGON—ADM, TT—Dist. 1—The active stations are 7AY, 7TAQ, 7E2J, 7VK, 7UG, 7TOZ and 7HBD. The star station is 7TU. 7AAJ is a close second. 7DJ did some notable DX. 7AAJ has two good "ops," Mr. and Mrs. 7AAJ. They know all the principal languages of the globe. Foreign countries need not be hesitant about calling 7AAJ. 7AY gets out WP. 7AYA did some notable DX. 7TAAJ and 7TUJ joined the 250 watter. 6CEG says only one more wire is needed for the 250 watter. 6BBJ and 6LM. SGU is the first station to report. He is going back to sea in a month or so. 7YA is breaking in a new staff of "ops." 

Traffic: 7JF 146, 7PJ 39, 7GW 14, 7TU 8, 7BTR 1, MONTANA—7NT, ADM—Butte loses 7GS and 7MX who both sold their transmitters. Sorry to see you go, OMs. 7PU was awarded the ADM prize QST subscription. (Hereafter this prize will not be awarded to any station with a smaller message total than fifty unless a lot of experimenting is done and a full report sent in.) He is going back to sea in a month or so. 7YA is breaking in a new staff of "ops." 

Traffic: 7JF 146, 7PJ 39, 7GW 14, 7TU 8, 7BTR 1. 

PACIFIC DIVISION (Northern Section) 
P. W. Dann, Mgr. 

DIST. 4—6CLD is very consistent and handled 100 messages this month. A-1 stations. 6D3 and 6CLD are keeping their end of the traffic game up. 6CLD is an oscillating crystal for his set. 6CLS-6ABD and 6CAI are keeping their end of the traffic game up. 6BYV did some weather report and Army test work and 6MM. 6NL has in charge the communication system while 6CSX is maintaining a regular schedule with Honolulu. The 6CLD has the pleasure of crossing the line back toward Point Barrow. They will have a medal; he converted two BCL's to hams. 6NX is in the service at present, but hopes to be included in the 6CLD group next month. He is going back to sea in a month or so. 6AY is breaking in a new staff of "ops."
working on third harmonie; he is QRM'd by power leaks. 6F8J, after tuning, did better DX. 6ANW is new OBS for Richmond. 6CUX, now on 80, using "The Popular Call" antenna. He is sending many messages. 6BQJ still QRW with BCL's. 6AON, the new OBS for San Francisco, is experimenting with the new OBS call. He is now putting up a real antenna and expects to do some traffic handling soon. 6VR is San Francisco's prize DC. CQ and he implies that 6CHG has nothing to put up his side of the "Jewell" miles-per-watt watch with a 301-A mixer.

AZONA—Stations in the state are active almost to exceptiona DX records have been made. School causes the most "QRM." 6BAH is going to use B battery supply. 6CWU and 6CAP are getting out well. 6BQJ is now DX of Erie. 6BQJ is still working regularly with real DC. 6B9J is also consistent. 6AAM is on now but needs a good receiver. 6BWS has had no success with low power but that may be due to the results he gets from a Grebe CR-5 on high waves. 6HPF is trying to make a fiver perk on 40. We received the report that 6ANO has been off most of the month on account of transmitter troubles. It is not found. Every effort is being made to locate this trouble.

Traffic: 6CQJ 247, 6CTN 97, 6AKW 15, 6CUX 35, 6CAP 16, 6ANO 36, 6VS 69, 6YD 28, 6AXK 4, 6CBJ 6, 6HQ 50, 6BW 30, 6DBA 21, 6BAS 20, 6BB 15, 6DAM 19, 6CUX 4, 6AXK 10, 6GWS 5, 6LA 6, 6BVY 7, 6BEV 8, 6BGG 16, 6BD 92, 6HZ 242, 6CTO 1, 6DAH 59, 6EH 11, 6DF 54, 6AHP 6, 6CDY 6, 6UBS 5, 6AJJ 17, 6BVR 24.

HAWAIIAN SECTION

R. A. Cantin, Mgr.

6AFF traffic report for the month shows that it is more than able to perform in an efficient manner and advertise the fact that you are on the air for traffic. In thirty-one days, 6AFF, worked all the U.S. territories, Australia, New Zealand, China, Philippines, India, Siam, Tahiti, and, Alaska.

