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An important contribution to amateur radio is occurring in Chicago this year. A large group of local amateurs representing all the affiliated clubs in the vicinity, under the chairmanship of Section Communications Manager Fred J. Hinds, is making a monumental effort to display amateur radio to the visitors at A Century of Progress. Crack stations on c.w. and 'phone are in operation for the public to see, and local 5-meter tenders constantly on hand to tell the visiting amateurs about amateur radio. For visiting amateurs there is a club room in which to meet the gang and chew the sock, an opportunity to see what will doubtless be this year's most famous amateur stations, and during August a bang-up exhibit of manufactured amateur apparatus, an exhibit of this exhibit, the convention, and the fair itself open-house for the visiting ham! It is truly a no-display amateur radio to the public and to hold on to committees to stage an ordinary convention of real hard work. Those of you who have served communication as well. There is a comprehensive display amateur radio to the visitors at the World's Fair, and we may expect some such amendments to be announced in the near future, possibly at the same time as the changes in the licensing procedure.

We expect that in the near future there will be some interesting changes in amateur regulations. The Commission is contemplating inaugurating the long-obvious economy of combining amateur station and operator licensing, as we have long urged. This was impossible when these functions were in the hands of separate establishments, with the licenses issued each with no particular respect to the other. Now it is only logical that they be combined, with a single application form, a single examination, and a single resulting document that not only attests the authority of the holder to maintain an amateur station but also authorizes him to operate it or any other amateur station. From our standpoint the plan will have much to recommend it. For the average amateur it is absurd to have these interdependent licenses expiring at different times with the constant annoyance of new applications to file, "affirmative showings" to make, and so on. The single three-year document, which A.R.R.L. proposed to the Commission some time ago, should make an immense saving of time and administrative effort for the government, of time and annoyance for the amateur.

League officials have been in close touch with the administration during the development of these plans. It is too early to outline them in detail but we may expect in them no lowering of the standards of amateur radio; rather, improvement should result. Although every branch of the government is trying these days to simplify procedure and save money, the League knows that any dropping of the bars would work serious injury upon amateur radio. We stand for the personal examination of applicants, the passing of an honest test of qualifications, demonstration of code knowledge by every amateur, enforcement of reasonable regulations.

With so many of us on the air, there is nothing else to it: we must have a reasonably high standard. Things are looking up a bit in that respect. We believe that prospects are now excellent for a somewhat more rigid examination of qualifications than we have had in the past and for some visible cooperation from the government in the policing of our bands against flagrant abuses.

It may also be said that the Commission views with favor the A.R.R.L. Board's proposal for opening some more territory to 'phone and for modifying the regulations governing plate supplies, and we may expect some such amendments to be announced in the near future, possibly at the same time as the changes in the licensing procedure.

It is altogether likely that, when we get new licensing regulations, they will provide that every licensed amateur is automatically authorized to operate a portable station under the same call as his normal station, complying only with some simple rules when in the field. We have made an interesting discovery. There are something like 37,000 amateur station licenses in existence in the United States now. Of these, approximately 10,000 are for portable stations! The answer, of course, is 50-megacycle work. We knew there was immense interest in 5-meter experimentation but we had no idea it reached these tremendous proportions. Our perplexity that membership in our League was not growing as rapidly as the list of licensed stations is now answered and offset by the great pride we can take in this demonstration of the way amateurs tackle a new field. It's a healthy sign and shows that we are continuing to live up to our traditions. Certainly we ought to get somewhere this summer in 5-meter work with 10,000 portable licenses in existence!

August, 1933
From the government's standpoint these separate licenses for portables are sheer duplication of administrative work. Since an amateur ticket does not license specific equipment but only authorizes the holder to do certain things in return for his assumption of responsibility and demonstration of ability, there is no good reason for not combining the right to have a portable with the license for a permanent amateur station. A simple rule for identifying the transmissions of the portable station in fact makes possible the simultaneous operation of a portable and a permanent station under the same call, perhaps indeed communicating with each other. We are all in favor of this simplification. A.R.R.L., for years has preached at Washington the principle that an amateur applicant ought to be adequately tested as to his capabilities, made to assume full responsibility under law and regulations, and then given blanket authorization to do everything permitted an amateur without any stipulations of apparatus and with a minimum of procedural red tape. The right to operate a portable station, provided only certain special rules are complied with, ought to be included.

Because the Commission has not had the funds and personnel to examine the holders of temporary amateur operator licenses within the one-year life of such ticket, they have again had to resume the practice of renewing temporary pending examination. Although our League believes that the "temporary" is much abused and that many a punk is hiding behind a temporary who ought to be ferreted out and either made to qualify or get off the air (and we have campaigned to that effect for several years), we have recently been obliged to defend the other side of the fence and say to the Commission that if they are unable to provide examinations within a hundred miles of the holder during the life of his license, they must renew it. Otherwise many a deserving amateur would be driven from the air through no fault of his own.

We also discovered that some of the inspectors were telling applicants for temporaries that they were not entitled to them because a little later in the summer, say in the next three or four months, there was going to be an examination within a hundred miles and the applicant could then appear — in the meantime doing without. As a result of our pointing this out at Washington, a 30-day limit has been placed on this practice. That is to say, if there is to be an examination within 100 miles of the applicant within the ensuing month, he is told to wait and appear for examination; otherwise, he is eligible for his temporary.

In addition to QST and the Handbook the League has produced this year a couple of booklets which we believe will be found most instructive and valuable. We intend before the year is out to produce a few more in a series which is now getting sufficiently extensive to be called a "Radio Amateur's Library." One of the important functions of A.R.R.L. is to make absolutely-reliable information available to its members at nominal cost. In preparing these booklets it will be our policy to select subjects upon which further light is badly needed, to give them complete treatment to an extent impossible in the pages of QST or the Handbook, and to sell them at nominal prices. We hope that you, the gang, will find them well worth while and by your support make possible the continuation of the series.

K. B. W.

Message Reception Solution

One of the six stations (W7DEF, W8GHI, W6ABC, W9JKL, W5MNO, W7PQR) received the message. They will be listed and all but one eliminated.

The message was received at 10.01 A.M., since the problem states that it was received while W5MNO had the curtain down to keep the sun out of his eyes. Therefore, since W7DEF worked every day in a shoe store, he could not have received the message. That eliminates W7DEF.

W8GHI was only on the air from 9 to 11 P.M. every night, therefore he could not have received the message from W7DEF because the message was sent in the daytime. That eliminates W8GHI.

The message was sent at 10 o'clock and received at 10.01, a total elapsed time of one minute, or a speed of 30 words per minute. Since W6ABC couldn't copy over 15 words per minute, the speed of the message eliminates him.

W9JKL was near sighted, therefore he couldn't have noted the time across a room. That eliminates him.

W5MNO was in bed eating crackers; so he couldn't have received the message.

The remaining station, W7PQR, received the message because he was out of a job and could be on the air at the proper time with no restrictions to prevent him from doing the receiving.

For Our Foreign Readers

To those of you who use the British Pound Sterling as a basis of remittance, we are glad to report that, as not for many months past, the rate of exchange covering remittance to the United States is again favorable. As we go to press with this issue of QST, the pound is practically at par at $4.86. We believe that this will be good news to our many prospective new members, and particularly to those who have let their A.R.R.L. membership-QST subscription lapse because of the then-existing exchange ratio.
A Simple 1750-Kc. Auxiliary Transmitter

A Set for Old-Timer and Novice Alike

By George Grammer, Assistant Technical Editor

ALTHOUGH the impression seems to be prevalent, that simple little 1750-kc. transmitters are intended solely for beginners, they have their place in the Old Timer's scheme of things, too. There are times when the chase for bigger and better DX begins to pall, when the vagaries of transmission conditions in our long-distance bands become tiresome; times, in fact, when it would be a distinct relief to sit down to the set knowing that the hurry and bustle and QRM would be absent and a CQ would bring an answer from some one — perhaps but a few miles away, perhaps a hundred — who would have the time and the inclination to do a little rag-chewing. In other words, there occasionally comes over most hams a desire for peaceful companionship, far removed from the strain of battling in the noisy traffic of our more populous bands. To confirmed c.w. men who own no microphones and have no wish to sit in the high places customary for satisfactory five-meter work, there is only one possible answer — the 1750-kc. band. The c.w. territory in that band offers just the right atmosphere.

No doubt the reason why there is less c.w. utilization of the 1750-kc. band is that most amateurs build their transmitters for maximum effectiveness on the higher frequencies. Crystal sets usually start out with 3500-kc. crystals, and it is a nuisance to provide additional coils and change them for occasional 1750-kc. operation — besides, another crystal would be needed. Self-excited transmitters for the higher frequencies usually have tank coils made of copper tubing, which material, if used for 1750-kc. coils, becomes cumbersome. Most of the bother can be avoided by building a separate low-power set for 1750 kc. only. Since tubes and parts are inexpensive — and comparatively few parts are needed — the cost will impose little strain on any pocketbook. The set can be fed from the regular transmitter's power supply.

A suggestion for a simple "auxiliary" 1750-kc. transmitter is shown in the photographs. The circuit, a chokeless push-pull Hartley with series plate feed, is given in Fig. 1. Although not at all difficult to build and operate, the set has an output of about 20 watts and, with a well-filtered power supply, gives a note which should satisfy the most exacting. One of the features of the design is that no adjustments need be made to the oscillator; the circuit values have been chosen so that the tubes are properly excited and operate efficiently. There are only two tuning adjustments to be made — oscillator frequency and antenna coupling. Furthermore, the transmitter will operate nicely if one tube is removed; in that case it becomes merely a series-fed Hartley oscillator. The output power will be reduced under those conditions, of course.

HOW TO BUILD IT

The baseboard on which this particular oscillator has been laid out measures nine inches wide by ten inches deep. The tuning condenser, a Cardwell Type 123-B, is set at the front center, mounted on a pair of small metal angles. Immediately behind the condenser is the tank coil, which is bolted to a pair of small porcelain stand-off insulators (the No. 22 size made by E. F. Johnson) suitably spaced on the baseboard. The coil is wound on bakelite tubing and has 22 turns of No. 12 enamelled wire, the turns being spaced out with heavy string to make the total length of the winding 2¼ inches. The ends of the coil are held in place by short machine screws passing through holes in the tubing. After the coil is finished it should be given a coat of clear lacquer or collodion to keep out moisture.

The stand-off insulators on which the tank coil mounts are also pressed into service as terminals for the tank connections (short pieces of copper strip inside the tank coil connect the ends of $L_1$ to the insulator studs) and as part of the supports for the grid condensers, $C_2$ and $C_4$. The ends of these condensers facing the rear edge of the board
also are supported on small stand-off insulators so that the condensers are held firmly in place and cannot vibrate. The plate by-pass condenser, $C_b$, is fastened to the baseboard by wood screws and is midway between the two grid condensers. The two grid leaks, $R_2$ and $R_5$, have their pigtails clipped short and are soldered in place between the rear terminals of $C_2$ and $C_4$ and the rear terminal of $C_3$. From this point a wire goes directly to the center-tap resistor, $R_1$, and thence to a clip connector on the rear edge of the baseboard. A plan view photograph shows these connections perhaps more clearly than they can be described.

The connections from the plate terminals of the tube socket to the ends of the tank coil are crossed over as shown in the photograph. To keep the wiring from getting too "bunched up" it is well to put the tube sockets in the positions indicated. In other respects it is hardly likely that differences in lengths of leads which theoretically should be balanced will have any appreciable effect on the operation of the oscillator, particularly at this comparatively low frequency. The filament connections have been kept at the rear in this layout so the wiring will be separated from the r.f. circuits. The positive plate voltage terminal is connected to the center of the tank coil and the front terminal of $C_2$ by a wire which runs under the baseboard. The "minus-B-key" terminal is not connected to anything in the set; it is there simply for convenience in making the external connections.

The remaining point of interest in the transmitter is the method of coupling to the antenna. Variable coupling is secured by sliding a coil of small diameter in and out of the tank coil—

![Diagram](image)

**FIG. 1 — THE PUSH-PULL SERIES FEED HARTLEY CIRCUIT USED IN THE 1750-KC. TRANSMITTER**

$C_1$ — 500-$\mu\mu$fd. variable condenser (Cardwell 123-B). $C_2$ — .002-$\mu\mu$fd. mica condenser (Aerovox Type 1450). $C_3$ — .00001-$\mu\mu$fd. mica condensers (Aerovox Type 1450). $C_4$ — 250-500-$\mu\mu$fd. variable condenser, any type. $R_1$ — 20-ohm center-tapped resistor.

If the coil specifications have been followed exactly and the same type of tuning condenser is used, the 1750-kc. band will be found in the vicinity of 75 percent of the full capacity of the condenser. In any case, however, it will be necessary to check the frequency by means of a calibrated monitor or frequency meter. The first step in the tuning process is to set the frequency inside the band with the antenna coupling very loose; that is, with the coupling coil pulled out as far as it will go. The rest of the procedure is simply a matter of tuning the antenna system to resonance and determining the degree of coupling which gives the greatest power output with good frequency stability. The tuning method will of course depend upon the antenna system in use.

If one has a regular 3500-kc. Zepp antenna, the length of which ordinarily will be between 125 and 132 feet, provided the feeders are not more than a half-wave long (approximately 65 feet) the two feeders may be tied together at the station end and connected to a tuning condenser, $C_b$, having a maximum capacity of 250 to 350 $\mu\mu$fd. One of the regular feeder condensers will

**TUNING**

![Image](image)

**THIS VIEW SHOWS SOME OF THE LAYOUT DETAILS**

The construction of the antenna coupling coil and its dowel mounting also is shown.

a method reminiscent of the loose-couplers of long ago. The coupling coil is wound at one end of a piece of bakelite tubing which is bolted to a half-inch wooden dowel arranged to slide back and forth in clamps made of half-inch-wide brass strip. Towel rod clamps would do nicely for this job. The clamps are mounted on somewhat larger porcelain stand-off insulators which also serve as the antenna and ground terminals, being connected to the ends of the coupling coil by short pieces of flexible wire. Note that to secure maximum variation in antenna coupling $L_1$ should not be in the center of the sliding system but must be set off at one end as in the photograph.
do. The rest of the circuit will look like the antenna circuit in Fig. 1, with one end of Lg connected to ground—a cold water pipe, preferably. A radio-frequency ammeter or small auto headlight bulb can be inserted in the ground lead at "X" to indicate maximum current.

Alternatively, a second wire approximately 120 feet long may be substituted for the ground connection, with perhaps better results, especially if it is difficult to secure a low-resistance ground. If the regular antenna is not a full 3600-ke. Zepp, it may be necessary to use a different method of tuning. In that case the essential thing is to be sure that the total length of wire used (feeders tied together count as one wire) should be about 125 feet, including the length of the ground lead. If this condition can be fulfilled series tuning can be used just as shown in Fig. 1. If the total length of wire is less than 125 feet, however, it may be necessary to cut out the tuning condenser and tune the system by means of a tapped coil which replaces \( C_s \), thus raising the fundamental wavelength of the system. As a general rule it will not be difficult to arrive at a combination which can be tuned to resonance with the oscillator.

While adjusting the coupling and antenna tuning for maximum antenna current a constant check should be kept on the frequency and the note. Tightening up the coupling is likely to affect the constants of the oscillator circuit to an extent sufficient to shift the frequency considerably, and \( C_1 \) should be readjusted should this occur. The coupling should not be too tight because a swinging antenna will cause the frequency to waver and make the signal difficult to read. The monitor will tell very accurately just how far one can go in taking power from the transmitter.

![FIG. 2 — SUGGESTED POWER SUPPLY CIRCUIT](image)

It is helpful to have a milliammeter in the plate lead so the plate current can be read. If the oscillator has been built according to instructions, the plate current with the antenna disconnected will be about 20 milliamperes with 400 volts or so on the plate; with the antenna coupled the plate current should rise to 80 or 100 mils.

**FOLLOW THE SPECIFICATIONS**

It should be borne in mind that the circuit specifications given in Fig. 1 have been worked out for Type 45 tubes and they should be followed exactly if the set is to work well. The grid-coupling-condenser and grid-leak sizes have been determined experimentally to give the right amount of excitation and the right operating grid bias. Tubes with different characteristics than those of 45's will not necessarily work with the same values. Type 10 tubes, for instance, would require lower-resistance grid leaks, and this in turn might mean that grid r.f. chokes would be needed to prevent undue loss of excitation in heating of the leak resistors. Use the 45's.

It might also be mentioned that the design of this transmitter is not especially well adapted to quick band-changing, nor is it certain that the same grid condenser values would work well on higher-frequency bands. As pointed out in the beginning, the set is an easy-to-build and inexpensive outfit to be used as an auxiliary transmitter or perhaps as a "first" set for a beginner who wants to get started on 1750 kc. Other designs, already described in *QST* and in the *Handbook*, are better adapted to high-frequency work.

**POWER SUPPLY**

A final word about power supply should be in order. Any well-filtered supply capable of delivering 100 milliamperes at 350 to 400 volts will be satisfactory. It should not be much greater than 400 volts because the operation of the tubes is likely to become unstable. Good regulation is an advantage. If the regular transmitter power supply voltage is too high—generally the supply for the oscillator and buffer stages in a transmitter will do a good job—a power supply may be made quite cheaply from broadcast receiver parts. Fig. 2 shows the wiring of a typical power supply which will be entirely adequate.

Since it's easy to do, why not give 1750 kc. a buzz occasionally? Get acquainted with a new bunch of fellows—it's worth while. And, looking at the thing from another angle, it may actually be necessary to have a 1750-kc. set this coming fall and winter for traffic handling over moderate distances when the peak of the sun-spot cycle washes out "local" work at night on the 8500-ke. band.

**Northwestern Division Convention**

Hotel Imperial, Portland, Ore.,
August 18th-19th

Sponsored by the Rose City Amateur Radio Club the convention this year has been prepared with the idea of giving full value to those attending with a good program from beginning to end. The fee is $4.00; ladies, $2.00. Write to R. C. Ripke, Secretary, Room 615, Imperial Hotel, Portland, Oregon, for further information.
THE practically universal acceptance within the last year of the superheterodyne type receiver as the standard for amateur work represents a new phase in amateur communication. The regenerative autodynes even when they are tuned radio-frequency receivers have, more or less, outgrown their usefulness. Present conditions demand the receiver which combines ease of operation, high sensitivity, a high order of stability and, above all, selectivity. The superheterodyne fills these requirements admirably, indeed so much better than our "pets" of yesterday that comparison is out of the question.

When the receiver about to be described was in the process of design, it was decided to see just how inexpensive a band-pass superhet could be made without sacrificing, in any way, the desirable features mentioned above. Several receivers were assembled using the more promising variations in circuit design. A final model was then built combining the most desirable features and at the same time those parts were omitted which were found to contribute nothing to the ultimate performance. The result is a receiver whose cost is surprisingly low and whose performance is of a really high order.

Essentially it is a compact, single-dial control superheterodyne for both 'phone and c.w. that makes six tubes do the work of eight and incorporates a pre-selector to minimize r.f. image interference. Built around the 2A7 tube, it employs this new pentagrid as combined oscillator-first detector, 58's in its two-stage i.f. stages, another pentagrid as combined second detector-beat oscillator, a pentode power output tube and a power supply rectifier. Another departure from the conventional is the elimination of the familiar plug-in coils. A switching arrangement allows the user to listen back and forth on two bands at will by the mere flip of a knob on the panel. The inclusion of more than two bands in such a receiver was felt to be unwarranted in view of the almost universal habit of one- or two-band operation in the average station and the additional cost and complication which would be inevitable with switching to cover everything with band-spread tuning. Provision could be made, however, for a switching arrangement to cover a greater number of bands or even for complete coverage from 15 to 200 meters.

THE HIGH-FREQUENCY CIRCUITS

The carrier circuit, that portion of a superheterodyne receiver which is tuned to the frequency of the desired incoming signal, is unique in design in that the antenna, pre-selector and first-detector coils for the two bands are all wound on the same form. The antenna coil is located at the center with a pre-selector winding (one for each band) on either side of it, and the corresponding first-detector coils placed near the extremities of the coil form. In other words, the pre-selector coil for each band is between the antenna coil and the first-detector coil.

The pre-selector circuit may be understood by reference to Fig. 1. At "A" is shown the conventional r.f. amplifier ahead of the first detector circuit. That portion of its circuit shown by

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1 A logical suggestion is that the two-band switching be combined with plug-in coils as a compromise between the nuisance of straight plug-in coils and the complication and inflexibility of completely built-in coil switching. Each set of plug-in coils could cover two neighboring bands, for instance. — Editor.
the light lines has been dispensed with in this receiver and the remaining coil and condenser combination or "pre-selector" circuit electromagnetically coupled to the antenna coil on one side and to the first detector coil on the other side, as shown at "B." It performs similarly in both arrangements, the difference being that instead of a gain in the r.f. amplifier tube being realized, some loss is introduced by the preselector circuit. This is not actually detrimental to the overall sensitivity because of the tremendous amplification available in the high-gain i.f. amplifier. The same improvement in the selectivity of the receiver is thus secured with a saving of a tube and its associated equipment.