Radio Club of Hawaii, Station 6BUC, did not do much traffic work during the month. They reported that the operators were kept busy acting on an "Interference Committee" formed by Major Dillon, Supervisor of Radio 6th District. Mr. Dillon was on one tour of inspection for this district; he was very interested talking at a public meeting for the radio fans. The amateurs came in for a word of praise when they told how the amateurs keep busy and continue experimenting with him to reduce interference to the BCL.

6AJL is back on the air again after being on the sick list. He worked 1BY direct and was reportedly as RX by 6B9J Argentine, 6CLD did good work for the month. Best DX worked 2AGS and 9th districts. Mid-term exams kept 6CST QRW hence very little operating on 40 and phone calls. 6AOJ, 6CHX 6, 6BAM 89, 6CCG 10, 6VX-WP 62, 6BSF 14, 6CMG 47, 6ALV 14, 6RJ 16, 6GWN 8, 6ALX 20, 6GAX 13, 6AHG 6. 6GQ reports lots ofDX in the family and too QRW for 6QX to handle, he manages to keep up the broadcasts. Look for sure as 6BRS were coming right ahead. One of the real old timers, 6DH, was off the list and a new one to the counties named. F. Lesheter, 635 52nd St., Oakland, Calif., CM for Oakland. Art Hart, 741 47th Ave., San Francisco. It is requested that all the fellows interested in Dist. 5 take note of the new personnel in order that the reports may go to the correct points.

Dist. 6—Hurrah! Adams has another OBS to add to his list and that's sure doing fine for the few situation admissions in the county. 6BAS is using a master oscillator and large territory which he has. 6SA is the new OBS for Richmond. GAPP wants traffic. 6BQJ is working smoothly. Many of the stations that have been inactive for a while are coming back and many DX records have been broken. All continents have been worked.


SOUTHERN SECTION

L. E. Smith, Mgr.

The new officials of the Southern Section the becoming accustomed to the "harmonie" and things are now running smoothly. Many of the stations that have been inactive for awhile are coming back and many DX records have been broken. All continents have been worked.

Dist. 1—How's this, boys? 6AJM has worked Holland, N-A11, with 38 watts input! 6IA is QSO Hol­land, N-A11, with only 15 watts input! 6CQJ is working on 40m. with tone on 80m. 6ZB still power leaks around, so is not on most. Much of the QSO's was from Tia Juana, so it may be better now. 6BQJ is working on third harmonic; he is QRM'd by power leaks, 6B9J, after tuning, did better DX. 6B9J still QRW with BCL's. 6B9J is now DX of Erie. 6B9J is still working regularly with real DC. 6B9J is also consistent. 6AAM is on now but needs a good receiver. 6BWS has had no success with low power but that may be due to the results he gets from a Grebe CR-5 on high waves. 6HPF is trying to make a fiver perk on 40. We received the report that 6ANO has been off most of the month on account of transmitter troubles. It is not found. Every effort is being made to locate this trouble.

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ROANOKE DIVISION

W. T. Gravely, Manager

WEST VIRGINIA—The lower portion of the state seems the most active in message reports, although the "Panhandle" reports the best DX worked. 6AJL, again this month, is doing a good job. He worked 6BCS, 6BUC 49, 6BAM 49, 6X1, 34, on 40, is very QRW. PRR traffic handled through Wheeling FB with 6AJL the star station. 6ALG, rebuilding for "44" tube, is working with Wheeling FB with 6AJL Virginia with his new call, 8IT. 3B9JX blew his fifty. 6BGJ reports 8A1A new station with three operators in Charleston. 6DOQ reports 8AEK west coast consistently. 6CRB, on 40, reports working foreigners. 8AMD, getting out PB and has a pure QSO note. Further reports are lower power and getting good results. Did the gang at 8AMD's goof? It is the picture of a hum and on the reverse side says "You are half-baked if you
don't ask me to be your Valentine!" The Huntington
gang have organized a regular ham radio club. 8CH
and 8CB are consumer and secretary. 8AG, of Pittsburgh, visited Wheeling several
times this month and made arrangements about the
PRR tests.
Traffic: 8AUL, 24; 8CDV, 6; 8ALC, 4; 8BXP, 4;
8MG, 11: 8ATG, 8; 8CRB, 29; 8DLO, 30: 8IT, 13;
8AYF, 24; 8CFL, 34; 8ADM, 63.