The coils are wound on a three-inch length of one-inch outside diameter Bakelite tubing that is long enough to leave room for a mounting bracket. The tubing should be heavy walled (about 1/16 inch) to provide a rugged form which is reasonably free from distortion and shrinkage. As seen from the photographs, the antenna-pre-selector-first detector or input coil is mounted just to the right of the three-gang variable condenser and directly over the band selecting switch. This location is important in that it provides for the shortest leads and more or less isolates these circuits.

The oscillator coil is somewhat similar in design to the input coil, the tickler being wound in the center with a grid coil on each side, on a two-inch length of one-inch diameter Bakelite tubing. It is mounted under the chassis directly beneath the variable condenser and opposite the 2A7 detector-oscillator tube socket. It is important, also, that leads from this coil be kept short as undue coupling to other circuits would be likely to spoil the effect of the desired electron coupling provided in the 2A7 tube.

Care should be taken in arranging the circuit particularly with the output plate and oscillator anode leads of the 2A7. Excessive coupling between these leads is quite detrimental to the operation and performance of the tube.

Reference should be made to the sketches of the coils, Fig. 2, and to the complete circuit diagram, Fig. 3, for information as to the number of turns and spacing between coils. In these sketches, the coils shown are for the 1750-kc. and 3500-kc. bands. Other bands would be spaced on the coil form at the same distances as shown, only the number of turns being changed. The starts and finishes of these windings are brought from right front to rear are, in order, the first i.f. transformer, the first i.f. tube socket and second i.f. transformer. To the left of the last are the second i.f. tube socket, second i.f. transformer, pentagrid second detector socket and pentode audio socket. Immediately in front of the second detector socket is the i.f. transformer that furnishes the c.w. beat oscillator tuned circuit. The rectifier socket is to the left of this, with the power transformer front left.

August, 1933

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through small holes in the tubing and terminate in lugs at the bottom of the form. All coils are close wound except for a 3/32-inch gap left in each of the pre-selector and first detector windings and the oscillator secondaries, to permit adjusting the inductance as will be explained later. The gap is made in the coil by winding on a few turns, then leaving a space of 3/32-inch, and continuing the winding. No. 32 enameled wire is used for all coils.

A

FIG. 2—CONSTRUCTIONAL DETAILS FOR THE CARRIER-FREQUENCY AND OSCILLATOR COILS FOR TWO BANDS

Those for other band combinations would be similar.

The variable condenser is a remodeled three-gang broadcast type condenser of the midget variety and is very rugged in construction. All but one stator plate in each section were removed, making a three-gang, three-plate condenser, the individual maximum capacities of which are approximately 30 µfd. None of the rotor plates was removed since this would tend to make the rotor assembly less rigid and therefore likely to lose its alignment. A condenser with built-in trimmers should preferably be used, that type of trimmer being generally well constructed. Each section of the variable condenser is shunted with a 25-µfd. moulded mica type condenser soldered directly to convenient lugs. These condensers are used for band-spreading and therefore should be made from first grade selected ruby mica; the cheap variety is likely to change in value with varying atmospheric conditions.

THE 2A7

This completes the frequency conversion portion of the receiver except for the 2A7 tube. This tube has only recently come into general use. Its principle is not entirely new, but a word about its construction and operation might not be amiss. Briefly, it is an electron-coupled oscillator and first detector combined in one envelope. The oscillator portion of the tube is quite similar to the conventional triode, comprising a cathode, control grid and a grid-like structure which is the plate or anode. The associated circuits are quite the same as those used with an ordinary triode oscillator. When in an oscillating condition, a cloud of negative electrons forms near the oscillator plate and constitutes a "virtual cathode" for the detector portion which is like the ordinary screen-grid tube and is composed of a control grid, screen grid and plate, all surrounding the oscillator portion. The electrons in the negative cloud are attracted to the highly positive detector output plate but are controlled by its grid on which is impressed the incoming signal, thus effecting the desired modulation.

In connection with the use of the tube several values of recommended operating voltages are listed herewith and the group corresponding to the voltage of the power supply used should be adhered to as nearly as possible. Improper voltage proportion is likely to reduce the conversion gain and in some cases cause instability. Particular note should be taken of the oscillation of the plate circuit, 250 v. to 260 v. and the plate screen (Osc. anode) circuit, 100 v. to 150 v. Proper voltage proportion is likely to reduce the conversion gain and in some cases cause instability.

THE UNDER SIDE OF THE CHASSIS, SHOWING THE SHIELDED OSCILLATOR COILS NEAR THE CENTER, THE COIL SWITCH TO THE RIGHT AND THE VOLUME CONTROL TO THE LEFT

The other parts are arranged as convenient.
tor anode voltage, which is generally lower than the plate voltage and should be supplied through a dropping resistor as shown in the diagram. This is important for stable operation, especially at high frequencies. A one-watt carbon type resistor may be used for this purpose and is not particularly critical, any value between 20,000 ohms and 40,000 ohms being quite suitable.

The method of connecting the grid leak around the tracking condenser in the first detector circuit may seem unconventional but was found to produce the best results. If, in this circuit, the grid leak were connected around a grid condenser in the ordinary fashion, the grid would swing "free" with the low end of the grid leak insulated from ground by the tracking condenser. This would cause "blocking" and intermittent oscillation on signals of even moderate volume.

The i.f. amplifier following this frequency conversion stage is a conventional two-stage amplifier using 58 tubes and is tuned to a frequency of 465 kc. The transformer coils are of the universal "criss-cross" type and are wound with Litz wire. They should be loosely coupled to provide a high degree of selectivity. In wiring care should be used in by-passing the various "hot" leads; otherwise instability will result. By-pass condensers should be soldered to the sockets and chokes, or as near to them as possible, to make the by-passing most effective.

Following the i.f. amplifier is the combination second detector and electron-coupled beat oscillator, which is another unique feature of the receiver. Here again the versatile 2A7 tube performs the work previously requiring the use of two tubes.

**FIG. 3 — COMPLETE CIRCUIT OF THE RECEIVER**

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Three-section variable tuning condenser, 30 µfd. max. per section.</td>
</tr>
<tr>
<td>C2</td>
<td>Tuning condenser trimmers.</td>
</tr>
<tr>
<td>C3</td>
<td>Moulded mica band-spread condensers, 25 µfd. fixed.</td>
</tr>
<tr>
<td>C4</td>
<td>Tubular bypass condensers, 0.2 µfd. 400-volt.</td>
</tr>
<tr>
<td>C5</td>
<td>Tubular by-pass condenser, 0.1 µfd., 200 volt.</td>
</tr>
<tr>
<td>C6</td>
<td>Detector plate filter condenser, 250-µfd. fixed.</td>
</tr>
<tr>
<td>C7</td>
<td>&quot;Tone&quot; condenser, 0.02-µfd.</td>
</tr>
<tr>
<td>C8</td>
<td>Audio coupling condenser, 0.05-µfd.</td>
</tr>
<tr>
<td>C9</td>
<td>Beat osc. grid condenser, 150-µfd.</td>
</tr>
<tr>
<td>C10</td>
<td>Moulded mica osc. tracking condenser. See coil table.</td>
</tr>
<tr>
<td>C11</td>
<td>Dry electrolytic filter condenser, 4-µfd.</td>
</tr>
<tr>
<td>C12</td>
<td>&quot; &quot; &quot; &quot; &quot; 8-µfd.</td>
</tr>
<tr>
<td>C13</td>
<td>&quot; &quot; &quot; &quot; &quot; 8-µfd.</td>
</tr>
<tr>
<td>C14</td>
<td>Audio by-pass condensers, 10 µfd. 50-volt electrolytic.</td>
</tr>
<tr>
<td>R1</td>
<td>First detector and oscillator cathode bias resistor, 400-ohm, 1-watt.</td>
</tr>
<tr>
<td>R2</td>
<td>Screen-grid filter resistors, 25,000-ohm, ½-watt.</td>
</tr>
<tr>
<td>R3</td>
<td>Bleeder resistor, 40,000-ohm, 1-watt.</td>
</tr>
<tr>
<td>R4</td>
<td>&quot; &quot; &quot; &quot; &quot; 60,000-ohm, 1-watt.</td>
</tr>
<tr>
<td>R5</td>
<td>Second detector plate resistor, 200,000-ohm ½-watt.</td>
</tr>
<tr>
<td>R6</td>
<td>Pentode grid resistor, 500,000-ohm ½-watt for 47 tube, 250,000-ohm ½-watt for 2A5 tube.</td>
</tr>
<tr>
<td>R7</td>
<td>Osc. plate resistor, 40,000-ohm 1-watt.</td>
</tr>
<tr>
<td>R8</td>
<td>Osc. grid leak, 100,000-ohm ½-watt.</td>
</tr>
<tr>
<td>R9</td>
<td>I.F. cathode bias resistor, 750-ohm 1-watt.</td>
</tr>
<tr>
<td>R10</td>
<td>Volume control with built-in a.c. switch, 75,000-ohm.</td>
</tr>
<tr>
<td>R11</td>
<td>Second det. and beat osc. bias resistor, 5000-ohm, 1-watt.</td>
</tr>
<tr>
<td>R12</td>
<td>Beat osc. grid leak, 100,000-ohm ½-watt.</td>
</tr>
<tr>
<td>R13</td>
<td>Pentode bias resistor, 400-ohm 2-watt.</td>
</tr>
<tr>
<td>SW</td>
<td>3-gang, two-position band-selector switch.</td>
</tr>
<tr>
<td>SW1</td>
<td>100-volt switch (mounted on volume control — see R6).</td>
</tr>
<tr>
<td>SW2</td>
<td>High-voltage cut-off switch &quot;Transmit&quot; and &quot;Receive.&quot;</td>
</tr>
<tr>
<td>SW3</td>
<td>Beat osc. switch &quot;Phone — &quot;C.W.&quot;&quot;).</td>
</tr>
<tr>
<td>RFC</td>
<td>12-millihenry universal type r.f. chokes.</td>
</tr>
<tr>
<td>IFT</td>
<td>Tuned primary and secondary 465-kc. i.f. transformers (any standard type).</td>
</tr>
<tr>
<td>CH</td>
<td>30-henry 50-ma. filter choke.</td>
</tr>
</tbody>
</table>
of two tubes. The tuned circuit of the beat oscillator makes use of an additional i.f. transformer of the same type as is used in the i.f. amplifier itself and is plate tuned. It is adjusted by backing off the grid trimmer to minimum capacity (or disconnecting it entirely) and tuning the plate trimmer only to provide the desired beat with the i.f. signal. By using the "offset" method of adjustment previously introduced in QST, it will be found that the best note is much louder on one side of zero beat than on the other, giving the effect of "semi-single-signal" reception. Examination of the diagram will show that the oscillator is merely a version of the familiar type of circuit, so no trouble should be experienced in making it work well. Care should be taken with the shielding and wiring, however, to prevent radiation that would tend to overload the i.f. amplifier and therefore reduce the gain. The circuit should be arranged to reduce to a minimum possible coupling into the i.f. plate or grid leads.

Grid-bias power detection is employed using the screen-grid portion of the 2A7 tube. Connections are made in the same way as in any ordinary power detector circuit, the operation of the tube in this manner comparing favorably with a 57 tube. One point to be noted here is the cathode bias resistance. If its value be too high, it will not permit oscillation when beat-note reception is desired; too-low resistance will cause insensitivity and low signal volume. Values as high as 10,000 ohms may be used but 5000 ohms seems to be optimum.

The second detector is resistance coupled to a pentode output tube which may be either a 47 or 2A5. This is connected in the usual manner except that a "phone jack is provided to open the pentode grid when headphones are plugged in, thus permitting headphone reception from the second detector output with comfortable signal volume. Loud speaker reception from the pentode output is also provided for. The speaker used is a six-inch dynamic that gives an excellent account of itself, both from the standpoint of quality and "quantity" of signal reproduced. This speaker, as does the general run, has an output transformer mounted directly on the frame, obviating the necessity of providing space for one on the chassis and assuring a correct impedance match. Another reason for selecting a dynamic speaker is that the field may be used as a filter choke, making unnecessary any external excitation and at the same time providing additional plate supply filtering.

As a tone control (which more correctly might be called a "high" eliminator), a .002-µfd. condenser is connected from the grid of the pentode to ground. This tone control could be made adjustable by the use of a larger condenser in series with high resistance, but by attenuating the frequencies above about 2500 cycles it was found that very little was lost in the fidelity of voice reproduction while the noise, which falls for the greater part in the upper band of audio frequencies, is reduced very materially. Thus intelligibility, which is the important thing, is considerably improved. With this condenser as shown, a receiver operated under extremely adverse conditions (racket from trolley cars, power lines, etc.), could be used with a fair degree of success whereas it was next to impossible to hear signals without it.

The power supply is built into the chassis, making the receiver complete and at the same time eliminating wiring from an external power pack. The transformer lies flat on the chassis with the winding and lugs protruding through for convenient connection. A transformer which supplies 350 volts at 50 ma. to the first filter condenser, together with the necessary filament windings, is quite suitable. A 30-henry 50-ma. choke, used in conjunction with the speaker field, and 20-µfd. of electrolytic condenser form the filter. Hum level is extremely low and is unnoticeable even on headphone reception.

CONCERNING CONSTRUCTION AND ADJUSTMENT

Some notes on the mechanical construction will assist in laying out a receiver of this type. The chassis, which measures 13 by 9 by 2½ inches, is made of sheet steel, although aluminum or brass could be used as well. If steel is used, however, it should preferably be cadmium or nickel plated to prevent rusting. The top and sides are cut in one piece and the sides folded down and riveted at the corners with small flaps. This makes a sturdy foundation on which parts can be mounted neatly and rigidly. The photographs show layout of the various sockets,
holes, etc. This need not be followed to the letter but should be closely approximated because any arrangement which places the final i.f. stage or the detector in too close proximity to the receiver input is likely to cause feedback with its resultant oscillation and distress to the builder. The sockets used are of the familiar wafer type which make a neat job and do not require much space. The coil mountings may be small brass brackets but in any case the coil should be mounted rigidly to assure permanency of alignment and calibration. The coils are shielded with aluminum cans (diameter at least 2 inches) which should make a good electrical and mechanical contact to the chassis.

The wiring, especially those circuits carrying r.f., should be rigid (No. 20 solid push-back wire is used) to prevent frequency instability. Little more need be said on the construction as one generally likes to incorporate his own ideas. Then, too, there are often parts around the shack which are adaptable but necessitate small changes in general design.

In aligning the r.f. circuits it is well worth the time and few extra parts to build a small modulated oscillator with coils to cover the intermediate frequency and also the high-frequency band or bands for which the receiver is intended. The circuit for such a modulated oscillator is shown in Fig. 4. An output meter of some sort is also a material aid to precise adjustment. This may be a rectifier type a.c. voltmeter, which can be used to measure the audio output voltage. A 0-3 a.c. voltmeter connected across the speaker voice coil is quite satisfactory. A vacuum tube voltmeter might be used for this same purpose or, alternatively, a good high-resistance d.c. voltmeter can be connected across the second detector plate resistor, thus measuring the rectified carrier. With the last, an unmodulated signal can be used. The method of aligning the receiver is fairly simple and if instructions are followed there should be no particular difficulty. Assuming an oscillator on hand which tunes to 465 kc. the i.f. transformers are first aligned, the procedure being the same as that given in previous QST articles. The strength of the oscillator signal should be down to prevent overloading or double peaks. An extremely simple "attenuator" adjustment is the variation in coupling of a length of wire between the oscillator and i.f. amplifier, this coupling being reduced by moving the wire away from the i.f. circuit as the transformer tuning is brought to peak. When this part of the receiver is aligned and working OK, we can start on the high-frequency input circuits.

Here again the test oscillator would be of valuable assistance, although in its absence a heterodyne frequency meter on the signal from a strong unfading station may be used for the purpose. The tuning condenser dial should be set to the place you wish the high-frequency end of the band to start, probably ten or fifteen dial divisions from the minimum capacitance end. The oscillator trimmer is then varied until the desired signal is heard, the dial readjusted for maximum response and, finally, the first detector and pre-selector trimmers varied until the loudest signal is heard or a peak reading is obtained on the output meter, as the case may be. The band-changing switch is then thrown over to the other band and, without touching the trimmers the

<table>
<thead>
<tr>
<th>COIL DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coil</td>
</tr>
<tr>
<td>$L_a$ — 1st detec-tor</td>
</tr>
<tr>
<td>$L_b$ — Pre-selector</td>
</tr>
<tr>
<td>$L_a$ — Antenna</td>
</tr>
<tr>
<td>$L_a$ — Osc. Grid</td>
</tr>
<tr>
<td>$L_a$ — Osc. Plate</td>
</tr>
<tr>
<td>Osc. Tracking</td>
</tr>
</tbody>
</table>

(Continued on page 72)

August, 1933
"Five-and-Ten" Oscillator-Amplifier Transmitters
By D. A. Griffin, W2AOE*

Perhaps the uninitiated might infer from the title that we intend to enter into a dissertation on the art of mass sales at low prices. Although most amateurs undoubtedly are familiar with the emporiums flaunting these famous words as meccas affording inexpensive means of adding to their collection of wire and haywire, "five and ten" conveys a more important meaning to the progressive experimenter.

During the past two years a great deal of progress has been made developing equipment for use on five meters. This will continue as time goes on, with the pathway to improved results clearly indicated. Transmitters free from frequency modulation or drift and receivers of the super-heterodyne type unquestionably deliver results unobtainable otherwise. Without doubt, then, an increasing number of amateurs will put such equipment into use.

On the other hand, the ten-meter band has suffered from a serious case of sleeping sickness. Five years ago, exceptional DX records were hung up with equipment which to-day would be termed mediocre, what with the recent rapid strides in tube and apparatus development. However, we now find signs of a healthy awakening of interest in our 28-me. territory. A few patient experimenters are making contacts and a considerable number of twenty-meter DX harmonics has been heard on this band.

And now that a goodly portion of the 28-me. band has been opened up for 'phone use, together with the fact that the last year has brought about the wide-spread use of stable superheterodynes with extremely sharp i.f. amplifiers (the S.S. super works very well at 28 mc.), transmitter improvement is certainly in order. If we are to take advantage of the high selectivity and gain of such receivers, the transmitted signal necessarily must be pure and free from drift. Frequency modulation must be eliminated if modulation is to be applied.

The oscillator (right) is high-C with a push-pull TNT circuit and is inductively coupled to the push-pull neutralized amplifier (left). The coils shown are for 28-me. operation.

*3 Oak Ridge Ave., Summit, N. J.

FIG. 1 — CIRCUIT OF THE BASIC OSCILLATOR-AMPLIFIER UNIT

L1 — 1/4-inch inside diameter, 8 turns for 28 me., 4 turns for 56 me.
L2 and L3 — 3/8-inch diameter, 4 turns for 28 me. and 2 turns for 56 me.
L4 — 2-inch inside diameter, 6 turns for 28 me. and 2 turns for 56 me.
All above coils made of 3/16-inch copper tubing.
C1 — Double-section midget condenser, 140-µfd. per section.

RFC — Hammarlund CH-8 r.f. chokes.
Vi and V3 — Type 10 tubes for voltages indicated. Other UX type tubes may be used with reduced plate voltage.

[Diagram of circuit shown]
The purpose of this article is to describe the design of medium-powered stable transmitting equipment that is readily adaptable for use on both 28 and 56 mc. Because of the relatively high circuit efficiency required at 56 mc., we find equipment suitable for 56 mc. to aid materially in securing really good efficiency at 28 mc. As has been pointed out previously, our 56-mc. requirements for some time to come may be relatively simple. That is, the simple oscillator-amplifier type of transmitter will be sufficient. The special type of superheterodyne useful at this frequency employs an i.f. amplifier with fairly broad selectivity, so that the slight frequency modulation set up with the simpler type of oscillator-amplifier transmitter will not cause any serious difficulty.

Experimental work was started with a simple oscillator-amplifier shown in Fig. 1. The results checked with the theory very nicely, the stations worked on 56 mc. reporting “normal” signals. The transmitter was then shifted to 28-mc. c.w. and interesting improvement became apparent. W2TN, twelve miles distant, was worked with an R5 signal both ways, both stations employing superheterodynes. Only once have signals as strong as R2 to R3 been reported between these two points on 56 mc., probably because of the range of hills intervening. W2TP, twenty miles away and without such screening, reported an R6 28-mc. signal using a Single-Signal Super. Considerable frequency modulation was noted when tone was applied, but a very good signal was reported when the super-regenerative receiver was used. This indicates that to get started easily on 28 mc. for local work, super regenerators for reception and simple m.o.p.a. transmitters are the immediate answer. And there is the promising possibility of DX work with this equipment too. However, the better type receiver will be handicapped if the signals are of the wobbled type.

The basic oscillator-amplifier unit is interesting in that it was designed to be completely universal. Both grid returns are brought out separately to binding posts, for instance, and both filament circuits are also brought out independently. With this arrangement, any UX-based tubes may be employed in the oscillator or amplifier. Either the final amplifier or both oscillator and amplifier may be keyed in the center tap, or it is possible to grid-modulate the amplifier by connecting a microphone transformer into the jack provided to measure the grid current. Class B plate modula-

### Diagram

**FIG. 2 — CIRCUIT OF THE ADAPTER UNIT**

L1 is the grid coil used in the oscillator, C6 is a 50-µfd. midget variable and the neutralizing condensers C7 are each 20-µfd. midgets. Flexible leads with clips connect to the plates of the respective tubes. Further details are given in the text.

**THE EXCITER UNIT CONTAINS AN ELECTRON-COUPLED OSCILLATOR (LEFT) AND A DOUBLER STAGE (RIGHT)**

This unit mounts below the other and is coupled to the buffer input by a low-impedance transmission line.
are designed to take another similar set of plugs on the top, the grid coil may be connected right back into the circuit on top of the bakelite panel. The 50-µfd. condenser, C₅, then tunes the grid coil. The 20-µfd. neutralizing condensers, C₂, are cross-connected underneath the panel so that short flexible leads from these condensers connect directly to the opposite plates by means of clips fastened to the stubs on the plate-tank condenser stators. By removing the grid leak and substituting fixed "C" bias, and plugging in this grid tuning-neutralizing unit, the TNT oscillator is changed into a neutralized amplifier in a few moments, its circuit being similar to that of the final stage.

With the TNT oscillator converted to a neutralized buffer amplifier, the next step was the construction of a suitable driver unit. The ideal method, crystal control, was considered, but the complexity of the circuit was discouraging, unless 20- or 40-meter crystals were employed. Simplicity of design indicated the use of a self-controlled oscillator-driver- doubler arrangement. The Type 59 in the familiar electron-coupled circuit, doubling in its plate circuit and driving a 46 doubler, was finally selected after considerable experimentation with a number of tubes.

Cathode oscillator bias is employed instead of the conventional grid-leak-condenser method. This resistor prevents the plate current from creeping if the tube is loaded to the limit, the bias increasing automatically when the plate current tends to go up. As the plate circuit works into a relatively constant load, no trouble is encountered with frequency shift after the initial adjustment is made. The 46 doubler is of conventional design, with the exception of the use of a cathode bias resistor. At 56 mc., without the cathode resistor the plate current would creep badly. In a minute or so it would draw over 100 ma. and cease to function as a doubler. The 300-ohm cathode resistor holds the plate current to a 60 ma. limit and sufficient output to drive the buffer amplifier at 56 mc. is obtained.

The problem of coupling the driver unit to the buffer-amplifier unit, with the two mounted in a rack and with approximately ten inches in height separating them, was taken care of by use of the low-impedance line coupling method recently described in QST. With a pick-up coupling coil (L₉) of slightly smaller size than that used for the TNT oscillator-grid coil on 56 mc., coupling to the 46 driver plate tank is not particularly critical. The clips on the buffer grid coil are connected two turns in from each end of the four-turn coil for 28 mc., or three-quarters of a turn in from each end of the eight-turn coil for 56 mc. Both buffer and final amplifier neutralize easily, although to do a good job of neutralizing a thermo-galvanometer or similarly sensitive indicating device is necessary. On both 28 and 56 mc., the final amplifier is operated as a true Class C amplifier, with 70 watts input at 28 mc. and 40 watts at 56 mc., the buffer amplifier bias being adjusted to secure maximum output at 56 mc. When we consider that there is as great a difference in frequency between five and ten meters as

there is between ten meters and the audio spectrum, the drop in tube and circuit efficiency is readily appreciated.

For operation on 28 mc., the oscillator generating circuit works at 7 mc., the plate circuit doubling to 14 mc. The 46 then doubles to 28 mc.,

(Continued on page 88)
Ten-Meter Band Hot!

Many Stations Report Successful Contacts—28,000–28,500 Kc.

‘Phone Band Officially Opened to All

By Clark C. Rodimon, Managing Editor

Probably more hours have been spent in hunting for signals on our ten-meter band with less success than on any other part of the ham spectrum. Yes, we have done our share. At the moment we seem doomed for an era of ten-meter QSO's (hence our desire to hasten scraps together for August QST) or our hunch is "seven sheets to the wind." We have been listening on ten meters for signals for the past five years, have heard a signal drop in and out before an identification was possible, but all in all it has been a mighty discouraging bit of listening. Just four days ago a W3 told us he heard our signal on ten last summer but didn't get around to telling us about it! That one meagre report would have kept us at it for another few months at least. Just two days ago, June 25th, we were aroused from some lethargic listening on 14 mc. for the elusive J signal (another pastime of ours) when the telephone rang and it was W1DF telling us that W9DZX was coming through R7 on "ten." In less time than it takes to tell it we were hearing this signal — honestly, this one signal coming through in all that expanse of stillness was about the keenest thing we ever heard — even though the signal was a rough r.a.c. After considerable calling W9DZX was raised with our 14-mc. set — though the queer part is that W9DZX on a hunch went up to 14 mc. to see if anyone would answer him there! While working DZX we ran across W9HBD coming through R7 with a p.d.c. crystal signal — and that did cap the climax! W1DF heard W9EF R9.

Right here and now we want to know just how long this has been going on. We actually believe that if we had not heard this activity with our own ears it never would have been reported. Why is it that this dope doesn't come in? It is red hot news — something that is the most intriguing bit of work we have had anything to do with since preliminary five-meter work two years ago when its local aspects turned up. What's more — ten meters will more than duplicate 5 meters for local work — and without going to a mountain top to accomplish the feat.

A brief résumé is in order of what has been done on ten meters. Its DX possibilities are immense. In years gone by all continents have been worked from U. S. A. with much inter-continent work between FSCT and W2JN, as well as between South Africa and U. S. A. The tests made at W1CCZ will be recalled where for a whole week W6UF was contacted during daylight with maximum signal strength at both ends — and with ZL2AC listening in to both ends of the conversations!

Successful Ten-Meter Stations

The rig at W9HBD starts out with a crystal and 247 on 80 meters and winds up with a WE-211-E on ten meters. This tube, it will be recalled, is the one with plate and grid chokes in the base and the same variety that used to cause so much trouble when we went down to the "short waves" (in the vicinity of 110 meters)! This shows that with care any ordinary equipment can be used — just care in design and tuning up with low voltages. The antenna is a vertical fundamental which also acts as a guy wire to a pole mounted on the roof of the garage. W9HBD says, regarding recent work, "— tuned her down to 10 meters Saturday, June 10th for test with W2TP. He heard me QSA 5 R7 but I couldn't locate the band with my receiver so he reported back on 20-meter 'phone. No more efforts were spent on this hand until June 25th, when signals sounded very strong on 14 mc. While QSO W2TP we decided to try 10 meters once more. The result was a perfect 40-minute QSO which you fellows heard in Hartford. Also heard W4CJ testing 'phone previously;"

W9HBD is old 9AZX (of DX days in '24 and '25, and has been reported by W9BGO and W5BTW. "Bill" Short, W9EF needs no introduction to any 28-mc. story. He has been plugging at this band for five years that we definitely know of. He has done considerable DX with Europe on this band and is still at it. W9EF says, "— tell the gang that if 20 meters is alive with signals it is almost a sure barometer that 10-meter conditions will be okay."

W9EF writes that on June 25th at 10:45 a.m. C.S.T. he raised W2TP with signals R9 at both ends, W2TP then used 'phone for the first 'phone contact W9EF has had. W8EXX and W4UC were also heard as well as a W3. The power input at W9EF is 160 watts, which feeds into a 65-foot antenna. About 15 feet of the present 65-foot antenna is vertical and the remainder is horizontal. A full-wave indoor antenna is used for reception, the receiver being a two-circuit regen re-
receiver with 2 stages of peaked audio. In closing W9EF says, "I honestly believe there is a big field in 28-mc. work. Patience will be required and if only a reasonable number of stations will give this band their attention their work will be rewarded. The old guard has been hammering away for a long time, have found out many interesting facts, but some new blood injected into the cause will add more stimulus to the work and help pep up the boys who grind away Sunday after Sunday with practically no encouragement from the rest of the amateur fraternity. Let's give ten meters an honest trial."

Another old-time 28-mc. man showed up on Sunday, June 25th, with a husky signal, and speaking of results, W9DZX says, "Heard W2TP R7 working W9HBD. Nearly all morning harmonics from WAZ were R5. 11:05 a.m. C.S.T. heard W9IFG R3 calling W9EGG but believe it was a harmonic. At 12:10 p.m. I worked W2TP again and was reported R8. Later I called CQ and was answered by a NDC signal about 28,180 kc. who faded out before he signed. Nothing more was heard. A card was received from WICKP reporting my signals on this band."

"The antenna at W9DZX for transmitting is 16½ feet long, voltage fed and horizontal in the attic. Another horizontal wire is strung up ¾ wave away and transmit in either direction, using the back wire as a reflector."

The receiver at W9DZX is a simple 2-tube affair using 235 detector and 224 audio with plug-in tube-base coils. There are power leaks around the back wire as a reflector.

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W1DF, operated by George Grammer, Asst. Tech. Ed., QST, has done considerable listening on this band — using an FB7 receiver with homemade coils. On June 25th the following stations were heard: W5DW, W9DZX, W9HBD, W9EF and W8AUP (?). On the evening of June 26th stations heard were: W4ZH, W4Z2F, W4BHA, W4EG and NY1AB. It is known for a fact that NY1AB was on 14 mc. at the time, and from the signal strength of the others they are also suspected of being harmonics of 14 mc., with the exception of W4BHA who was R8.

MISCELLANEOUS

From W8DYY we learn of his activity on this band, having been reported in Europe last year by G5QA. W8CPE reports having carried on a schedule with W7BAC on 28 mc.

On June 26th W1SZ heard NY1AB on 28 mc., having heard NY1AB on 14 mc. just a few minutes previously. A short call on 14 mc. and NY1AB verified our suspicions — he was transmitting on 14 and it was his second harmonic that was coming through R7! NY1AB is rigging up a final amplifier for 28-mc. work, using a diamond antenna pointed at New York.

On July 4th W1SZ rigged up a crystal control set and QSO'd W9EF, the final stage being a pair of 10's in push pull, exciting a fundamental vertical antenna.

From the R.E.F. we learn that the F stations are on ten meters every day at 0800, 1230 and 1830 GMT.

Apparently many stations have shown varying amounts of activity on this band at different times, harmonics are getting through as well as fundamental signals, but we have heard very little of it here at QST. We wish that all who are active or who are interested in this band would send in reports or communications to the Experimenters' Section, QST, 38 LaSalle Road, West Hartford, Conn.

Flash—OKIAW Reports Successful 28-Mc. Work

J UST as we go to press we receive some real news from Europe — and are managing to squeeze it in. Seems as though the ten-meter band was opening up simultaneously all over the world. OKIAW reports about 50 QSO's in six countries (see Calls Heard) since May 16th. The main transmitter used has an input of 35 watts and is crystal controlled. Both 'phone and c.w. are used, with the 'phone being reported R5 in France and England. OKIAW is on every day and reports that FSCT is R5 at 1030 GMT and starts fading until 2110 when F8CT is R2-3. OK1AB, OK2VA and OK2SI are also active on this band. The receiver at OKIAW is a simple detector and one stage audio.

There's no telling what will happen between now and next QST but one can expect anything — and the point is, we want to hear about it to report the good news. All that seems to be lacking now are stations at the correct distance for consistent QSO's — should this band be populated by stations from varying distances we feel confident that QSO's could be effected at about any time!

Rocky Mountain Division Convention

Acacia Hotel, Colorado Springs, Colo., August 26th—27th

PIKE'S PEAK Amateur Radio Association is sponsoring this convention and has prepared a program to enable all delegates complete enjoyment during the two days with business sessions the first day and social activities on the second day. Bring your ladies! Further information may be obtained from Carl C. Drumeller, Secretary, 411 N. Cedar St., Colorado Springs, Colo.

Strays

W4AUW says he uses his buffer stage to polish up his tuning inductances. Ow!
The Tool-Box 56-Mc. Transceiver
A Hand-Portable Five-Meter Station with a New Type Antenna System

By Thomas P. Leonard, W1AUJ-WICTM,* and Calvin F. Hadlock, WICTW-WIFFR**

WHEN new apparatus is developed for use on any of the lower frequency amateur bands, knowledge of it spreads rapidly from one section of the world to another by means of DX rag-chews* on the air. This does not, however, hold true of five-meter apparatus. Because of the limited range, when improvements are made on this band the information is spread locally but, unless it is printed in QST,* the rest of the country is not likely to hear about it.

There are two new developments that have justly become very popular around this section and which the authors feel are too good to be kept secret from the rest of the five-meter enthusiasts throughout the country. Hence we are going to pass along the dope. The first of these is a transceiver that works surprisingly well and is really portable. When this is used in connection with a new antenna system, the second item of equipment, astonishingly good results are obtained.

One of the new transceivers is shown in the photographs. R. S. Briggs, W1BVL and W1ZZAW, of Dorchester, is the one who introduced this unit to the gang. The present arrangement is very nearly identical to his and he should be given full credit for the development. The circuit and specifications are given in Fig. 1 and the construction is shown by the photographs. It is entirely self-contained, with the exception of the mike and antenna. The "mike," a Western-Electric hand-set telephone unit, is pushed into two phospher bronze clips on the back of the case when not in use, while the antenna system may be rolled up and tucked away wherever convenient. Inside the case, left to right, are two Type 5308 4.5-volt Burgess "B" batteries, the transceiver unit proper, and the two dry cells for lighting the filaments and supplying the mike current. Five small slender flashlight cells, which provide bias for the Type 233 tube, are hidden in the corners around the two dry cells. The minimum inside dimensions for the case should be 13½ inches length by 5½ inches width by 6½ inches inside height with the lid closed. Of the three binding posts near the top of the panel, the left-hand one is for a simple four- or eight-foot antenna, while the other two connect to a two-turn pick-up coil between the two tuning coils and are used for the two-wire feeder of the special Pickard antenna system.

The midget dial is, of course, for tuning. The

**19 Garfield Terrace, Malden, Mass.

THE COMPLETE TRANSCIEVER FITS IN A "DOLLAR-STORE"

Type Tool-Box Having Inside Dimensions of 13½ by 5½ by 6½ inches. Centered on the 6½ by 5½-inch aluminum panel is the midget vernier dial for tuning, with the send-receive switch immediately below it. The knob to the left is for volume control and that to the right for the filament switch. Microphone and telephone receiver are combined in the W.E. handset, which fits into clips on the back of the case when not in use. The special Pickard antenna system used with the set may be rolled and packed in a small canvas bag. As the finishing touch, the proper licenses could be fastened to the inside of the cover.

August, 1933
FIG. 1 — CIRCUIT AND SPECIFICATIONS OF THE TRANSCEIVER

C1 — .001-µfd. mica condenser.
C2 — 3-plate midget condenser, two stator and one rotor, double-spaced (National STN-6).
C3 — 100-µfd. midget mica condenser.
C4 — .004-µfd. mica.
C5 — .002-µfd. mica.
R1 — 100,000-ohm 1-watt (transmitting grid leak).
R2 — 100,000-ohm 1-watt (receiving grid leak; may require variation).
R3 — 10,000-ohm variable resistor (volume control).
R4 — 2-ohm filament supply resistor.
L1, L2 — each 5 turns about 5/8-inch diameter, No. 14 enameled wire (adjust to cover the band).
L3 — 2 or 3 turns, same diameter (coupling should be slightly adjustable).
RFC — Radio-frequency choke, 2½-millihenry (National R-100).
SW — Sections of four-pole double-throw jack switch.
T1 — Audio transformer with extra winding for microphone (see text).
T2 — Output transformer (to match telephone receiver).

The transformers can be purchased, or adapted in the following manner: T1 is any ordinary interstage audio transformer with the addition of a 300-turn microphone winding; T2 is a 7000-ohm-to-15-ohm speaker output transformer (for use with the low-resistance telephone receiver).

When putting the receiver into operation, a strong hissing sound should be heard in the earphone. It will be noticed that no super-regeneration oscillator tube is used; super-regeneration is produced in the detector tube by the use of a lower value of grid leak than usual. To insure that the detector super-regenerates properly, condenser C1 should be a good mica condenser, condenser C2 should be mounted and grounded directly at the r.f. choke, the filament by-pass C3 should be mounted directly at the filament terminals and tuning condenser C4 should be mounted well away from the chassis. In one instance where the tuning condenser was mounted with screws to the panel, insulated only by washers, the receiver would not work. As noted under Fig. 1, the value of resistor R3 may require some variation from that given, although it has not been found especially critical. If these precautions are

FIG. 2 — ARRANGEMENT AND DIMENSIONS OF THE PICKARD ANTENNA SYSTEM USED ON THE 56-MC. BAND

shaft to eliminate body capacity. The aluminum panel in this model is only 5½ by 6½ inches.

Reasonable care should be used in selecting and laying out the parts, but there should be little trouble in getting the outfit to work properly. Good tubes are essential; poor results will be obtained with inferior tubes. When the outfit is working properly as a transmitter, it should be possible to light a 6-volt dial-light bulb with its loop placed in the field between the two coils. When the mike is spoken into, this bulb should flicker considerably.

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taken there should be no trouble experienced in getting the receiver to operate properly.

There is another point that might be mentioned. This type of receiver radiates strongly when operating and it is recommended that it be used only for portable work. The type of receiver using a separate i.f. tube would be preferable for a fixed station — to reduce interference to other stations. Otherwise this receiver seems to be nearly the equal of the type with a separate super-regeneration tube, although slightly more fussy to get going.

Fairly good results can be obtained by connecting a four-foot wire at A. Much better results can be obtained, however, by connecting the feeders of the special antenna at A.

THE PICKARD ANTENNA SYSTEM

The second piece of apparatus is the antenna system with its special coupling transformer. The system was designed by Dr. G. W. Pickard, who is well known to hams the world over. This antenna certainly is a definite improvement over any other system that has been commonly used on the five-meter band. The system consists essentially of a half-wave antenna with untuned feeders, an impedance match being effected by using a coupling transformer between the feeders and the antenna. This transformer consists of three "pi" coils with three turns in each. The three coils are placed side by side and make an auto transformer of nine turns wound continuously in the same direction, with feeder coupling taps taken off across the middle three turns.

To wind this coil, take some heavy insulated wire, such as the No. 14 rubber-covered used for open house wiring. Start from the inside and wind a three-turn spiral, taking a tap off at the outside. The inside diameter should be about a half-inch and the outside diameter of the coil about 2\(\frac{1}{4}\) inches. Continuing on in the same direction from this tap, winding inwards, make another three-turn coil beside the first one and from the end of this coil (the inside) take off the second tap. Continue on from this point, winding outwards in the same direction, another three-turn "pi," producing three coils of three turns each, lying side by side.

Then tie the whole thing securely with string. The antenna is connected to the two taps while the feeders are connected to the two ends of the coil, as shown in the schematic diagram. For the 50-me. band, the length of each of the two halves of the antenna should be somewhat less than four feet because of the loading effect of the center coil, about 43 inches being usually correct. The feeders should be spaced about 2 to 2\(\frac{1}{2}\) inches for No. 14 wire. If smaller wire is used, the spacing should be decreased in proportion. The set end of the feeders connects to the two- or three-turn pick-up coil previously described. The feeders can be of any length necessary.

A considerable number of these sets are already in use around Boston and many more are under construction. Following is a list of some stations which have these transceivers in operation: W 1CTM, W1FFR, W1GGG, W1DRK, W1EMD, W1ZZAW, W1BNT, W1HAW, W1DZI, W1VA, W1HC, W1CG and W1EUZ. There are probably many others. Some of the "DX" worked with these outfits is as follows: W1CTM to W1CTM (about 11 miles); W1EMD to W1KH (about 16 miles); W1DZI to W1CSP (approximately 20 miles); and W1ZZAW to W1DPP (about 31 miles).

Pacific Division Convention

Hotel Saint Claire, San Jose, Calif., September 2nd–4th

SANTA CLARA County Amateur Radio Association knows how and the prepared program confirms the assertion. The price: $3.00. Arrangement with the hotel management makes it possible to obtain accommodation as low as $1.00 per person when several occupy one room; single room, one person, $2.50. The speakers: Earl R. Meissner, Dr. Terman, Frank Jones and Ralph M. Heintz. Write E. R. Booker, Chairman, P. O. Box 734, San Jose, Calif.

August, 1933 25
An Electronic Divertisement
Exposing a New Principle and Its Practical Application

By Alfred H. Miller, Jr., W3BJL

To trace properly the development of wireless telegraphy it would be necessary to go back some hundred years, to Michael Faraday's discovery of electro-magnetic induction. However, that would require more time than is available so we will have to skip over all that for the present. For the same reason we shall quietly pass over all the early struggles of such men as Maxwell, Hertz, Marconi, Alexanderson, De Forest and a host of others.