NORTHEASTERN DIVISION—The gang has worked out fine
on 40 and has worked 1-LAS. 8CH is handling lots
of traffic when he gets time to pound brushes. 4FY
will be back soon and is working 80 at a better
power level. 3KG is doing excellent work on 40. 4RV
has worked some for 20, but is back now, and a
new station in Charlotte uses a 7½ watt. 8QRK handles some traffic on 80. 4TJ's YL sure helps
him run up a traffic total.

Dist. 1—There is only one active station in this
district, 8CVA, although 8VRS has been requested to
be on the air. However, 8VRS has been living the
road as a salesman so at present does very little radio work.

8CDE—8FM was the only ORS to turn in a
report, but 8USB turned in a report. There seems to be no amateur radio stations in any other
part of the state. Several new stations are expected to become active in April 80 station is
just waiting for DeForest tubes. 8CRB bought out 6RM's transmitter and will be probably going full
blast with the 250 watt for the next month.

Traffic: 8FM 10; 8USB 18; 8STQ 61; 8RV 62;
8RM 28, 8CRB 12, 8ORS 19, 8CVA 50.

SOUTHEASTERN DIVISION
A. D. Trum, Mgr.

The amateurs of the Southeastern Division are
requested to send in to the DM pictures and articles
about their stations so that we may have some on certain from time to time and to actively
promote new stations. Several other stations are requested to send in for line for ORS. Communication
officials are requested to boost activity. We want
a team of hams in our district. Several amateurs are holding their own. Foreign DX is excellent. Porto
Ricos requests hams in this division to watch for
their signals so that they can connect more easily.

stylus—8QRA—8NM—8TJ—8BS—8LAC—833. Traffic figures have dropped just a bit. Dist. 3
leads the state with a total of 198 messages. 8ATP
of the same district has a total of 189 messages. 8SN 91 messages. 8YB at Auburn, Ala., comes second by
handling 82 messages.

Dist. 1—Birmingham shows little activity. 8AX
works out consistently on 40. He has been officially
appointed as an Army Station. 8VV holds forth when
school work lets up for a few hours. Several
professors are placing their new stations into line. 8ARJ
is working regularly with two H tubes. 8ACV can be
counted on for reliable communication with 8YB and
4UR.

Dist. 2—5AC handled most traffic this month. He
has a regular schedule with 99X in Panama. He
works with 8CT in Mexico City and has been heard. 5AR
in New Zealand. 8QK is getting about with a new "fifty". He worked 1-LBU and 6ZAC-NPN in Samoa. 5AR
has left the game for the present. His QSO's have
been cancelled accordingly. 5DL and 6QP are on again.

Dist. 3—Montgomery fellows are bound to keep in
the lead in general activity and traffic handled. We
had no traffic from this district with 8FM still holds to 80 meters, but is now using 40 meters too.
Our DM is out for new material and has renewed prospective has been slightly improved. Traffic
very nicely. He has been working Porto Rico consistently. 5DI left 5YB long enough (47 messages for a week) to get some traffic. He got 29 messages out of his system in a single week.
5DI is at 5YB and handling ARRL affairs there.

Dist. 4—A recent visit by the R. I. added several
new "ops" to the staff of 5YB. A "250" is being installed and great things are to be expected of these
fellows.

Traffic: 5AC, 22; 5AAD, 3; 5ADA, 35; 5AJP,
38; 5AEJ, 9; 5ATF, 51: 5AX, 12; 5DI, 29; 5QK, 7;
5QK, 7; 5QK, 7; 5QK, 7.

PORTO RICO—Every station in Porto Rico has already
linked with some foreign station. The thrill of these
QSO's keeps the hams interested. Foreign traffic
is a take the honors for foreign communication 48A takes the honors for foreign communications with 48Z close behind. 4RB and 4UR take third place. 4RB on OM! 4KT at his favorite.
Caribbean takes pride in offering dependable service to the mainland in real emergencies. 4RL has one operator at
college. His traffic has gone down some. 4DI has done
little work this month.

Traffic: 4SA, 12; 4EB, 19; 4KT, 2; 4JB, 7; 4RL,
6; 4UR, 1; 4UR, 1; 4UR, 1; 4UR, 1; 4UR, 1.

The DM wishes to express that the hams in Porto Rico are a fine lot. We are proud of the way they handle traffic and their contacts.

SOUTHEASTERN DIVISION
A. D. Trum, Mgr.