Instead, let us take up the subject of this article, namely, The Romantic Life of the Electron, and its practical application to amateur radio. Strange as it may seem, this subject is not entirely new, dating back as it does to the time of William Shakespeare. Besides being somewhat of a writer, Shakespeare was an ardent experimenter, and records recently brought to light would seem to indicate that William was one of the first. When he was not busy writing, the records show that he could always be found in his laboratory.

Early one bright September morning, Tuesday the 18th, 1621, to be exact, Shakespeare discovered what we now know to be electrons. His first observations were somewhat of a surprise, and as this is not a discourse on eugenics or psychology we cannot go into all the details. However, let me assure you that some aspects of his discovery are quite interesting.

The fact that impressed him the most was the startling romantic tendencies of these busy little people. Further experiments and observations of the electrons enabled him to reach the conclusion that the electrons mated very early in life, settling down to domestic harmony in a perfect state of monogamy. They remained this way always, until their sad but final decomposition. No divorce, love-nests or scandals ever disturbed their peaceful existence.

Curious to exploit his discovery still further, Shakespeare one day succeeded in separating an electron from its mate, to observe the reaction. The separated male was placed in the company of several very attractive, and as yet un-mated "lady electrons." True to William's expectations, the separated male ignored the seductive sirens and remained in a corner, pining in vain for his lost mate. This gave Shakespeare the idea for a new story, and he dashed out of his lab to write the now famous "Romeo and Juliet."

Here the record ends abruptly. Shakespeare finished the story of "Romeo and Juliet," but before he could return to his laboratory to finish the experiments, he was stricken with fever, and quietly passed out of this life. His last thoughts were turned towards the problems of the electrons.

The records reached this country in some unknown manner, and remained hidden until my esteemed friend, Dr. Twadington X. Quagmite, found them covered with dust, in an attic in New Rochelle early in 1879. Dr. Quagmite, well known in scientific circles, both here and abroad, is Professor of Xerophthalmia at Bolognae University.

He has spent (or should I say mis-spent) the last 52 years in furthering the early experiment of William. As Shakespeare was made immortal by his writings (so I think), Dr. Quagmite will go down in history for his contributions to amateur radio.

Knowing that the main characteristic of the electrons was their constancy, Dr. Quagmite gathered some few hundred males and females together when they were quite young. These he introduced to each other, an action, by the way, entailing much patience and diplomacy. When the couples were all happily married and settled down into what is known as an electronic marriage, Dr. Quagmite quietly and on tip-toe, late at night, would sneak up on a young couple and deftly, with his tweezers, imprison them. The young husband went into one bottle and the blushing bride into another. In this manner over a period of years he has caught and bottle some five or six thousand electrons.
If this method seems cruel to you, this ruthless breaking up of homes, please try to overlook the Professor's actions, and forgive him in the interest of science. The Professor has confided to me, with tears in his eyes, that the reproachful look of these tender little people has often tempted him to give up his experiments, but then he sighs and says, “Science must advance, and as an ardent pupil I feel it my duty to carry on, regardless of my conflicting personal emotions.”

A real trouper, the Professor, with him the show must go on.

If you have not already guessed it, Dr. Quagmite had at last found a use for this romantic tendency of the electron. Let us turn for a minute from the Professor to radio.

How many of us have just settled down for a swell QSO, adjusted the old cans, opened up the log and raised a station, only to be called to the 'phone? Very annoying, isn't it? Well from now on, thanks to Dr. Quagmite, your worries are ended. With the aid of this simple (?) hookup and a few odds and ends of junk lying around the shack, you can free yourself forever of this trouble.

To begin with we have a small block of wood, which may be the bottom of a cigar-box, a small section of the dining room table, or the piano; in short, any small wooden object that is handy. It is mounted on the operating table within reach of the operator. The block had five contacts, 5, 10, 15, 20, and a center one. When called to the 'phone, make a hasty calculation of the approximate speed at which the other station is working you and take plug (2) inserting it into center of block. We will assume the incoming signal speed to be about 15 words per minute. Of course the other speeds could be used but we will use 15 for the explanation. The other contact of plug (2) is then inserted into the hole (15).

For the present disregard the numbered circuit and follow the center circuit, comprising battery (3) and the tube W.S. (4). This tube and its companion N.W.S. is the result of Dr. Quagmite's research. In the tube (4) marked W.S. (meaning Window Shade) is imprisoned a ravishing female electron, pining for her mate. When the center contact is closed, battery (3) energizes small motor in top of tube which raises window shade exposing fair damsel to view of her mate in opposite tube (5) N.W.S. (meaning no window shade). Mate, of course having nothing to do all day but look out the window spies her immediately. Knowing that he cannot reach her, and feeling very depressed, mate rests elbows on window sill and gazes longingly at the fair vision across the way. This action on his part closes contacts on window sill energizing circuit composed of battery (6) and electromagnet (7) releasing catch (8) allowing platform of hydraulic jack (9) to descend slowly. At this point it might be wise to mention the fact that the platform of the jack is weighted down by the old “B” batteries (10), incidentally, about the only use that I have ever found for them. As platform descends, sliding contact (11) closes circuit in primary of power transformer (12) turning on the power for the transmitter.

We are, of course, still talking on the telephone, but the transmitter is now all turned on, filaments lit and ready for operation. Now we turn to the output of the receiver (13) it not being necessary to show the whole receiver. Shunted across the fones or speaker, is a new transformer called the “dit-dar-dit-dar-dit . . . dar-dit-dar” transformer (14). The secret of this transformer is very simple when once explained. If you will be kind enough to notice, the windings are wound in the form of that well known signal, dit-dar-dit-dar-dit-dar-dit-dar. The received signals are of course passing through this transformer all the time, in a very weak condition. However, when the station working you gives the final signal dit-dar-dit-dar-dit-dar-dar-dar-dar, the primary and secondary circuits being wound, and consequently tuned to resonance a much larger amount of current is induced into the secondary. This strengthened signal then passes through amplifier (15).

At this point I would like to mention that in early experiments a push-pull amplifier was used, but further trials showed that a single 245 would answer the purpose just as well.

Return for just a minute to the four circuits on the left. Remember we have plugged in the square block, at the approximate speed of the station being received, which in this case was about fifteen. The amplified signal has now passed through the 245 tube (15) and energized electromagnet (16) which releases trigger (17) allowing hollow iron ball (18) to roll down incline into tank of water. A five-gallon tank will be of sufficient capacity for our purpose. By closing the circuit at the left we have opened a small valve

(Continued on page 70)
Amateur Radio at A Century of Progress

For one solid year the World's Fair Radio Amateur Council has been working night and day to put over the amateur exhibit at the World's Fair. The result is well worth their effort. Two thousand square feet of exhibit space were secured in the Travel and Transport Building. On long counters all along the four sides of the exhibit hall are arranged the exhibits of the various radio manufacturers. In the center of the hall are located the transmitters of W9USA-W9USB, most-discussed of amateur stations at the present time.

Among the exhibitors whose products are displayed on the long counters are the A.R.R.L., Biley, Burgess, Chicago Transformer, Eveready, Instruograph, Johnson, Kenrad, Lincoln, Littelfuse, McMurdo Silver, Midwest, National, Raytheon, RCA, Sangamo, Shakeproof and others whose exhibits were in the process of being mounted at the time this information was compiled.

The two transmitters and the two operating positions of W9USA and W9USB are located in the center of the Exhibit hall. The largest rig has an input of 1000 watts, while the smaller one is rated at 200 watts output. This installation operates on either c.w. or 'phone. National and Silver receivers are used at the two operating positions. A safety power switch is included in the center of the table for emergency use; likewise, a duplicate switch is installed at the information desk as an extra precaution.

W9USA and W9USB are on the air daily, keeping reliable schedules in nearly every state. As a result of the fine cooperation received from amateurs contacted daily, traffic from World's Fair visitors is being delivered in a business-like manner and as soon after filing as possible. No rubber stamp messages are accepted. At this time an average of 100 messages per day is being transmitted over W9USA, with the messages received running about the same amount. Traffic for Chicago and suburbs, including people visiting the Fair, is delivered immediately, while other traffic to the state of Illinois is transmitted over a state network. Operators on duty at W9USA are W9HYI, K7YH, W9CYD, W9BYL, W9AIO, W9VS, W9DOU and W9CGV. Ed. Wilson, W9DDE, is communications manager on the Council, while Forrest Wallace, W9CRT, acts as traffic manager of the stations, in addition to his other duties on the Council's publicity staff. Laddie Smach, W9CYD, is chief operator.

The radio amateur exhibit is located on the second floor of the Travel and Transport Building, near the 31st Street entrance to the Fair. At this writing, the first of July, this exhibit has been viewed by 40,000 persons. Amateurs from every state in the Union and from Canada, Jamaica, Panama, Hawaii and Alaska have placed their calls and signatures in the registration book. The remaining months of the Fair, and in particular the World's Fair A.R.R.L. Convention during August 3d, 4th and 5th, should see many other thousands of amateurs viewing this extensive and elaborate amateur radio project.


“Five-and-Ten” Oscillator-Amplifier Transmitters

(Continued from page 20)

Driving the neutralized buffer amplifier on the same frequency, which in turn excites the final stage. To shift to 56 mc. the oscillator generating circuit is shifted to 14 mc., doubling in the plate circuit to 28 mc. The 46 now doubles to 56 mc., followed by the two neutralized stages on 56 mc. Various combinations of doubling and tripling were tried, but the set-up outlined gives the best results. The coupling coils between the buffer and amplifier stage are set at right angles, closer coupling resulting in decreased output.

With this arrangement, immediate improvement in results was noted. W2TP reported the signal “QSA5 RS crystal” on 28-mc. c.w. with the S.S. receiver. “Broadcast quality” was the report on 56-mc. ‘phone using a Class B 210 modulator with a good speech amplifier system. Although lack of time has prevented any hunt for 28-mc. DX to date, this can be expected to follow as the number of active amateurs working on this band increases and time is taken to do some intensive listening.

W9BOR says he's been hearing a good many Ed Wynne notes lately - the kind that break and jump from one tone to another!
Modernizing the Long-Wave Receiver

By Hugo A. Bondy, W2CMY

IT MAY seem somewhat trite, in these days of ultra-high-frequency development, so much as to suggest thinking of the low frequencies. However, to the amateur who is interested in what goes on at sea (and most of us are) and to the ex-commercial who likes to keep an ear peeled to the doings of the old gang on "600," a good long-wave receiver is a source of great enjoyment. Despite this interest, however, one seldom encounters a receiver of this description in a ham shack.

Those receivers that have been built have generally fallen far below expectations, usually because of the low-gain low-output vacuum tubes that have been with us in years past. But with the new types now available it is possible to construct an excellent long-wave receiver with a minimum amount of gear.

In designing this receiver the following standards were set as those to which the receiver would have to conform:

1. A.c. powered and self-contained.
2. Tuning range from the high-frequency end of the broadcast band (200 meters) to the longest commercially-used wave length (19,000 meters). This wide range was desired to cover the long-wave stations transmitting press, stocks, weather reports, time ticks and transoceanic traffic.
3. Loud speaker output comparable to that of a broadcast receiver.

With these three points in mind, the problem was tackled from several angles. Honeycomb coils were decided upon in the early stages of development, as the most effective means of doing the job. Tapped inductances would have proven too bulky, and they would not have given the degree of control over sharpness of tuning that is essential in 600-meter work and which is gained through the use of the honeycombs. A standard back-of-panel mounting is used for the coils. A stage of t.r.f. was tried in the early models but was dispensed with finally as being unnecessary.

The receiver is self-contained in a case made of 1/16-inch aluminum, whose dimensions are 13 inches wide, 10 inches high and 8 inches deep. The receiver is assembled on a steel chassis of the midget broadcast receiver type, a three-inch deep sub-base cavity housing the power transformer, filter chokes and the filter condensers in addition to the usual sockets, resistors, etc. The entire cabinet has been finished with French grey Duco.

The diagram is shown in Fig. 1. It is, in itself, nothing startling. Use is made of the now ancient and venerable three-circuit tuner with regenerative detector using a 58 and a power audio stage with a 47 in the socket. The constructional details should not require much explanation and any amateur should experience no difficulty in duplicating the job.

Provision is made for either series or parallel tuning in the primary circuit, the switch $W_1$ being provided for this purpose. This is a multiple affair consisting of a s.p.s.t. switch and a s.p.d.t. switch assembled together. For wavelengths between 200 and approximately 4000 meters series tuning is used while for longer wavelengths parallel tuning is employed. In the case of the medium waves the purpose is to tune below the fundamental wavelength of the antenna and the added inductance of the primary or antenna coil. In the case of the long waves

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*123 Phelps Road, Ridgewood, N. J.

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$L_0$ is made tight by means of turning the "coupling" control to the right. For traffic copying on 600 in QRM (which is always with us, as on 40) and in QRN, the coupling is made loose by swinging $L_0$ to the left. A definite ratio exists between the degree of coupling between the primary and secondary circuits and the amount of capacity used to tune the primary circuit. When shifting from tight to loose coupling the capacity of $C_1$ must be increased to hold the signal, and vice versa.

As a rule the position of the tickler $L_0$ is set for the particular set of coils in use, and the degree of regeneration or oscillation is controlled by means of the screen-grid series resistor $R_3$. The resistor method of oscillation control provides smooth operation with a minimum of detuning effect.

The means of controlling the volume in this receiver, though not exactly orthodox practice, was found to do the job very nicely. In fact it was tried on a short wave receiver as well. There too, $R_2$ functioned with success as a cathode series resistor.

A goodly sized sky wire is required with any long-wave receiver, an 80-meter Zepp answering this purpose very nicely.

This receiver has been in operation, at W2CMY during the past winter, with exceptionally good results. WAX, WOE, WPR, VPN, VQI, VRT, CLA, NBA, and NAX have put in R9 signals with a high degree of consistency, at night all winter long. Not infrequently we have been honored with signals from KSE and KPH, on the West Coast. All of which, for 600 meters—with all of its QRM—isn't so bad.

**Midwest Division Convention**

September 2nd and 3rd, Melbourne Hotel, St. Louis, Mo.

Who remembers the first big convention held in St. Louis in 1920? Some of the men who helped put over that convention are in charge this year; moreover, it is the concerted effort of the Hannibal Radio Club of Missouri; Mound City Radio Club, the O.B.P., St. Louis Amateur Radio Club all of St. Louis and the South Missouri Amateur Radio Asso. The official convention will be held on Saturday and Sunday but as Monday is a Holiday the Committee will make special efforts to entertain those desiring to stay over. A special invitation is extended to the ladies. The means of controlling the volume is set for

<table>
<thead>
<tr>
<th>Wavelength Range</th>
<th>$L_a$ (TURNS)</th>
<th>$L_b$ (TURNS)</th>
<th>$L_c$ (TURNS)</th>
<th>SW</th>
</tr>
</thead>
<tbody>
<tr>
<td>250 to 700 meters</td>
<td>75</td>
<td>50</td>
<td>25</td>
<td>series</td>
</tr>
<tr>
<td>150 &quot; 1500 &quot;</td>
<td>150</td>
<td>100</td>
<td>75</td>
<td>&quot;</td>
</tr>
<tr>
<td>700 &quot; 2200 &quot;</td>
<td>200</td>
<td>150</td>
<td>100</td>
<td>&quot;</td>
</tr>
<tr>
<td>1100 &quot; 4000 &quot;</td>
<td>300</td>
<td>250</td>
<td>150</td>
<td>&quot;</td>
</tr>
<tr>
<td>2200 &quot; 4700 &quot;</td>
<td>300</td>
<td>300</td>
<td>150</td>
<td>parallel</td>
</tr>
<tr>
<td>2500 &quot; 5500 &quot;</td>
<td>500</td>
<td>500</td>
<td>200</td>
<td>&quot;</td>
</tr>
<tr>
<td>3000 &quot; 15000 &quot;</td>
<td>750</td>
<td>750</td>
<td>300</td>
<td>&quot;</td>
</tr>
<tr>
<td>6000 &quot; 21000 &quot;</td>
<td>750</td>
<td>1250</td>
<td>500</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

Note: Choice of $L_a$ is dependent on the length of antenna used.
THE system of automatic overload protection and push-button control to be described was developed as the result of blowing up too many dollars worth of radio equipment during the past few years at W8PK and W2EB. On one occasion back in 1925 we were working a pair of 204-A's in a self-rectified circuit on 20 meters. The tubes were beginning to show signs of weakness under the strain of 2500 volts and the grid wires shorted to the filament. The tubes blew up and so did a perfectly good 2-kva. transformer. At another time a fifty-watt which had had its base removed in 1924 for some 5-meter work (removing bases of tubes was an old Spanish custom in those days) and which had to have a copper tack driven into the glass envelope at the point where the plate lead protruded — yes, the plate lead broke at the point of exit during the process of removing the base — took a deep breath on volts through the hole made by the copper tack. The filament wilted—and so did a 750-va. transformer. On still another occasion we blew up four 210's, three milliammeters, a plate transformer and a pair of rectifier tubes. After this loss we started using crude fuses in the high-voltage leads. They were not very satisfactory, however, because it took time for the fuse to burn out and even though the time was but a few seconds, we kept on losing equipment.

Three years ago we decided to put to work a system of control for starting and stopping the transmitter and have it automatically shut off in the event of an overload. The system is fool-proof throughout and has never missed fire except when the battery went dead. Three relays are required to do the job, as shown schematically in Fig. 1. The 110-volt a.c. relay is a General Electric Type G-2; the other two are Western Electric R-207 and R-699 relays. Two small Yaxley push-buttons are needed, one (start) making contact when pressed, the other (stop) breaking contact when pressed. A 22½-volt "B" battery is used to operate the R-207 relay; since this relay will operate with only one milliampere through the winding the "B" battery lasts at least a year even though the control is used every day. The 60-ohm potentiometer was made by putting a 20-ohm rheostat in series with a fixed 40-ohm resistor.

When the "start" button is pressed the R-207 relay operates, closing the two sets of contacts which are normally open. This causes the relay to lock through one set of its own contacts and through the normally-closed contacts of the R-699 relay. The 110-volt relay operates under control of the second set of contacts on the R-207 relay. The R-207 relay can be released by pressing the "stop" button or by the opening of the contacts on the R-699 relay when an overload occurs.

The 60-ohm potentiometer is the means of adjustment for different overload currents. Practically the total plate current of the complete transmitter flows through the potentiometer. For example, the potentiometer may be adjusted so that the relay will operate when, let us say, a 300-ma. current flows through the resistance. Now if for any reason a current of 300 ma. or more flows through the potentiometer the R-699 relay operates, opening its contacts and in turn releasing the R-207 relay. The 110-volt relay, being under control of a pair of contacts on the R-207 relay, also releases and shuts off the power supply.

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Additional protection is provided when operating on 'phone. This protection consists of two more relays which are connected into the circuit as shown in Fig. 2. Class B modulation is used for the 'phone job, and to make certain the load is always on the Class B output transformer before plate voltage is applied to the audio system, the control relay B-16 is connected in the last amplifier stage. Since a few seconds are required for the crystal to start and for power to appear in the final amplifier the output transformer would be unloaded during this interval. However, no damage can be done to the output transformer when using the automatic control since the voltage cannot be applied to the audio system until after the final stage is drawing plate current. When 'phone is used the potentiometer is set to take care of the additional current required by the audio system.

This system has been in constant use at W2EB for three years and has not given a moment's trouble. It has prevented plenty of grief and saved lots of equipment. We are now using it at W8PK, where it is proving to be equally reliable.

### Silent Keys

It is with deep regret that we record the passing of these amateurs:

Milton E. Adams, W9AQG, Minneapolis, Minn.
Scott Biggs, W5AXG, Jackson, Miss.
Edward P. Getter, ex-SAIM, Dayton, Ohio.
Wm. E. Maguire, W6CFA, Olinda, Calif.
Sylvestre Miller, ex-9UR, Aurora, Ill.
Headley Peake, W3DDE, Big Stone Gap, Va.
Chester Tworkowski, W8ECD, Detroit, Mich.

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**NEW REGULATIONS!**

The Federal Radio Commission on June 23d enacted complete new amateur regulations.

At request of the A.R.R.L. Board, effective immediately the 160-meter 'phone band is widened to read 1800-2000 kc., and the bands 28,000-28,500 kc. (a fourth of the 10-meter band) and 400-401 mc. are opened to 'phone for all amateurs. You may GA with voice on these frequencies anytime you wish.

The remaining regs are effective October 1st. Highlights:

- Station licenses only to those who qualify as operators and who own or control apparatus. Separate operator licenses for those who have no station, but no separate station license for non-operators.
- As per Board’s recommendation, adequately-filtered d.c. power supply required on all stages on frequencies below 14,400 kc. (all wave lengths down to and including the 20-meter band). Tone-modulation permitted above 28 mc. (10-meter and 5-meter bands — and 3 m.).
- Every licensee entitled to operate a portable without special license, under same call, per simple new rules. No more separate portables.
- Amateur mobile authorized on aircraft only, on 50-mc. and 400-mc. bands only.
- No change in communication (“traffic”) regulations.
- No change in existing licenses until they expire, but new license system for newcomers and for renewals as either op or station license expires. Station and operator business combined in one application, one examination; all papers to be graded in Washington; ultimate result, one combined station-and-operator license issued from Washington, term 3 years.
- Extra First Class license abandoned when expired. New op licenses endorsed Class A, Class B or Class C. Class A is unlimited, i.e., includes unlimited 'phone. Class B is c.w. plus limited 'phone, like present First Class. Classes A and B only by personal examination as now, compulsory within 125 miles airline of the 20 district offices (see list, p. 33, QST, December 1932, or License Manual) or of Washington, St. Louis, Pittsburgh, Nashville, Oklahoma City, San Antonio, Columbus, Des Moines, Cincinnati, Cleveland, Sheeneclady, Winston-Salem. Outside that range, eligible for Class C by mail, same (continued on page 42)
STRAYS

Everett L. Battey, W1UE, and Miss Louise Hyneck of Hartford, were married on July 1st. The A.R.R.L. Ass't C.M. will continue to be on the air from W1MK and W1UE. All hands please note that a 100% ham picked RM NITE for the big doings. The whole field organization gang extends best wishes to "Ev," the latest member of the Hq. staff to join the ranks of the benedicts.

Miss Lillian M. Salter, well known to all hams who get C.D. bulletins as LMS, is talented in musical interpretation as well as extremely competent in handling details of A.R.R.L. communications organization. Miss Salter played the wedding march.

If your receiver gets an overdose of r.f. whenever the transmitter goes on the air, try connecting a neon lamp between the antenna and ground terminals on the receiver. When the gas in the bulb ionizes it tends to minimize the r.f. voltage getting in at the receiver input terminals. Possibly the operation of the bulb can be improved by removing the resistor in its base. This suggestion comes from Lieut. Hansen of Byrd Expedition fame.

Needless to say, the neon bulb won't be of much help unless the receiver itself is completely shielded.

Two new songs from W1EOP:
1. The A.C. Song: "Ho, HUM, Spring is here now."
2. The Class B Song: "It ain't worth a thing if it ain't got that SWING."

One of our favorite errors (or is it the printer's favorite?) cropped out again in June QST—"serious" filament operation in "Transformerless Plate Supplies." Yep, we heard about it from the gang!

One of W8DJE's SWL friends claims that DJE is always coming on "all of a thudden." W4EDI, taking the examination for his Extra First ticket, forgot the penalties for various violations of laws and regulations. So he wrote, "Too darned much to take a chance."

VE1AV had the tough luck to lose his home by fire not long ago, and along with it went a collection of QSL cards that had been accumulated over a period of six years. The OM would appreciate it if any of the fellows with whom he has QSO'd in the past would send along duplicates.

Copper cans from defunct Mershon 5-5-5 and 8-8-8 condensers make excellent coil cans when cleaned, especially for sets using plug-in coils, since the cans are plenty large. (Same goes for the aluminum cans used on other makes of condensers.)

W1ALE recommends the following formula for putting photos on QSL cards by the method described by W9ANZ in QST for March, 1932:

A. 1 part potassium ferricyanide
5 parts water
B. 1 part citrate of iron and ammonium
5 parts water

Dissolve the two chemicals separately and then mix in a dark room. The rest of the process is the same as that used by W9ANZ.

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August, 1933
Ever since we announced the inauguration of a new and improved method for the distribution of foreign QSL cards to League members in the United States, our Canadian fellows have been asking when such service was to be extended to Canada. More than that, many of them immediately volunteered their services for the work, in that same spirit of cooperation that typifies so many other aspects of amateur radio. So now we are pleased to inform our Canadian fellow-amateurs that, effective immediately, the district-distribution of QSL cards sent to League Headquarters by foreign amateurs will apply to Canadian hams as well as those in the United States.

The new A.R.R.L. District QSL Managers for the five Canadian districts are as follows:

- VE1 — J. E. Roué, VE1EB, 84 Spring Garden Rd., Halifax, N.S.
- VE2 — R. E. L. Johnson, VE2BO, 536 Grosvenor Ave., Westmount, P.Q.
- VE3 — Bert Knowles, VE3OB, Lanark, Ont.
- VE4 — Dr. J. J. Dobry, VE4DR, Killam, Alberta.
- VE5 — E. H. Cooper, VE5EC, 2024 Carnarvon St., Victoria, B.C.

In announcing these appointments we want to express our thanks not only to the men named, but to the many other Canadian amateurs who similarly volunteered for the work; it is a matter of regret that we haven't got enough jobs to hand around! Selections, in each district, were made in the order of receipt of the application.

Now, just to go over the details of the system, for those who may not have seen the March article.

Every Canadian amateur who wishes to receive foreign QSL cards should immediately despatch to the QSL Manager for his particular district one stamped, self-addressed envelope. Make sure the envelope has the necessary first-class Canadian postage. On the outside, in the regular place, should be your name and address. Your call (this is important) should be printed prominently in ink in the upper left-hand corner of the face of the envelope. In order to make it easier for the QSL Manager to maintain the system, it is earnestly requested that a standard-size envelope 9 1/2” X 4 1/4” be used. Anything smaller than this is too small for most of the cards that will be received.

After you've sent your envelope to your QSL Manager, the rest of the system “works while you sleep.” When we receive a batch of foreign QSL cards here at League Hq. (we get around 80,000 a year now) we sort them and send all VE1’s to Mr. Roué, all VE2’s to Mr. Johnson, etc. They, in turn, insert the cards into the envelope you have provided, and when the envelope has enough cards in it to bring it up to the weight limit, or sooner if the cards aren't coming in for you very fast, they'll seal it and drop it in the mailbox. When you get an envelope of cards, you should promptly send your QSL Manager another envelope to fill the empty gap in the file. OK?

For U. S. Amateurs

Since the publication of the original article on the system, it is quite likely that there are many new amateurs on the air and who, needless to say, are anxious to know if they have been heard in foreign climes. As we have already intimated, the system just outlined for Canada is already in effect in the United States. District QSL Managers for the United States are as follows:

- W1 — Jack Keim, W1VP, 287 Warren St., Needham, Mass.
- W2 — H. W. Vahlne, W2SN, Lake Ave., Helmetta, N. J.
- W3 — E. L. Thompson, W3CQ, 312 College Ave., Salisbury, Md.
- W4 — T. G. Smith, W4ATZ, 815 Telfair St., Augusta, Ga.
- W5 — Shelton Stanton, W5ACA, 2627 Milan St., New Orleans, La.
- W6 — C. E. Spinn, W6FZQ, Box 1804, Phoenix, Ariz.
- W7 — L. G. Kelly, W7BFC, 4919 So. Prospect St., Tacoma, Wash.
- W8 — F. W. Allen, W8GER, 324 Richmond Ave., Dayton, Ohio.
- W9 — H. C. DaMuth, W9FJB, 1411 Dempster St., Evanston, Ill.

Amateurs desirous of receiving foreign QSLs should send a 3¢ self-addressed envelope of the size mentioned (known as No. 8 at postoffices) to their respective QSL Managers and the system will run as indicated.

Notes

Before we finish this squib we want to mention a few things that are turning up in this QSL system business.

First, there are many dozens of cards on hand at each of the QSL Managers for the U. S. for amateurs who haven't sent in envelopes. Better do it, OM's, whether you expect cards or not. Lots of times you'll find that you are getting cards even if you didn't know it. Many of these foreign QSLers, you know, are listeners, so the fact that you haven't worked anybody doesn't mean that cards aren't trying to find you!

Second, in a number of instances where a

(Continued on page 74)
Concentric Cable Feeders

At a recent meeting of the Transmitting Amateur Association of El Paso the Program Committee gave a demonstration of concentric cable feeders using a full-size 7000-kc. antenna fed through a twelve-foot feeder, the rig being supplied with power from portable transmitter W5GL.

In arranging this demonstration it was thought desirable to construct the apparatus from standard material and in such a manner that it could be used as a working model for anyone interested in installing a concentric cable feeder system. The feeder was designed in accordance with the data given in an article by True McLean in the October, 1932 issue of QST, so the theory need not be gone into here. There are, however, several unique features involved in the mechanical construction of the feeder that are worth describing in detail.

For the outer conductor a ten-foot length of standard 3/4-inch steel tube or thin-walled conduit was used. The inner conductor was a piece of No. 2 hard-drawn copper wire whose outside diameter is very nearly the required 3/8-inch. The spacers were made of hard wood of just the right outside dimensions to slip easily into the steel tube. A hole was drilled in the center of these spacers just large enough to permit the No. 2 wire to pass through with a snug fit. The wire was then "tinned" on each side of the spacers to prevent them from slipping. These wooden spacers were placed about twelve inches apart on the straight runs and three inches apart in the 90 degree bends.

The bends were made from sections of the steel tube and were formed on a bender that electrical contractors use for that purpose.

No attempt was made to fish the center conductor around the bends as it was found much more convenient to make each bend a separate unit and couple a straight length of tube to each end of the bend in the following manner: A small hole was drilled in the center of each inner conductor to be joined and a small copper dowel inserted to hold the conductors in line when they were ready to be soldered. The threadless connectors (see photo) were slipped over the end of the straight section of tube and the center conductor was slipped out far enough to give working space. The two ends were fitted together with the dowel referred to above holding them in line. They were then soldered fast. The coupling was slipped into place on the bend and the straight section shoved home in the opposite end of the coupling, which was then screwed down hard, completing the job.

The upper photograph, A, shows the center conductor protruding from the outer tube, exposing one of the wooden spacers. The coupling is at the left. Photo B shows the two ends of the center conductor in place and ready for soldering. The coupling has been left off to give a better view of the spacers. At C is the completed joint coupling the 90-degree bend to the straight tube. While the tubing used in the demonstration was of steel and gave excellent results, it is possible to obtain hard-drawn copper tubing and standard aluminum conduit in sizes from 1/2-inch up. Fittings and bends for these are also available and any machine shop will turn out spacers from hard rubber, bakelite, maple or other suitable insulating material for a very small sum.

The writer believes that hams will find that the concentric cable feeder constructed along the lines as outlined above will find many applications, and will take its place along with the Zepp as a popular system of feeding a remotely-located radiator.

— L. G. Wainman, 512 Myrtle Ave, El Paso, Texas
A.C.-Operated Pre-Amplifier

The circuit shown in Fig. 1 is not original at all, but inasmuch as it has served to operate both dynamic and condenser-type microphones "all amplifier tubes. Filament current is adjusted by varying $R_4$ until the milliammeter, $M$, reads the correct value for the tube filaments — in the case of 30's, 60 mils. Since the filaments are in series, $R_4$ always should be adjusted for rated current flow of one tube; furthermore, the tubes in the amplifier should all be rated to take the same filament current. Resistors $R_1$ and $R_2$ provide the grid bias for the two tubes; $L_5$ is a decoupling choke. The other circuit values are those usually to be expected in similar amplifiers.

If a twin d.p.d.t. switch is inserted at the points marked "X", arranged so that a resistor of 1800 ohms replaces the field coil of the dynamic speaker (or a resistor having the same value as the field coil resistance), a condenser microphone can be used in place of the dynamic. Fig. 2 shows this more clearly. A single stage of condenser mike pre-amplifier is all that is required in addition to the two stages shown. If the condenser mike is sensitive enough it might be used directly, with suitable switching of the head connections.

If the filament of the condenser mike pre-amplifier is also in series with the other filaments, the milliammeter should still read 60 mils. An arrangement of this sort reduces materially the cost of operating and maintaining a condenser or dynamic microphone. It has been used by W9BHM and W9AAI for a number of years. Its recent inauguration at W9JHY has sold me 100% on the idea.

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M. C. Bartlett, W9JHY

Screen-Grid Detector Coupling

Homemade detector couplers using old audio transformers as audio chokes do not always perform as they should; the following letter from Pensyl Mawby, of Trenton, N. J., offers a suggestion which may help in cases where trouble has been encountered:

"I never bought one of those nice, expensive 500-henry chokes used to couple a 35 or 24 detector to a 27 audio; my dollars had to be stretched over too many miles. As per suggestions in QST I tried all sorts of old audio transformers, including single stage, p.p. transformers, output audio transformers, output audio transformers, output audio..."
choke, etc., with only fair results. I also tried the 250,000-ohm plate resistor without much success. 

"In desperation I tried the circuit shown in Fig. 3. The volume was very much better; the sensitivity was marvelously better. English and German b.c. 'phones are easy to listen to and identify as never before (without antenna, only water pipe to one post and radiator to ground)."

"Maximum sensitivity seems to be reached by using 6 to 8 megs. as detector grid leak and high resistance at \( R \) in the detector plate circuit. Quality is then not at its best. By reducing the value of \( R \), sensitivity is less, quality is improved and tube noises are less. It is a simple matter to pick up a very weak carrier with high \( R \) and then adjust for best results."

A really good audio transformer — one having large primary inductance — should be used. Mr. Mawby's transformer is a Samson Symphonic.

An Anti-Blinker

Here is a scheme which may help out hams who find themselves the object of their neighbors' complaints that the lights are blinking.

The transmitter at W4GQ draws quite a bit of power from the 110-volt line, as it uses a 204-A in the final stage, with a 203-A for exciting buffer, both of which stages are keyed simultaneously in the center tap. Consequently, when the key was pressed lights all along the line took a sudden dip, and the filament voltage on the transmitting tubes dropped about ten percent. It was quite impossible for anyone to read while the transmitter was being keyed because of the blinking lights, so the following scheme was adopted:

A dummy load consisting of two 6fl0-watt electric heater coils in parallel was put in series with a Bradley Radiostat (heavy duty) and run through the contacts of a reverse-action relay. This was a 150-ohm telegraph relay with double-action armature. In telegraph use the rear contact screw has a piece of fiber in place of the contact point, and is used only for a back-stop. The contact screws were reversed, so that with the coils energized the contact was broken. Also a heavier pair of silver contacts was soldered on instead of the lighter contacts.

By reference to the diagram Fig. 4, it can be seen that when the key is pressed the d.c. in the center-tap lead actuates the relay coils, releasing the dummy load from the line. When the key is released the transmitter load goes off and the dummy load immediately takes its place. The Radiostat should be adjusted so that the filament voltmeters have the same reading when the key is down as when it is up. When so adjusted, and when the relay contact spacing and tension spring are adjusted to give quick action, there will not be time for the electric light filaments to cool perceptibly during the action of the relay. Result: No blinks, and steady transmitter filaments. When once set the unit may be forgotten.

The same switch which cuts the power to the filament transformer during listening periods also disconnects the dummy load, so there is no avoidable waste of current in the dummy.

One word of warning! Don't use a relay with too high d.c. resistance, as it will introduce bias to the transmitter. The 150-ohm relay works very nicely here.

This arrangement has been in use at W4GQ for some time, and works perfectly with any power used. A broadcast receiver in the next room, approximately 15 feet from the transmitter, operates with no interference at all. The only indication that the transmitter is being operated is a dip in the lights when beginning a period of transmission and a brightening back to normal when the transmission is concluded.

--- A. H. Davis, W4GQ

Remote Switch

The drawing of Fig. 5 shows a home-made switch built by Frank Robison, W6HDX, for the purpose of changing the length of his antenna — in this particular case to change the length so the fundamental wavelength would be shifted from 40 to 80 meters and vice versa. A copper switch blade is pivoted as shown on a bakelite...
"T," the ends of the antennas being fastened at the ends of the arms of the "T." One wire is connected to the blade by a short piece of flexible wire; the other antenna connects to the switch jaw, also a piece of copper. A coil spring is fastened between the points marked A and B. A cord is fastened to the end of the switch blade so the switch can be operated from the ground. A jerk on the cord carries the blade slightly past the vertical position and the spring pulls the blade over to the opposite side, much in the manner of the small snap switches used on lighting circuits.

The uses of a switch of this type are not necessarily confined to changing the length of an antenna; for instance, for antenna changeover when the feeders are located close to a transmitter for antenna; for instance, for antenna changeover when the feeders are located close to a transmitter which is remotely controlled; or for operating lightning switches without opening the window, etc.

The Goyder Lock

A variant of the oscillating amplifier known as the Goyder "lock-system" has attained considerable popularity in Europe, according to a letter from J. Fleurbaey, ON4ZA, who used a transmitter of this type in the March International Contest. Described briefly, the amplifier is simply a TNT oscillator with its grid coil loosely coupled to a crystal oscillator or doubler tank; to get crystal control the oscillating amplifier is tuned to the same frequency as the crystal oscillator or doubler and because of the well-known tendency of two coupled oscillators to "lock" at the same frequency the crystal tube takes control. The result is a signal with all the characteristics of crystal control but obtained without neutralization and without worry of getting adequate excitation for the amplifier, since it supplies its own excitation. A simplified diagram is shown in Fig. 6.

ON4ZA gives the following as the tuning routine:

1. With the power amplifier switched off, adjust the crystal oscillator (and doubler, if one is used) for maximum stability. Pick up the crystal signal in the monitor and adjust to zero beat.
2. With the crystal oscillator switched off, tune the TNT oscillator so that zero beat is obtained at exactly the same spot on the monitor dial.
3. Couple the grid coil of the TNT oscillator to the tank of the crystal-controlled driver and turn on the latter.
4. Retune, if necessary, until only a crystal-controlled signal is heard in the monitor, all tubes being "on." When this condition is reached the two oscillators are "locked" and the crystal has control.

At ON4ZA the oscillating amplifier is a European-type 203-A with about 100 watts input. The oscillator tube is a 47, used with a crystal having a fundamental frequency in the 7-mc. band. The input to the oscillator is 7 or 8 watts, and the oscillator tank is coupled to the TNT grid coil for 7-mc. work. On 14 mc. a 46 doubler, running with about the same input as the crystal oscillator, is used, its output being coupled to the amplifier grid.

It should not be necessary to point out that a transmitter of this sort should be monitored constantly, and that it should be carefully checked every time it goes on the air after having been idle for a time. Frequency creep caused by tube heating often is enough to allow the tubes to get out of synchronism, which not only destroys the crystal-like character of the signal but may result in off-frequency operation.

Strays

Forced to do some soldering on the roof when his antenna lead broke off, W2BNJ saved the day (there was no way to heat a soldering iron on the roof) by using a can of Sterno bought at the local five and dime store. The joint to be soldered was held in the flame until hot enough to melt solder, which was then allowed to run in the joint. This worked on a cold winter day, and may help some hams who run into the same kind of emergency.

Phone men who cause interference with neighbors' telephones might try placing a .002-µfd. fixed condenser across the mike button in the telephone, suggests W9TE. Such a condenser is already incorporated in the handsets. (Some telephone companies are rather prejudiced against unauthorized alterations in their circuits. — Ed.)

VK2JZ has a good stunt for getting 28-mc. reports. His 28-mc. transmitter, a push-pull 45 outfit with its own power supply and antenna, is keyed by a relay in parallel with the keying relay on his 7- and 14-mc. transmitter. Therefore every transmission on the last two bands is duplicated on 28 mc. — without additional effort — putting a signal on that band much more frequently than would be possible otherwise. If more hams would do something similar there would be plenty of sigs for listeners to pick up.
Amateur Radio STATIONS

W6AQA, Los Angeles, Cal.

With long-wave receiving equipment on the desk and the screened-in rack-mounted transmitter and speech equipment with tricky dials and tube guards, W6AQA looks like a young broadcasting station. Nevertheless, all the transmitting equipment is home-built—patterned after the W. E. style of construction—at the expense of several months of patient work. The r.f. end of the set, in the right-hand rack, consists of a 10 oscillator, 10 neutralized buffer and 203-A final amplifier. Appropriate power supplies are mounted on the same rack. The left-hand rack contains a three-stage speech amplifier, meters and controls. The modulator, a pair of 845's in parallel, is in the upper deck of the r.f. rack.

The cabinet at the left on the desk contains the short-wave receiver; next to it is an IP-501 Navy receiver with its amplifier. The mike is a double-button broadcast type.

Says W6AQA, “I have always thought it a darned shame that so many amateurs are satisfied with a station layout that looks like the remains of a spaghetti factory after a cyclone. . . . With radio parts selling at the lowest wholesale prices ever, a commercial-appearing job can be produced for practically the same cost as a layout that encourages the rats to move in.”

W3BLZ, Morrisville, Pa.

This formidable array of racks and panels which constitutes the transmitting end of W3BLZ is, quoting Franklyn J. Wolff, the owner, “commercial in looks but 100% amateur in construction, being built up from panels, parts

and odds and ends purchased at attractive prices from the defunct Universal Wireless outfit.”

Built for 75-meter 'phone, the r.f. part of the transmitter (in the center) has the usual crystal-controlled oscillator, buffer and modulated amplifier, and in addition has a linear r.f. stage with an 851. The modulated amplifier is a Western Electric 242; the modulator, a W. E. 212-D. The panel at the far left contains a thermostatic control unit for the crystal. Since the photograph was taken a 14-mc. transmitter has been built in the upper part of this panel, using the same modulating equipment as on 75 meters.

The speech equipment is not visible in the photo, but consists of a W. E. condenser microphone and pre-amplifier followed by a W. E. speech amplifier ending up in a 211 which excites the 212-D modulator.