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Traffic: 4SA, 12; 4EB, 19; 4KT, 2; 4JB, 7; 4RL,
6; 4UR, 1; 4UR, 1; 4UR, 1; 4UR, 1; 4UR, 1.
Traffic: 4IT, 70; 4VQ, 134; 4JW, 44; 4MV, 155; 4AAJ, 9; 4RRL, 20.

GEORGIA—Georgia hams are doing fine work.

Traffic: 500; 4JL1 works from the Augusta section.

NORTHERN TEXAS—The ADM calls attention to the fact that the wavelength violators are being brought to account.

Traffic: 500; 5GL1, 5KAH, 5AJ, 5ATC, 5VN.

OHIO—The ADM is glad to note that the Ohio stations are keeping the weather closed.

Traffic: 500; 5ARO, 5AT, 5AJ, 5AA, 5AT, 5AF, 5AG, 5AGW, 5AV, 5MV, 5AHD, 5AV, 5A.

SOUTHERN TEXAS—The month has been uneventful.

Traffic: 500; 5AKA, 5ATC, 5AV, 5MV, 5AHD, 5AV, 5A.

ONTARIO AMATEURS CONDUCT TESTS FOR HYDRO-ELECTRIC COMMISSION ON SHORT WAVE WAVES.

Traffic: 500; 5JAC, 5AK, 5AV, 5MV, 5AHD, 5AV, 5A.

ONTARIO DIVISION

W. J. Sloan, Manager

ONTARIO AMATEURS CONDUCT TESTS FOR HYDRO-ELECTRIC COMMISSION ON SHORT WAVE WAVES.

Traffic: 500; 5JAC, 5AK, 5AV, 5MV, 5AHD, 5AV, 5A.

SOUTHERN TEXAS—The month has been uneventful. Many of our stations are rebuilding. The amateur is never quite satisfied with what he has, but he is ever striving for something better. 5ASD has been in the hospital. 5ARX is a new Cushing station. 5ARX lost another mast. 5AJ has been using a single UV20S. 5SW is heard in Australia. 5ATK, 4KK sez that he is doing fine work and 4AAM, however, all Florida stations are requested to report their mode.

Traffic: 500; 5ATC, 5AV, 5MV, 5AHD, 5AV, 5A.

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Traffic: 500; 5ATC, 5AV, 5MV, 5AHD, 5AV, 5A.

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Traffic: 500; 5ATC, 5AV, 5MV, 5AHD, 5AV, 5A.
radio weather has been fierce, schedule have been kept with Toronto, with the result 3NI again is found in the Brass Pounders League. At the request of the Hydro-Electric Power Commission, 3NI transferred his equipment to Cameron Falls, where tests were conducted with 9AL and 9BJ in Toronto. 3NI's other op, "AB" and SHP went into the wilds of Ontario. 3KA Is an OWLS and Is right on the job with his still car, carrying on picture transmission work with signa around this little old continent, but continues to do good work conducted with 9AL and 9BJ in Toronto. SNI's Thomas, SABG and SIA has been bothered eoneiderably by BCL's lately. They everything bearable, and is on the air with two for plate supply. 1!DO bas returned home and is in the Brau Pounder's League.

SOUTHERN ONTARIO: J. A. Varey, ADM—3DI continues to do good work an all waves from 80 down, and this month hands in the best total for this division. 3KA is an OWLS and right in the job with the "fifty-two-point-tivers." 3KF still pushes R6 signs around this little old continent, but seems to prefer the "hoy" to the real DX. 3KG clicks with GYOR. 3GY reports things slow in London. No report from Sarnia, but old 8XI has been heard working almost every foreigner going. The Southern Ontario Division has reason to be proud of him. At St. Thomas, 3ABG and 3IA are heard occasionally. Why no report, OM's 3ZQ JRW filter and new gutter-antenna.

CENTRAL ONTARIO: A. R. Williams, ADM—3AZ has been bothered considerably by BCL's lately. They are just beginning to connect the light in his area with the ether-buster below. However, he is still carrying on picture transmission work with 8BR. This latter station now has a new 250 watt lantern plant. 8BA is busy conducting 24 hour tests with 2NI, and is conducting schedules with 1DJ, 3DH, 3NI and 4CB. 3MR is the local DX reception bound. He hears everything hearable, and is on the air with two battery-powered low power WE tubes. Toronto boasts that traffic is somewhat scarce, as this wave is NG for short distance, and 3KD is working all day. 4DF is working on 40 and 52 and handled a bunch of traffic for the Pine-to-Palma tourists. 4DS is on 40 most of the time using low power transmission. 4EA has little time for radio. 4FZ, the old 8SA, tries hard to get EA on the air but without much luck so far. 4AW is going strong on 88 and 30. 4DF is in at present transmits and controls. 4EH has difficulty in getting a good antenna in his poor location. 4DW is trying hard to find the waffle in his note. 4CH; 4DF is still on. 4AR is very QRW with school work. 4DJ is a new station operated by "Bill" Duffield. 4DB reports increased activity in this district.