W3BLZ’s 75-meter ‘phone has been heard in New Zealand, Australia, England and in various parts of Europe. Stations worked include everything that can be heard.

W6IBK, La Jolla, California

Although W6IBK has not been very long on the air, the station has a neatness and business-like appearance about it that some builders achieve only after years of haywire. 'Phone operation on 160 meters is the chief activity. The r.f. part of the set uses 46's in all
three stages — oscillator, buffer, and modulated amplifier — and is housed in the left-hand part of the large cabinet. The right-hand compartment contains a remote-control unit for the BCL re-

ceiver, a microphone control panel, and a loudspeaker for the short-wave receiver, the latter being a National PB-7. The mike is mounted on a floor stand which carries an auxiliary switch operating a send-receive relay in the microphone control panel so that the transmitter can be turned on and off without reaching for the control panel. The modulating equipment is mounted in the cabinet on which the land 'phone is sitting and is therefore not visible in the photo. Two 46's in Class B are driven by another 46, which in turn gets its signal from two stages of speech amplification with a 57 and 56.

During the brief existence of W6IBK its signals have been heard in Hawaii, and many stations in the 6th, 7th and 9th districts have been worked, all on 160-meter 'phone.

W8AJK, Morgantown, W. Va.

W8AJK is located in the Physics Department of West Virginia University, at Morgantown, West Virginia.

The transmitter is a three-tube affair, consisting of a 10 crystal oscillator, a doubler using a 10, and an 852 final amplifier. By means of switches it is possible to operate on either 40 or 80 meters without changing inductances. Both the doubler and final amplifier are neutralized. A rectifier-filter power supply is used for the Type 10 tubes and is housed under the crystal oscillator. A motor-generator located in the room below and remotely controlled from the transmitting table furnishes volts for the 852 and filament voltage as well. For 20 meters a small push-pull 10 outfit is used, the circuit being the reliable TNT. Not much work is done on 20 because of too bad QRM from automobiles. The transmitting antenna is a half-wave 80-meter Zepp located between two buildings and about 70 feet high.

The regular receiver, at the left of the table, is an electron-coupled oscillator with an r.f. stage and a pentode output. It is entirely a.c. operated. On the right is a self-contained set (QST, May, 1932) used for portable work and for monitoring the transmitter. It is calibrated and serves as a frequency check. Frequency settings are made with the aid of General Radio frequency meters.

While the station is used largely for demonstration and experimental work, quite a bit of rag-chewing and general ham work is done. Reports on the station's signals are always satisfactory.

W2ENR, Schenectady, N. Y.

HERE is a glimpse of some of the Schenectady gang operating W2ENR, the station of the Schenectady Amateur Radio Association. Besides functioning in normal club activities, the station works in the Naval Reserve Net each Friday night, being operated by members of the local communication reserve unit.

The transmitter, loaned by W2BWF, has a crystal-controlled oscillator using a Type 10 tube, two buffer stages with 865's, and an 860 final amplifier, this last operating with about 1500 volts on the plate. Provision is made for doubling into 40 and 20 meters. The receiver is a three-tuber having a detector and two audio stages using 201-A's.

Grouped around the set are W2EFM, W2LU, W2CJP-ZZK, W2DTS, W2AZH and W2CAZ.
Devoted to the interests and activities of the
INTERNATIONAL AMATEUR RADIO UNION

President: H. P. Maxim
Vice-President: C. H. Stewart
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Headquarters Society: THE AMERICAN RADIO RELAY LEAGUE, West Hartford, Conn.

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New Zealand Association of Radio Transmitters
Norsk Radio Rela Ideke
Polish Zwiazek Krótkofalowcow
Radio Society of Great Britain
Rede dos Emissores Portugueses
Reseau Belge
Reense Emetteurs Français
South African Radio Relay League
Suomen Radiosähköilmailijoille
Sveriges Radiokommunikationsförbund
Unión de Radioemisores Espanoles
Union Schwetz Kurzwellen Amateur
Wireless Institute of Australia
Wireless Society of Ireland

Conducted by Clinton B. DeSoto

Official:
Elected by a unanimous vote on the part of a majority of the membership, the CeskoslovenskÁ Amatér Vysilaci (C.A.V.) becomes the 23rd member of the Union. This organization represents an amalgamation of the formerly competitive Czechoslovakian societies, the K.V.A.C. and the S.K.E.C., and is truly national in character. Its inclusion on our membership roster will be of value to the Union not only because of the amateur spirit displayed in overcoming differences of opinion and tradition for the common good of our art, but because of the added strength lent by the society itself.

At the annual general meeting held in Prague on March 25th officers for the current year were elected as follows: president, Col. J. Skla, OK2VA; vice-presidents, Ing. J. B1sek, OK1BK, and P. Motycka, OK1AB; honorary secretary, Prof. V. Vopicka, OK1VP; assistant secretary, Zd. Valesk1, OK2SI; honorary treasurer, M. Paulik. There are eight other officers on the board. The total membership is 242; the number of licensed stations 79. The address for QSL's and general correspondence is: C.A.V., Praha II, hl. postal box 69.

Proposal No. 13 of Calendar No. 9 by the R.S.G.B. has also been adopted by the membership. This proposal provides that in the future full details regarding the status of all societies applying for membership shall be published in the Calendar at the time of their proposal for election. Thus the findings of the Headquarters' preliminary investigations concerning all applicants will be made available to members, and a more considered vote can be rendered.

DX:
A remarkable set of DX conditions has prevailed on the 14-mc. band for the past several weeks, the time of writing being June 20th. At all hours of the day and night signals can be heard here in New England, and reports indicate that this situation is prevalent throughout the United States and presumably the world. The greatest DX is heard in the morning hours, of course, with J's and other Asians coming through from 8 a.m. to noon, eastern time, according to W8CRA. In case you've forgotten, the Japanese are restricted as to operating times, the allowed periods near these times being 1300-1500 and 1700-1900 G.C.T.

From then on the skip gradually lessens, until after midnight on some nights we here in New England are able to hear W8's and W4's quite satisfactorily. The antipodes come in best during the noon and early afternoon hours, as is to be expected, Europeans falling into the late afternoon and early evening. South American's and W6's occupy the balance of the evening, until the W9's and W5's begin to slip through. And so it's been going, day in and day out.

The most noticeable general observation to be derived from all this is that 14 mc. is beginning to closely resemble 7 mc., with certain added advantageous characteristics. Signals are no longer comparatively weak, as they have been for the past couple of years; they are strong, banging through in resounding fashion. This means most to the 'phone gang, for they are more dependent upon strong signals than c. w. stations. Twenty-meter 'phones are now being heard literally around the world. Such stations as K6BAZ, YV2AM, X1G and two or three Britshers are

August, 1933
being heard everywhere and are working everything. There are numerous others in their class. We’re expecting a lot of new ‘phone WAC’s to be coming up in the very near future!

It’s not only on 14 mc. that this change in conditions is noticeable. W2AOE reports that many of the second district gang are hearing middle western W’s on ten meters as well as twenty, both harmonic and fundamental signals. And they’re doing it consistently, too, so it’s not merely a freak of an hour’s duration. Again we repeat, there are a tremendous amount of new things to be learned in the ever-changing aspects of our present radio conditions, and as the largest organized body in the field, amateur radio has a splendid opportunity to once more contribute in highly significant fashion to the development of the radio art by careful, methodical investigations and orderly collation of these changing conditions.

Corrections:
In the March issue of QST we published a photograph of VK4JB. That was all right, except for the fact that we captioned it as belonging to OK2MA, ANT. MACHAN, SLEZSKA OSTRAVA 1312, CZECHOSLOVAKIA. Recently WAC on c.w., this QRP station has already worked five continents on ‘phone VK5JB instead of VK4JB. We regret the error, and apologize to the actual owner of the station, Mr. O. E. Alder, 16 Old Sandgate Road, Albion, Brisbane, Queensland.

We’ll excuse ourselves by calling it unconscious chivalry, but it seems we exaggerated somewhat in describing the activities of Miss Austine Marshall, VK3YL, in the April issue. It develops that it was not the transmitter that took first place at the Melbourne Radio Show, but a home-made push-pull transmitting condenser tested at 6000 volts. Then, too, she is the only YL in Melbourne to have passed the A.O.C.P. exam; there are a number of other successful Aussie YL’s and XYL’s in other sections of the country. We call to mind Mrs. C. R. McKenzie, VK2GA, Mrs. E. L. Hutchings, VK3HM, Miss Marjorie L. Hutchings, VK3HQ, and Mrs. D. Fanning, VK4DH.

General:
The R.S.G.B. 50-mc. tests from the Crystal Palace conducted by G6QB and G6NF were the most successful yet staged, over 100 stations assisting and remarkable results rewarding their efforts . . . . . Signals from the Palace were heard R9 by G5CV in an airplane 130 miles distant, while a reception report of 150 miles was received from a ground station . . . . . Old NJ2PZ will be back on the air in August, writes John F. Grinan from Jamaica . . . . . The new call to be heard on all bands will be VP5PZ . . . . . In connection with the unusually good reception of Japanese stations in eastern United States recently, the stations normally heard, numbering about 15, seem bunched about the following frequencies: 14,020, 14,100, 14,200, 14,300, 14,380 . . . . . The Senior B.E.R.U. Trophy was won by ZL4AI, reports J. Clarricotts secretary of the R.S.G.B. . . . The Junior Trophy was awarded to VS7GT, and the receiving award to 2BLG, now G2DV . . . . . D4UAN is now using the call D4UAY, while DE1365 has inherited ‘UAN, we are told by W2ABS . . . . . Across-the-Pacific 3500-kr. signals are being heard by the score in VK and ZL . . . . . Eric W. Treblecock, Moonta, South Australia, reports that K6, K7, W and VE stations to the total of 54 were heard during April and May on this band . . . . . W9USA-W9USB operating frequencies: 3505, 3560, 3630, 7010, 7120, 7260, 14020, 14240 kc. ‘Phone: 3907, 3960, 3995 kc. . . . . . Operating 24 hours daily, these stations are always open for a contact . . . . . New Zealand’s Radio family, the Kirby-Camerons, now boasting ZL4CL, ZL4DT, ZL4FN (sisters], ZL4BJ (OM of ZL4CL), is soon to be augmented by the licensing of the mother of the three sisters, and the brother of ZL4BJ . . . . .

New Regulations
(Continued from page 31)

privileges as Class B. Class C much like present Temporary; good for three years but subject to personal examination if op gets into trouble. In general, easier on the qualified and active amateur, tougher on the unqualified and inactive.

Complete text of new regs and detailed interpretation will appear in our next issue. Don’t miss it.

OK2MA, ANT. MACHAN, SLEZSKA OSTRAVA 1312, CZECHOSLOVAKIA

QST for
CALLS HEARD

OKIAW, A1. Weirach, Mestec Kralove, No. 9, Czechoslovakia
28,000-ke. band
daten fskt (fone) fthe f8evq f8pt f8yq fmesa fmrse
fnsb nftsmn ftmmn fsnmn fotsn f2h1o f4bsm f6mc
f6psn f7dt f4yf gnm1 gnsb gnsb gnsb gnsb gnsb gnsb
gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb
fnte fntn fntn fntn fntn fntn fntn fntn

WGEXQ, Ralph R. Heiges, 1572 West 48th St., Los Angeles, Calif.
14,000-ke. band
cr35 ear35 ear135 ear185 ear225 ear225 f8evn f8ex f8gy
f8sn gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb

Thomas A. C. Irma, 1012 Morris Street, Utica, N. Y.
14,000-ke. ’phone band
cm2m em2m v0asaw cib1 x1u x2b yv2am

Edward C. Lips, 2277 Fairland St., Pittsburgh, Pa.
14,000-ke. ’phone band
cm2m em2m gntb gnm1 kftsn v5km x1u yv2am

Eric W. Treblilyl, 784 Hare Tee, Moonta, South Australia
3.6-m. ’phone band
s11u s12ar s12li s13b0

OKIAW, A1. Weirach, Mestec Kralove, No. 9, Czechoslovakia
28,000-ke. band
daten fskt (fone) fthe f8evq f8pt f8yq fmesa fmrse
fnsb nftsmn ftmmn fsnmn fotsn f2h1o f4bsm f6mc
f6psn f7dt f4yf gnm1 gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb
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daten fskt (fone) fthe f8evq f8pt f8yq fmesa fmrse
fnsb nftsmn ftmmn fsnmn fotsn f2h1o f4bsm f6mc
f6psn f7dt f4yf gnm1 gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb
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daten fskt (fone) fthe f8evq f8pt f8yq fmesa fmrse
fnsb nftsmn ftmmn fsnmn fotsn f2h1o f4bsm f6mc
f6psn f7dt f4yf gnm1 gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb
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fnsb nftsmn ftmmn fsnmn fotsn f2h1o f4bsm f6mc
f6psn f7dt f4yf gnm1 gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb gnsb
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3.6-m. ’phone band
s11u s12ar s12li s13b0

Strays

If your dynamic microphone sounds too "boomy," try putting a condenser in series with the voice coil and mike transformer primary. W9EQZ finds that, a 1-µfd. condenser does a good job in his installation. The amount of capacity needed will depend upon the impedance of the microphone, of course, so it would be advisable to experiment a bit.

W7CIC suggests visiting your local postoffice and giving them your complete QRA with call letters. This should take care of those QSL's which arrive with only "W----, Blankville, Mo." for an address. (A senseless way of addressing a card, incidentally.)
Advance Warning

ON GOOD authority we have it that the Federal Radio Commission has just received 10 new AGSX (single-signal type) receivers for monitoring station use. These receivers have bandwidth coils for the amateur bands only. The implication is obvious. The new receivers have good frequency calibration and are more mobile than the "heavy" equipment which Uncle Sam uses for checking frequencies with great precision. With the new receivers it is a simple matter to roam about the vicinity of the amateur bands and "nail" all types of violations with facility.

This type receiver, rightly handled, instantly shows up defective signals, a.c. notes, undue broadness, frequency instability, and lop-sided modulation (fones) etc. It will make fast, direct checking of broadness, frequency-modulation (wabbulation) and the like, in accordance with the state of the art, (and Par. 381-382 of our regulations) possible. The F.R.C. is therefore completely in readiness to enforce its new amateur power supply regulation which becomes effective October first . . . and we are also told on equally good authority that the instructions for regular attention to what goes on within the amateur bands, by the monitoring stations, have already been issued from Washington. Very shortly, individuals who either purposely or carelessly violate regulations, and thus imperil the utility and enjoyment of the amateur bands for all amateurs, are going to get in trouble with the Federal government.

F. E. H.

Gaining Code Speed

BY N. I. HALL, WSTI

WHO wants to increase his code speed? The answer is unanimous. All of us! The only reason we don’t is that we hate to practice. But suppose we can increase it without practice. Sounds fine but how do we do it? Suppose that your operating speed is ten w.p.m. and that ALL of the other hams send fifteen w.p.m. or above. If you were even half a ham, it wouldn’t be long until you were doing fifteen w.p.m. with the rest of them. If you’ll grant me that, I’ll prove to you that gaining code speed is fun and not a drudgery.

We are all looking for something to take the monotony out of the ordinary QSO. What could be better than improving both our sending and receiving speeds. Get your fist warmed up by calling and chewing the rag with operators faster than yourself. The next time you tune over for checking frequencies with great precision.

Remember the "Q" signal for send slower is QRS, a#y JJ/tau of amateur camm,udcalio# acti'o activity. It’s really easy. I made one myself, which proves it. Hi.

Receiving is every bit as easy as sending. Just make it a rule to talk to the operators who send fast enough to give you some real practice. When you get a good operator, instead of giving him a report on his bugs and saying 73, get him to chewing the rag about gaining code speed, his sending, how he holds the key, etc.

Let the other fellow tell you to slow down if you are sending too fast for him or for the receiving conditions. Remember the "Q" signal for send slower is QRS, not QRM or QRN. No one was ever called a "lid" because he sent too fast, if he sent good code.

44

* (ORS-00-AARS) 129 S. Walnut St., Morgantown, W. Va.
Systematic Operating

By Adolph Moon, W6CIR *

R E C Q: To follow the A.R.R.L. procedure of calling up CQ three times and repeating three times is quite right. I find times when one does not even have to call that long. For instance, following that procedure, I sometimes find three or four stations answering. Surely this means that I have called too long. There is, of course, a limit to the number who will QRX to reply, and if too little time is allowed listeners will start tuning for someone else. Repeating the call but twice is suggested for minimizing QRQ and resulting in communication more quickly. While this depends on the time one is working, I have found it works out when most QRQ is present, and surely that is the time to minimize QRQ.

POOR SIGS: Reminder stations work that it is a violation of the regulations if they have broad, frequency-wabbulated signals. Well-filtered p.d.c. power supply is required to make self-controlled transmitters comply with the regulations, and really produce a sharp p.d.c. note. If r.a.c. is necessary for economy, comply with the regulations, and really produce a sharp p.d.c.

OBSCURED FREQUENCY: The violation of the regulations if they have broad, frequency-setting affects the tuning of the amplifier and antenna circuits. Thus, in the course of a few seconds we have tuned to any predetermined frequency and now ready to operate. The reasons for these sudden migrations over the band are many. (1) For instance, on the present frequency of the transmitter you have heavy QRQ, therefore, move to another frequency on which not quite so many are operating. (Just try and find one. (2) Again, you hear W1MK QSO with W6USA and you desire to QSO W1MK. Find W6USA, and as the conversation is drawing to a close, quickly turn the transmitter to W6USA's frequency and call W1MK after you hear his SK. Results—about 95% answer. Another instance. You hear W9ABC calling CQ. Set your transmitter on his frequency and when he signs give him a buzz. If you raise him, only one channel is necessary for both stations. All this "fluttering" about requires the most stable of transmitters and the most accurate of frequency measuring equipment. Do not the present designs of Hi-C oscillators, Lo-C amplifiers, electron-coupled frequency-monitoring equipment, and super-het receivers fill the bill? Why then, be limited to one or two spots in the band when so much is available? With the advent of the electron-coupled exciting stage for the M.O.P.A. this rapid and accurate changing of frequency presents interesting possibilities.

Traffic Briefs

John Payne, W1CCP-BSF, is radio operator on the Yacht Onezepo, WEEY. Although there is no high frequency transmitting equipment aboard, John expects to do some listening on the ham bands.

M.O.P.A. Work

By Wm. F. Stewart, W5MU-W5CSQ *

I N THIS day of temperature-controlled crystal transmitters, the following operating procedure may seem a bit radical, but after consideration it might take on an entirely different aspect. As in the case of most stations, two kinds of work are done, namely: traffic and rag chewing. For the former a particular frequency is chosen and used for all schedules and calls to clear traffic. For rag chewing the entire band or bands are used, choosing any particular frequency that may be desired, within those assigned by the F.R.C. of course. Experience indicates that special care and proper use of reliable frequency measuring equipment are necessary to avoid causing QRQ in changing frequency, and in avoiding any possibility of off-frequency operation.

By use of the frequency-monitor it is possible to tune the oscillator to any desired frequency. The amplifier stage is tuned and then the antenna circuit. Checking again with the frequency meter, final adjustment of the oscillator may be made without seriously affecting the tuning of the amplifier and antenna circuits. Thus, in the course of a few seconds we have tuned to any predetermined frequency and now ready to operate. The reasons for these sudden migrations over the band are many. (1) For instance, on the present frequency of the transmitter you have heavy QRQ, therefore, move to another frequency on which not quite so many are operating. (Just try and find one. (2) Again, you hear W1MK QSO with W6USA and you desire to QSO W1MK. Find W6USA, and as the conversation is drawing to a close, quickly turn the transmitter to W6USA's frequency and call W1MK after you hear his SK. Results—about 95% answer. Another instance. You hear W9ABC calling CQ. Set your transmitter on his frequency and when he signs give him a buzz. If you raise him, only one channel is necessary for both stations. All this "fluttering" about requires the most stable of transmitters and the most accurate of frequency measuring equipment. Do not the present designs of Hi-C oscillators, Lo-C amplifiers, electron-coupled frequency-monitoring equipment, and super-het receivers fill the bill? Why then, be limited to one or two spots in the band when so much is available? With the advent of the electron-coupled exciting stage for the M.O.P.A. this rapid and accurate changing of frequency presents interesting possibilities.

August, 1933

* Box 383, Rocklin, Calif.

** Box 346, Muskogee, Okla.
Expeditions

A T THIS writing, we are able to list five ship stations, of which three hundred licensed to operate on frequencies above 1500 kc. by the Federal Radio Commission, authorized to communicate with amateurs, under certain restrictions. These ships are:

<table>
<thead>
<tr>
<th>Name</th>
<th>Calls Letters</th>
<th>License</th>
<th>Location</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Martha</td>
<td>W2UN</td>
<td>F. F. McDonald, Jr.</td>
<td>Chicago</td>
<td>12450</td>
</tr>
<tr>
<td>Atlantic</td>
<td>W2BQG</td>
<td>Gerald Lambert</td>
<td>New York</td>
<td>12450</td>
</tr>
<tr>
<td>Pour Winds</td>
<td>W2KDU</td>
<td>Stanley Harris</td>
<td>New York</td>
<td>12450</td>
</tr>
<tr>
<td>Ramsey</td>
<td>W2XEN</td>
<td>Dr. Forbes</td>
<td>Cambridge, Mass.</td>
<td>12450</td>
</tr>
<tr>
<td>Alden</td>
<td>W2KDL</td>
<td>Donald Prince</td>
<td>Baltimore</td>
<td>12450</td>
</tr>
</tbody>
</table>

The yachts thus licensed operate on the group of frequencies above 3000 kc. with A-1 or A-2 emission, as follows:

- 3105-12450 5515 6170 8240 11025 12390 16490 22025
- 3115-12450 5520 6180 8250 *11030 12375 16430 22050
- 1150 5525 6190 8260 11055 12395 16500 *22080
- 1160 5530 6200 8290 11075 12420 16530 22100
- 1165 6210 8300 11085 12435 16560 22120
- 6220 8300 12450 16590 22150
- 6230 8320 *16660 16690
- 6280 8380 16850

* Primarily for calling.

The Ellsworth Trans-Antarctic Flight was granted an aircraft license for the plane NR-12260, the following frequencies being authorized, and the call assigned, KHINR:

- For calling, (kc.) 500, 3105, 4140, 5220, 8280, 11040, 12430, 16590, 23080. For working, (kc.) 477, 3115, 4150, 5515, 6230, 8300. 11025, 12450, 16580.

VOQH

On June 20th the Bartlett Northeastern Greenland Expedition sailed from Staten Island, with W2UN (Robert Moe, of Brooklyn) aboard as radio operator. On the evening of June 22nd radioed reports (via W2NV aircraft license for the plane NR-12260, the following frequencies being authorized, and the call assigned, KHINR:

- For calling, (kc.) 500, 3105, 4140, 5220, 8280, 11040, 12430, 16590, 23080. For working, (kc.) 477, 3115, 4150, 5515, 6230, 8300. 11025, 12450, 16580.

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- 1165 6210 8300 11085 12435 16560 22120
- 6220 8300 12450 16590 22150
- 6230 8320 *16660 16690
- 6280 8380 16850

MISS FLORA CARD, W6EK. FLORA HAS THE HONOR OF BEING THE FIRST YL EVER TO BE APPOINTED ORS IN THE LOS ANGELES SECTION She well deserves it, as she is an excellent operator and has a flock of FB schedules.

Traffic Briefs

The Allegheny Valley Radio Association and the Amateur Transmitters Association of Western Penna., are holding a Western Pennsylvania Hamfest at Memorial Park, New Kensington, Pa., on Sunday, August 6th, starting at 2:00 p.m. E.D.S.T. An interesting program including lunch is planned, and all amateurs are invited. W9PE, W. G. Durrall, Springdale, Pa., is chairman of the fest. Drop him a line advising if you will be present.

The Electric City Radio Club (Great Falls, Mont.) will hold its annual hamfest on Tuesday, August 22nd. It will be an all-Montana get-together and amateurs everywhere are invited. There will be no registration fee, only charge being the cost of the banquet (which will not exceed seventy-five cents). A representative from A.R.R.L. HQs is expected, and a hang-up good program is planned. Those who intend to take in this pow-wow should notify W7BUJ, Walter Lundy, 1511-8th Ave., No., Great Falls, Montana.

Any amateur locating a 204A, serial-30317 (stolen), is requested to inform J. W. Stafford, Instructor of Electrical Communication, Purdue University, Lafayette, Indiana.
A scientific expedition known as "Expedition of Explorers Associated" is off for the Arctic on the Norwegian boat *Narvik II*. Radio equipment aboard, under call letters LATD, will be operated by H. E. Mallineskrodt, ex-WLHA. The expedition will depend on amateur radio contacts for communication; the 14 mc. band will be used. All amateurs are requested to watch for LATD and assist the party wherever possible. Please report reception and all contacts to A. R. R. L.

"CQ Rush Urgent N C de W6ERM..." this is what W6AAQ, Birmingham, Ala., heard on the 7-me. band at 9:45 p.m. P.S.T. January 12th. One hour and forty-five minutes later the message was aboard a train out of York, Pa., traveling "Special Delivery mail" to its destination. W4AAQ, Birmingham, Ala., heard on the 7-me. band at 8:30 p.m., May 30th, WGBWZ, acting as master of ceremonies, called the "official bartender." Hi.

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**BRASS POUNDERS’ LEAGUE**

(May 16th–June 16th)

<table>
<thead>
<tr>
<th>Call</th>
<th>Orig.</th>
<th>Dot.</th>
<th>Lat.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>W6QG</td>
<td>128</td>
<td>156</td>
<td>75</td>
<td>329</td>
</tr>
<tr>
<td>W6WW</td>
<td>192</td>
<td>76</td>
<td>566</td>
<td>734</td>
</tr>
<tr>
<td>W6VW</td>
<td>192</td>
<td>76</td>
<td>566</td>
<td>734</td>
</tr>
<tr>
<td>W6WV</td>
<td>192</td>
<td>76</td>
<td>566</td>
<td>734</td>
</tr>
<tr>
<td>W6WJ</td>
<td>192</td>
<td>76</td>
<td>566</td>
<td>734</td>
</tr>
<tr>
<td>W6WH</td>
<td>12</td>
<td>106</td>
<td>511</td>
<td>629</td>
</tr>
<tr>
<td>W6WDU</td>
<td>22</td>
<td>7</td>
<td>640</td>
<td>669</td>
</tr>
<tr>
<td>W6WHM</td>
<td>12</td>
<td>106</td>
<td>511</td>
<td>629</td>
</tr>
<tr>
<td>W6WJ</td>
<td>22</td>
<td>7</td>
<td>640</td>
<td>669</td>
</tr>
<tr>
<td>W6WDU</td>
<td>22</td>
<td>7</td>
<td>640</td>
<td>669</td>
</tr>
</tbody>
</table>

These stations "make" the H.P.L. with totals of 500 or over. Many "rate" extra credit for one hundred or more deliveries. The following one-operator stations make the H.P.L. for delivering 100 or more messages; the number of deliveries are as follows: Deliveries counted:

- W6WHM, 258
- W6VX, 126
- W6JX, 102
- W6GQ, 101
- W6QX, 100
- W6JY, 75
- W6LY, 53
- W6PP, 52
- W6LJ, 50

A total of 500 or more, or just 100 or more deliveries will put you in line for a place in the B.P.L. Make more schedules with reliable stations. Take steps to handle the traffic that will qualify you for H.P.L. membership also.

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**Relative Standings of the Ten Highest Sections—May-June**

<table>
<thead>
<tr>
<th>Message Per Station (25%)</th>
<th>Stationary Reports (25%)</th>
<th>Gain or Loss (Traffic Reports, 25%)</th>
<th>Traffic Total (25%)</th>
<th>Standing Based on Average of All Four Ratings (%)</th>
<th>Section Communications Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. L. 240.1</td>
<td>Los Ang. (608) 109 N. C.</td>
<td>+14</td>
<td>Los Ang. 7135</td>
<td>E. Penna. 50</td>
<td>Wagenseller, WEGS</td>
</tr>
<tr>
<td>E. Pa. 150.9</td>
<td>Va. (150) 63</td>
<td>+14</td>
<td>Wash. 3447</td>
<td>N. Carolina 42.5</td>
<td>Wright, W6AT</td>
</tr>
<tr>
<td>Calif. 191.2</td>
<td>N. C. (140) 56</td>
<td>+14</td>
<td>E. Bay 3861</td>
<td>Washington 15.9</td>
<td>Delicate, W6A0</td>
</tr>
<tr>
<td>S. Tex. 172.6</td>
<td>Wash. (374) 55</td>
<td>+14</td>
<td>W. N. Y. 2897</td>
<td>Philippines 22.5</td>
<td>Thompson, KAXIA</td>
</tr>
<tr>
<td>AlaskA 165.4</td>
<td>Mo. (32) 59</td>
<td>+14</td>
<td>Ohio 2818</td>
<td>M. &amp; D. D. C. 27.5</td>
<td>Ginsbard, W6YK</td>
</tr>
<tr>
<td>East Bay 132.7</td>
<td>Pa. (538) 48</td>
<td>+14</td>
<td>Missouri 2014</td>
<td>Pennsylvania 21.5</td>
<td>L. Brink, W6BV</td>
</tr>
<tr>
<td>W. Pa. 97.3</td>
<td>Ill. (899) 46</td>
<td>+14</td>
<td>San Franc. 2374</td>
<td>Florida 21.0</td>
<td>Houston, W6ZM</td>
</tr>
<tr>
<td>W. N. Y. 90.5</td>
<td>W. Pa. (804) 37</td>
<td>+14</td>
<td>Mich. 2219</td>
<td>Ohio 20.5</td>
<td>Tallmounds, W6BAH</td>
</tr>
</tbody>
</table>

Eastern Pennsylvania has a slight lead on L. A. this month, making the top-of-column position nationally on the basis of placing three times in the highest group, while L. A. topped the country in two columns. L. A. also maintained her over-100 traffic-records in a summer month when the country dropped 229 records from the previous month. North Carolina again showed a fine gain-in-records and Ontario led in similar fashion. Without respect to national standings we are able to take credit for the Division; E. Penna. and W. N. Y. (listed), Iowa; Eastern Mass. Alaska; East Bay, Virginia, Colorado, Alabama, Southern and Northern Texas (tied) and Ontario lead Canada. During the May 16-June 16 month, 230 stations participated in the 1,662 delivered by 133 stations played 44,011 total; 76 top spots this month.

The Section A.H.L. membership (approx.) is shown heuristically, so that the degree of reporting activity may be indicated by comparison.

August, 1933
ELECTION NOTICES

To all A.R.R.L. Members residing in the Sections listed below:

A.R.R.L. has received applications for nominations to fill vacancies in the Section offices of Communications Manager and Secretary. Pursuant to the By-Laws and rules of the A.R.R.L., the persons nominated shall hold their respective positions for the term or office starting on the date given.

The persons nominated are:


For the D.C. Section, only the incumbent shall be named.

The persons nominated hold their respective positions for the term or office starting on the date given.

In the absence of nominations from Members of a Section, the incumbent shall hold his official position and carry on the work of the Section, subject, of course, to the question of filling a nomination petition and the holding of an election by ballot or as may be necessary. Petitions must be in handwriting, signed by A.R.R.L. members, and delivered to the SCM of the Section.

Due to resignations in the Washington and New Hampshire Sections there are vacancies for the offices of Communications Manager in these Sections and the closing date for receipt of nominations at A.R.R.L. Headquarters is hereby extended for 30 days from August 15, 1933. All nominations must be in the hands of the SCM of the Office in which the candidate is running.

Section Closing Date Present SCM Name of Office State

Washington Aug. 15, 1933 John P. Gruble "resigned"
New Hampshire Aug. 15, 133 V. W. Hodge "resigned"

Mississippi Aug. 15, 1933 William N. Weller Jan. 15, 1933
Arizona July 10, 1933 Ernest Meadors July 15, 1933
Eastern N. Y. Sept. 13, 1933 E. L. Hatch Sept. 16, 1933
Eastern Mass. Sept. 13, 1933 J. A. Mullen Sept. 16, 1933
Florida Oct. 6, 1933 Robert G. Anderson Oct. 12, 1933
British Oct. 16, 1933 J. K. Cavalsky Oct. 20, 1933

NOTE:

1. In Canadian Sections nominating petitions for Section Manager shall be filed in the A.R.R.L. office at 101 Queen St., Quebec, the address of the SCM of the Division of which the Section is a part. In the case of Section Managers, the candidates shall be elected and accepted. Additional election certificates have been mailed to those holding office of SCM of the Sections referred to above.

2. The qualified candidates who are nominated shall be listed in order of their names as appearing on the petitions.

3. The election for each office of SCM and Secretary shall be held in the office of the Section in accordance with the By-Laws of the A.R.R.L., and the Divisional Code. The office of SCM shall be filled for the term ending Oct. 16, 1933.

ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed in a number of Sections on or before the closing dates that had been announced for receipt of such petitions. As provided by our Constitution and By-Laws, when but one candidate is named in one or more valid nominating petitions this candidate shall be elected and accepted. Election certificates have been mailed to the following officials: SCM or Secretary, the term of office starting on the date given.

Mention J. H. Byrd Washington May 23, 1933
Northern Robert C. Hamberger Washington June 13, 1933
Quebec John C. Stadler, VE2AP June 15, 1933

DIVISIONAL REPORTS

ATLANTIC DIVISION

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Harry Ginsberg, W3NY - W3BAK, W3SN, W3US, RMs, W3BWT, Chief RM. W3DG and HF are testing on 50 mc. The Westmont Amateur Radio Club reports four Girl Scouts in code class. fellows this is my final report. If my successor receives the cooperation you gave me, this Section can't help being in front!


SOUTHERN NEW JERSEY — SCM, Gedney M. Erbe, W9USA. W3KHW has moved to New Jersey and now is working new quotas. New ORS: W3AVO and A.WL. W3AZZ and DGF are interested in ORS. W3AVJ is on 7 mc. Storms dropped W3BYM's pole. W3AWY wants to play checkers over the air. W3AFV has fine total. New hams: W3AFW, W3KHH, W3QO, W3QG. W3KHF adds hams to ORS line-up. W3ZJ is operating on only one frequency. W3AFV sends first report. W3ZJ is working hard on A.A.R.S. W3UT is DXing on 14 mc. W3BEI is QRL auto receiver. Please answer this query: "Are you in favor of having some kind of hamfest in Southern New Jersey this fall or winter?" Write W3AKI for nice QSL cards.

Traffic: W3CXX 1 CQO 3 GU 5 ZI 15 DGF 2 DBB 8 BYM 5 AW 10 OW 10 APY 99 AE 39 AOV 15 AZZ 14 BYL 7 BWR 3 IS 1 QL 3 AKI 1.

WESTERN NEW YORK — SCM, Don Farrell, W2DSP. W3KHW has moved to New Jersey and now is working new quotas. New ORS: W3AVO and A.WL. W3AZZ and DGF are interested in ORS. W3AVJ is on 7 mc. Storms dropped W3BYM's pole. W3AWY wants to play checkers over the air. W3AFV has fine total. New hams: W3AFW, W3KHH, W3QO, W3QG. W3KHF adds hams to ORS line-up. W3ZJ is operating on only one frequency. W3AFV sends first report. W3ZJ is working hard on A.A.R.S. W3UT is DXing on 14 mc. W3BEI is QRL auto receiver. Please answer this query: "Are you in favor of having some kind of hamfest in Southern New Jersey this fall or winter?" Write W3AKI for nice QSL cards.

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WASHINGTON PENNSYLVANIA — SMC, C. H. Grosarth, WSCQG — WSCPE has been assigned WLQP for A.R.R.L., on 3457 S6c. WSMEE is pouting them out. WSCQA’s schedules keep him busy. WSEIS reports by radio. WSWLG spent 100% time on ‘phone! WSCMP lost his schedules. WSHCG is moving, WSGUB reports his highest total so far. WSAYV enjoyed a fishing trip. WSBCH reports new Fall schedule. WSNHO, the Valley Amateur Radio League of Donora, WSCFR finally got that pole up. Everything in WSAJE’s shack up in two weeks time! WSGBC lost his fifty watter. WSBWL has been in training at Phila. Navy Yard. WSAHR continued and D4G attended convention at Buffalo. WIOH, and 101 of St. Marys are Clayton and Fred Wise, respectively.


EASTERN PENNSYLVANIA — SMC, Jack Wagenseller, W3GSB — W3ZZBA, ALX, CL and BKQ all make the BPL. W3ZZA handled all the Chester Fair tflc. W3AXL is new ORS. W3AGN has a portable, W3DRTZ, W3FLA delivered a lot from the forestry gang. WSCMF is after ORS. W3ADE QTA skeds for summer, W3RTS rebuilt xmitter and reactor, W3A3Z is motor-cycling, W3BIJ reports for Benson Radio Club, Bad YL QRM at W3ASW. W3WBB reports for VHF, W3LCJ for two weeks, W3ZVW has a 75 watter, W3AQI skeds W3USA daily. Thanks to W3CL, W3ADM is now reporting. W3BQK is handling World’s Fair tflc. W3AR8 changes to 1600. W3SRR is gone. The Shamokin Club is now A.R.R.L. affiliated. W3EBC is in­

Traffic: WSCPS, UPB~ — W5CCS-F, — W5CCS-F.

CENTRAL DIVISION

INDIANA — SCM, Arthur L. Brown, W9TE — W9MQQ is pinch hitting for W9TE as SCM this month, W9TE being on a vacation. W9NJF is call of Kokomo Radio Club. W9OHF is working new power supply. W9HPQ worked NY2AB, W9AXH likes ‘phone, W9QLE is planning on ‘09a’s P.P. in amp, W9CKG plans on a vacation, W9BAA is building o.c. rig, W9HUU is listening on 28 mc., W9HVC has a few schedules, W9QEDY and W9MTP is portable MTB, W9LIV has new o.c. rig, W9NC7 and MB2 are new hams. W9WPT worked X9ZU and VK8Q5. W9MYC is at Bay. W9HSH handles W9USA traffic. W9MSZ hears DX on 7 mc., W9NLJ is portable call of FVY. W9MCN has a pair of ‘09a’s. W9ZFT is coming on with vertical antennae.


KENTUCKY — SCM, Carl L. Plummer, W9OX — Monthly Kentucky QSO party will be inaugurated August 13th, W9AUI takes first place. W9CTT is eligible for ORS. W9BWJ has things up his sleeve (?), W9CNE avoids noise on 14 mc. W9RUE paid visit to W9USA. W9QOS resumes place on air after moving. W9JTO is slowing up. W9JPM has c.e. rig going. W9CMK will have time next month. W9CEC is on for summer, W9CZQ is going “phone,” W9CPI is spending two weeks on Great Lakes, W9RAZ is back in the “home-port.” W9ETO is adding a coast 50 watters, W9BUP is new station, W9FQQ is back from Capitol. W9K7QG is in Louisville for the summer, under call DKD, W9EOM moved to Pineville.

Traffic: W9AUI 122 FTTT 115 BJW 49 CNE 41 ARTI


OHIO — SCM, Harry A. Tummonds, W8BHA — Chief RM WSDDS — District 6 RM W8BHB: WSCXP cedes pedals into W9HTT, has portable QJO. New o.c. rig at W9GDC. W9CQ wants AARS blanks. 58 mc. at W8CMQ. No. 3 RM W8BKE: W8CPSL takes new commercial job. District. 8 RM W9SFS: W9GME reports new ham. 110 degrees hot in shack and 2 LUs at one sitting. District 5 RM W8FQG: W8HCs had over 300 QSOs last month. 110” degrees hot in shack at W8BMK, District 4 RM W8SEQ: W8WE joins AARL. W8DEM is rebuilding, W8DMH wants schedules. W8CQ's schedules. W8KRL is starting W8GNE, “Duk” reports W8ANZ, Something jumped us W8PO. District 1 RM W8THV: New 56 mc. club started at Cleveland. Present at first meeting: W8HIC, W8ZOB pres., Ex-W8CUX, Ex-W8CUX, W8ZFB, W8KIC, W8KIC, W8IB and W8VNB. The West Tech High School Radio Club put on a real hamfest at Cleveland. Harry Lann has announced a Hamfest for Euclid Beach this summer. W8RIN and GVL have been visiting the gang. W8AOG is checking DX for W9OEE. W8HED is back. W8SEF reports working following graduates from Heights High School: W8CPS, GAB, G1, IFP, EFW, W8AUM graduates from Lorain High School. W8RIN is remodeling W8BMX reports station off air. W8HYD is looking for commercial job. First report from W8HM, W8BMX reports by telephone,
WSCQ is going to put in new receiver. WSSZB is on 1.7 mc. 'phone. W8FEP says C.H.A.R.C. meets at his home every Wednesday night. WSCQ keeps real schedules. W8BBA schedules W0TBA 6:30 p.m. daily E.S.T. WSDH is QRL summer. WSPG is rebuilding. WSEWE is at Muscle Shoal. W6HYZ has c.e. rig. W6BHY reports from Nashville, Tenn. W6FX is on KUTM, William P. Reiss. W5VYR Technical 296 1518. BQ 223 FGV 178 EEQ 118 BAI 136 PO 96 QQT 92 DVL EQU 44 QSO 43 KMK 41 APC 59 JDI 35 ISK 34 BMK 11 ANZ 10 HMH 8 BYD 7 FJE 6 ESN 16 EVS 3 t.runk lines work fine. W9NDB has '45 Hartley. W9NDO antenna came down. W9ISR has c.c. W9IWY is installing W9IKL is building new 'phone rig. W9DQS is QRL summer school. W9NLU. W11ZY keeps schedules W9IAK is moving for hundredth W9USA ops. W9IWZ visited W9USA. W9IEP likes port­ W9USA 6:30 p.m. daily E.S.T. W8HRI has heard from hams who are Kappa Sigma. W9DGK is work­ W9A VB is on 14 me. 'phone. W9DDE plans a W9HBG is on violin. W9JVD has new bug. W9GEX is an ex W9NFB. 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first report. W5CR is now at W9FVM. W5CVO is at Stiloam Springs. W5BED and BUX visited the SCM. W5DBB has c.e. rig. W5CEO, NJ and ANZ are rebuilding. W5JK is going to use portable DM1. W5AHP traded his station to AKY for a motorcycle. W5BHK has 4 stage c.e. rig. W5DFY is now station in Little Rock. W5DI is active.