Traffic: 4AW 7, 4DY 8, 4DE 25, 4DW 8, 4EA-4FP 4, 4DF 4, 4GC 6.

SASKATCHEWAN—The gang in this district have been going strong this month. 7BO is on the air with the ether-buster below. However, he is still carrying on picture transmission work with 8BO. This latter station now has a new 250 watt lantern plant. 8BN, a new station in the gang. No report from "aussie-land." SBN, a new station in the gang. However, he is keeping in with the QRM's and is on the air with two battery-operated low power WE tubes. Toronto boasts that traffic is somewhat scarce, as this wave is NG for short distance. 7BO is working all day. 4DF is working on 40 and 52 and handled a bunch of traffic for the Pine-to-Palma tourists. 4DS is on 40 most of the time using low power transmission. 4EA has little time for radio. 4FZ, the old 8SA, tries hard to get EA on the air but without much luck so far. 4AW is going strong on 88 and 30. 4DF is in at present transmits and controls. 4EH has difficulty in getting a good antenna in his poor location. 4DW is trying hard to find the waffle in his note. 4CH; 4DF is still on. 4AR is very QRW with school work. 4DJ is a new station operated by "Bill" Duffield. 4DB reports increased activity in this district.

Quebec Division
Alex Reid, Manager

2BE, 2BG, 2AX, 2AL, 2CB, 2AU have been hammering at DX of late. 2AX worked 11 different foreigners in 4 days. 2CG has been off the air. 2BT is coming to life again and has his twenty watts working on 40. The DM, J. V. Argyile, resigned his position due to his feeling that he was unable to give the time nor the facilities for having the office with the effectiveness it deserves. 2BE, Radio Inspector and President of the local BCB club, was elected to succeed 2CG as DM. All ORS and other appointments have been automatically cancelled as from Feb. 28th and Mr. A. Reid will appoint good hams to all these offices as quickly as possible. Send your applications in to him.

A wish to thank the boys who have so ably assisted me during two years as DM and to ask that at least as much backing be given to Alec Reid, so that he can get more work into the Division. Cheerio, gang and 73 to all—J. V. A.

Van-Alta Division
A. H. Amsussen, Manager

The BCL's are now in the same frame of mind as the Hams; i.e. DX conditions are the BUNK. Vancouver and Calgary report very bad power leak QRMs. The new six-weeks-old BCL in Calgary now has three hundred strong, have used the facilities for better conditions in the near future. The new DX appointments are 5GT, 5BM, 4CL and the old stand-by, 4IO; now that we are all set, "let's go" and remember gang this space is too valuable to be used as a "Casualty List" for the benefit of the Dead Ones. 5GO heads the list for Vancouver in traffic, and DX having worked Bs and Ch. 5BM qualifies for the 2BE job by working HusAFF with one VT 2 and hopes to be a Com. opr. soon. 5AN has a schedule with Doc Sawbones at the local hospital but hopes he has a big traffic total next month. 5HS still moving to a new shack. 5CR is doing good work with a fifty. 5GF makes the old heap perk despite bad power QRMs. 5HP is a new station QRM. 5DE is doing good work on low power. 5BJ is now R. I. attention, gang! 5HK rebuilt xmitter but thinks the old pile-o-junk was best. 5AS is stepping, having had the facilities for holding the office with the effectiveness it deserves. 2BE, Radio Inspector and President of the local BCB club, was elected to succeed 2CG as DM. All ORS and other appointments have been automatically cancelled as from Feb. 28th and Mr. A. Reid will appoint good hams to all these offices as quickly as possible. Send your applications in to him.

A wish to thank the boys who have so ably assisted me during two years as DM and to ask that at least as much backing be given to Alec Reid, so that he can get more work into the Division. Cheerio, gang and 73 to all—J. V. A.