Traffic: W5BDW-ABJ 19 BFD 7 DBD 44 JK 12 BZK 22 CLQ 2 ABJ 36.

LOUISIANA—SCM, W. J. Wilkinson, Jr., W5WF—A club has been started in Shreveport. W5HZR, CMQ, DGE and AQG were in Shreveport. W5CFG is traveling. W5CTR likes rag chewing. W5DKR is new ham, W5BDH has nice schedules. W5IKC is handling traffic. W5AVO and CTO are QRL. W5BM has been laid up, W5CXX spends his time on c.e. W5CEN 97% bull. W5BXY applies for ORS. W5DLL-DJZ is La Place Radio Club. W5CFG is a Real Silk salesman. W5CW has an '04-A. W5AWK is home for summer. W5CFG is SOS (Shreveport's Official Snooper). W5AYZ had as visitors W5AHK, BKV, CDG assigned portable F1VI. W2FUM is new ham. "Things ill health. W2BLL uses portable FDW. W2UL, CC and CL are 'reun.

Glider Meet at Elmira. W2JPH is welcomed to our section. Editor, W4PL Cartoonist and W4AFM Office Boy and W5DJX will soon be on Barksdale and WF. W5CAX is back from Chicago. W5PY is recuperating from operation. W5ARJ is at Barksdale Field. K6FYF is at Barksdale Field. W5QH is president of F2GAF and AYQ have new receivers. W5BO is QRL police radio. W4AGW, the OW, and AYE are busy selling BOL sets. W4BNT will be on soon. W4NA is a radioeditor. W4VT is president of Memphis Amateur Radio Club. W5CAU is a good receiver. W5AMQ has TLLTAS. W4TD has an e.c. oscillator. W4AMT is home from college.

Traffic: W2JPH 1933 BUC H BGQ 12 BXD 10 CBS 9 VT-CU, HUDSON DIVISION.

HUDSON DIVISION

EASTERN NEW YORK—SCM, Robert E. Haights, W2LU—W2ATM leads with F5 traffic schedules. W2BLU is second high. W2BJA is out after 17 months of illness. W2BLH uses portable FDW. W2UL, CC and CL bad W5CXX Bon Voyage on 7 mc. as he sailed for Japan. W2EYR is going strong. W2GFU sports an FB7. W2GBN has been traveling county. W4AAO is en-tour of the country. W4VT is president of Memphis Amateur Radio Club. W4ABY has new rig to BXP. W4GU and AYQ have new receivers. W4ABY is striving to make TNT perk properly. W2CST has three stages of speech amplification. W2BYR got new transmitter working. W2EIO is back from his honeymoon with sister of W2CFW. W2FUY is new in Jersey City. W2DMU and PGJ had hard luck when lightning struck both outfits. W2AEV is experimenting with 28 and 56-mc. 'phone. W2EUB contacted Illinois on 21 mc. W2EYR are experimenting with 28 and 56 mc. W2CQF is active on traffic. W2DGU sends 'photo of extremely fine QSL. W2FMF is active on traffic. W2EUO and CQJ are on W2GAZ. W2JPH is going strong. W2GFU sports an FB7. W2GBN is a Real Silk salesman. W5CW has an '04-A. W5AKW is putting up new sky hook. W2FHB and FDQ are always in the air. W2FHO traded his station to AKY for a motorcycle. W5BHK has 4 stage c.e. rig. W5DFY is now station in Little Rock. W5DI is active.

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Traffic: W5ATN 297 BLU 120 BIA 106 LU 76 BELL 57 UI 30 FUR 20 KW-CFU 17 CBN 12 QY 7 FPH 3 BTQ 2 CJ-Anv 1.

NORTHERN NEW JERSEY—SCM, Walter A. Cobb, W2CO—W2FL visited the World's Fair and operated W2USA. W2BPL also threatens to check up on the Century of Progress. W2DPB reports the Rutherford Club coming along FB. W2ABT schedules K5AB. W2EKM has been appointed RM and ORS. W2TPT prefers to handle traffic via 'phone. W2CIZ is busy with amplifier jobs. W2KXM is making preparation for fall. W2DUL got personal with a rattler and landed in hospital. W2QST is active on traffic. W2DGU sends 'photo of extremely neat station. W2EAJ moved to new location. W2EOH Q5Oed W2PAH and W2AJY and AYQ have new receivers. W2BYL is missed. W2ATU is sick W2QST is active on traffic. W2DGU sends 'photo of extremely fine QSL. W2FMF is active on traffic. W2DGU sends 'photo of extremely fine QSL. W2FMF is active on traffic. W2EUO and CQJ are on W2GAZ. W2JPH is going strong. W2GFU sports an FB7. W2GBN is a Real Silk salesman. W5CW has an '04-A. W5AKW is putting up new sky hook. W2FHB and FDQ are always in the air. W2FHO traded his station to AKY for a motorcycle. W5BHK has 4 stage c.e. rig. W5DFY is now station in Little Rock. W5DI is active.

Traffic: W2BDW-ABJ 19 BFD 7 DBD 44 JK 12 BZK 22 CLQ 2 ABJ 36.
recommending from convention. W2AWT went to a wedding in his first tour. W2ERK is new move. W2HJW is headed up. W2PKL says W2 top for radio. W2OOW is on radio vacation. W2BMI is trying to beat depression. W2LG is both a father and an uncle! W2ZT joined the board in his first tour. W2FV is the man. W2HJW is stellar. W2AZV wrote his report in a pen in New York. W2BLH is on vacation. W2OOW is on radio vacation. W2HI is trying to beat depression again. W2ELK says WX too hot for radio. W2DQW got Q2 in college. W2DWY is in June. W2QG is president and W2HPR vice-president of the club. W2EXP.

Traffic:


MIDWEST DIVISION

NEBRASKA — SCM, Samuel C. Wallace, W5FAM — W5DHY says ELR. Burling is setting up. W5DHY is going to Nebraska this summer. W5HRJ is playing with antennas. W5EWO is making plate transformers. W5FHW is going on vacation to Wyo. W5BCX expects to have 51 going. In fall, W5HRJ is going back into building c.c. rig. W5RBN is new station at Atchison. W5DHA reports from Ft. Cook. W5EWO and 1PQ-0F report new Omaha radio club, Amateur Radio Operators Club, W5FAM enjoyed Convention at Lincoln.

Traffic:

W5DMY 30 DFV 19 ISJ 18 EWO 14 FVW 9 BSS 6 DI-AP 5.

KANSAS — SCM, O. J. Spetter, W7FPL — Rs. W7KGK and W7CFS, W7FPL schedules W7USA. W7GBP leads the state. W7FRC blew 888's. W7BESL is binding his QST's. W7GBP goes to Tulsa for the hams. W7FRC is getting five amps into zepp. W7GQK is OP at OFEP. W7MUY reports 7 me. W7JLF is -M with antennas. W7BGO is making plate transformers. W7AFK-ENK continues through summer QRM. W7JLP is on vacation again. W7HRN is on radio vacation. W7KLF is still having VHF trouble. W7DM is new c.e. 10 meter rig. W7IO is on September. W7OMA and W7QCG make the grand total for Kansas City Scoring with NO TRAFFIC! What's wrong, we should have a higher percentage?

Traffic:


NEW ENGLAND DIVISION

WESTERN MASSACHUSETTS — SCM, Earl G. Hinewson, W1A8Y-W1R8 — WIEFM leads in traffic. W1BNL is passing the summer at WQEC. W1FEQ is interested in phone. W1DJQ moved to Chicago. Five new stations using c.c. W1HRQ handled QRM traffic. W1DJQ reports for Field Day. W1ADF says the BBP picnic held at Prospect Lake was a great success. W1BPT is going to use the W1YQ radio in his portable. W1DWW is radio instructor for a local ham. W1GW worked WQG on 3.5 me. W1EJH lies low. W1HGJ calls the c.s. on phone. W1HDR is getting W1EJQ on air. W1FXQ is running around with his RS. W1GWJ is tossing traffic with Canada. W1FFA has a new 211E. W1JJL has trouble with his transmitter. W1DWW handled QRM traffic with W1CRD. W1B5O is looking for jobs. W1EJO is a new c.e. rig in use. W1FW7 is going to Maine for summer. W1BIO heard 6 continents and worked 4 in one night. W1ALP is suffering from summer fever. W1BUW and BMW are QRM business. W1BJA keeps schedules. W1COP is on 1.7 me. phone. W1AJD and C5G report for summer time. W1HGR is the main 5 CW for the summer. W1BNL and DZQ are experimenting on 5 me. W1UG is using a W1BO receiver. W1CGM and AKN

QST

COO, Frank A. Ellis, Jr., WICTI - W1MTK tops the list. W1DVD got a job. The Bristol Radio Club is all set for 50 me. W1APX is rearranging schedules.

Traffic: W1HD had BBU's, 56 me. portable out, on Field Day, 42 BBY 42 ABG-BMW 31 WV 28 UZQ-CCP 24 CTG 23 BFR 21 QHH 9 RA-JL 7 AJ-WI-BO 3 E7 6 AX 2 BNU 3 UQ 25 CEL 41 ACH 40.

Traffic: W1HD had BBU's, 56 me. portable out, on Field Day, 42 BBY 42 ABG-BMW 31 WV 28 UZQ-CCP 24 CTG 23 BFR 21 QHH 9 RA-JL 7 AJ-WI-BO 3 E7 6 AX 2 BNU 3 UQ 25 CEL 41 ACH 40.

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with a fine total as usual. W7ABU graduated from high school, congenital OM. W7DKP is a new Tsosoma ham. W7BCG has fishing fever. W7BSX BPLs. W7BBC says deliveries are sometimes embarrassing — hi, YA! sure keep W7BCV busy. W7AFGC lends the section. W7AWF is c.c. on 8457 kc. Davieville saving time with W7FTG and huddles. W7DQH and BIW work out fine. W7BGY says that enough fellows are making use of QSL bureau for this district, which is handled by W7WPC. W7LD rebuilt. W7TOK has gone vacationing. New W7UQA at W7MLO. W7ATCY celled a J3. W7AYO has almost enough money secured for new 6QAs. W7WSU is home from W7.


Traffic: K7PQ 210 T2 2 ARL 27 TD 29 ATF 91 ANQ 142 PQ 509 AIW 289 DBN 302 FF 253.

PACIFIC DIVISION

SAN FRANCISCO — SCM, Byron Goodman. W6CAL — W6FQ BPLs as usual. W6CFV has a bounty of a hour for total report. W6EKC may join club. W6GKO was in Pope Valley with portable. W6DGO claims "radio 24 hours a day."

Traffic: W6FQ 1215 CFV 343 EKC 207 GKO 105 DO 101 CIS 84 AZ 40 CH 38 BY 38 AB 26 BSG 24 BVL 23 ARS-AW1-ECU 21 ROM-ATM 16 ROM-T6QX 10 AVX 8 DTIR 7 DQH-FCX 5 AAR 4 AVY-BCA-CAL 2.

HAWAI! — SCM, C. D. Slater, K6GCO — K6DYG is back on the air. K6AJA is organizing BC station in Hilo. K6DFI worked Finland. K6BAZ is now WAC. K6JVO is a new c.e. K6HOO is active in traffic. K6ETF is rebuilding. K6ACW is YLing. K6HII has new call, IQL. K6QGF is coming on with e.e. K6GRV has new location. K6CCO puts out no B signal. K6SWB is active.

Traffic: K6EQW 1107 GUA 454 GRI 125 H00 91 CRT 50 DV 48 DSF 43 GFQ 23 ACW 22 EDH 16 CIB 15.

SANTA CLARA VALLEY — SCM, Bruce Stone. W6AMM — W6HM is in Canada for the summer. W6YG and W6YBL are closed down until fall. W6FBW is active at temporary W6BQ. W6HTP is new editor of the bulletin. W6CWN is moving traffic. W6A2C is wearing out maps routing traffic. W6QR is recovering after disastrous fire. W6GUJ and CSI are new reporters. W6GQG will sign INR while in the hills. W6ISD is using an e.o. state. W6JWZ has good L.A. schedule. W6AOQ, CNI and others spent a week-end on Loma Prieta experimenting where there were power leaks. W6C6X says 9 to 11 p.m. is his best band.

Traffic: W6HM 382 FQY 172 YQ 110 F7W 74 DBB 82 CSM 38 YL 33 A2C 50 Q8 14 GUJ 10 GZE 9 HSE 8 H00-8 HOE 5 CNI 7 C7X D1 2.

ARIZONA — SCM, Ernest Mendosa, W6BFJ-W6QC — New hams: W6BR, IGC, IFL, IJF, IJR, ILM, I0G, IQY, IIF, HJG, HUZ and HU. Ex-60TU is now W6H0G. W6H0G has portable IEE. W6F0G returned from vacation. W6CCL has portable W6F1 T. W6HXX was a visitor to W6EJQ. W6BFF moved into new shack. W6RJ is in Europe. W6GK6 has moved to Coschella, Calif. W6RJF is relief op at the scout camp. Clayton Williams is at W6QG. W6QJ and QC keep daily schedules. W6HAX had his set down for couple weeks. W6KI has been QRL. W6QFQ is having trouble. W6UYF (Mrs. W6DSQ) is a new Phoenix ham. W6LRD found that transmitter works much better when turned on. Hi! The Arizona Shortwave Radio Club is going to elect officers.

Traffic: W6ALU 580 QO 490 CVY 14 CFQ 8 IQB 3. S AN JOAQUIN VALLEY — SCM, G. H. Lavender. W6DZN — W6BHQ is going to make radio. W6DAE is in Modesto, Calif., with portable CP, W6FFU and GIV have W6EA CTA is taking portable GCB to the mountains. W6F0H thinks he may hibernate until winter. W6QGQ is active U.S.N.R. and A.A.R.S. W6CTV is busy. W6QFB's 4As are the berries. W6AME is bugging thru. W6ENA is a C.C.C. op at Sacramento at WUBA. W6ABB is still in W6AC. W6MF has moved to W6CA. W6PYM has portable IEEK. W6QDR is a C.C.C. op at WUBD in Fresno, Modesto Radio Club elected officers: W6C0J pres., W6AME vice-pres., W6FMY secy.-trea. Turlock Radio Club had a red hot hamfest — W6AN, our first report, there with all the news from HQ. The DX is in the mountains at a logging camp with portable W6WJ.


EAST BAY — SCM, S. C. Houston. W6EML — CRM, J. H. Macafferty, Jr., W6RJ. W6CDA leads the Section. W6HIM is handling one end of Ninth Corps Area C.C.C. not. W6GXM is off at one of the camps. W6XZ came to see the group. W6FJ has single voice frequencies. W6RF is active U.S.N.R. W6ABK schedules K6GO, K6CCO and J1CC. W6AF is QRL railroad. W6FII is alternate 2nd district NCS for U.S.N.R. W6FAC blew out transformer. W6HRN is going to Santa Cruz for summer. W6CIZ is rebuilding transmitter. W6Y6VM is closing for summer. W6H6I has replaced his 45s with 46s. W6EJA says 1.7 mc. phone is going strong. W6IT is prepared to give frequency measurements to any of the gang. W6DH5 has been working a new spot. W6FPH has trouble with MOPA. W6GBB has been pounding out a few, and has added EXE to the staff. W6FEB is on 1.7 mc. phone. W6ATT tried to break into the crews with a delivery. W6CYE, EDO and AJL sound good. W6G6Z is active. W6CAG is active.


PHILIPPINES — Acting SCM, Newton E. Thompson. KAIIXA — KAIHR new has c.e. KAIUP and ICO are installing c.e. Next meeting Philippine Amateur Radio Assn. will be held at KAIJR.


SACRAMENTO VALLEY — SCM, Geo. L. Woodington, W6DVE — W6FEJ has gone to the C.C.C. at Challenge. W6GSP and GCM are associate editors of Section dope sheet. W6ETM and W6HM are new operators at WUBC, C.C.C. station at Marysville. W6C6X, W6JWZ and W6WIF is under trouble with MOPA. W6GGR is setting up a pair of 211Es PP. W6CIR is building 8 super. W6C6C has returned from a round the world cruise. W6H2P is new traffic man. W6HIM has been working ECMQ. W6BFF is on 6 meters. W6CNO is in Europe. W6CRN is QRL 56 mc. W6GD6D joined U.S.N.R. W6K6M is pound away. W6DGS is home from college. W6BDK paid BHM a visit. W6QII, IOZ, 1NT, and 1VM have new hams. W6GVM's portable is W6FIR. W6FWS good report. W6FEL moved to Los Angeles. W6FRJ is going to New York. W6CWX has c.e. job. W6ENC is going to college. W6SYB worked G15QX. W6SK reports the
U.S.F.S. operate on about 3100-kc. 'phone and 'phone, listen on 3.5 mc., and often call hams for tests. W6GOZ worked at the post office this summer, and W6CK has closed for summer. W6GKK is looking for schedules.

Traffic: W6CKO 69K AK 50 GAC 21 DFR 9 BYB-SE 8 CQG 9 GEP 5 0K6-BLQ-GLZ 4 C3M 2.

Next week: L. Raymond F. W6EAD — W6ECE is coming on with fifties. W6HHT, GGO, DSD and UI are rebuilding. W6BTJ is winding power transformer, W6APJ broke his collar bone. W6AAK is pounding traffic at Forestry Conservation Camp in Idaho. W6XUM is guard. W6FPU is trying to go for unlimited 'phone. W6HQX has 45s P.P. W6HZE has three stage o.e. job. W6EAD has new transmitter.

Traffic: W6CU 47J APF 40 GPT 16 GGO-BTO 14 HED­
gur 5 8HH 4 RCE 3.

LOS ANGELES — SCM. Francis C. Martin, W6AAN — Fourth of July featured hamfest at Crystal Lake by San Gabriel Valley Short Wave Club and picnic at Montecito station at Radio show in L.A. 'W6BMO and FGT commented on W2XRF' news. W6CLV is at Boy Scout, Clamp in San Bernardino Moun­tain. W6CYP and FDSK suggested by W6CYP that extra credit be given in the "fifth stage." W6EYJ is building a 300-watt input. W6DQJ is living in Charleston. Ex­-W6DJTJ is building MOPA. W6DWE is building c.c. job. W6DVT sold out.

New calls: W4CDQ, W6FW is new OBS. W4IIT is now on 8 Sunday afternoons in Spanish. New ORS: W6KVW, W6QX, LQX, and DOZ. W6DWP takes 3.9 mc. 'phone. W6IIT finds it hard to move equipment around. W6YV has a 10-ft. mast. W6YV's 'phone is heard. W6BFDU is going to move traffic at WMMN. W6DVP has already suggested by W6CYP and FDSK that extra credit be given in the "fifth stage." W6EYJ is building a 300-watt input. W6DQJ is living in Charleston. Ex-W6DJTJ is building MOPA. W6DWE is building c.c. job. W6DVT sold out.

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Traffic: W4DSJ is temporarily at Steubenville, Ohio. W6DFC worked W6DG. W6BNE and EAG are trying 580-mc. 'phone.

TRAFFIC: W6BIF 106 EKQ 140 EXE 44 CMJ 63 JM 34 HD 24 EWM 19 BKG 15 BWK 14 1L 19 DFC-ELO 4.

Traffic: W6BAM worked Japan. W6BOP has a new portable. The W6AM group is putting 400 watts on new rig. W6HHP and F6W are working together on high voltage storage at W6XUN and BRO. W6VNO and F6F have now 32-rig, W6ADE is settling down in L.A. New 50 watters at W6DIN and EK. Visit with Utah Amateur Radio Club at Salt Lake City reported by W6GKM. W6ETJ and BVZ handled amateur stations at Radio show in L.A. W6BC and FGT are solidifying for summer. E.C. oscillator in receiver at W6FZL. W6ESE is laid up in bed. W6FT is looking for bootlegger traffic. W6GKK is looking for schedules, W6HGG, GGO, DSD and UI are rebuilding. W6BTJ is winding power transformer, W6APJ broke his collar bone. W6AAK is pounding traffic at Forestry Conservation Camp in Idaho. W6XUM is guard. W6FPU is trying to go for unlimited 'phone. W6HQX has 45s P.P. W6HZE has three stage o.e. job. W6EAD has new transmitter.

Traffic: W6CU 47J APF 40 GPT 16 GGO-BTO 14 HED­
gur 5 8HH 4 RCE 3.
W9NQV was at the Jrnmsfest. W9GLG is working DX.

Traffic Contest August 10, to Nov. 16. W9NM will have a DX station, W3BHC in reforestation. W3FYY's father is going to get a portable.

W9HDI and EHC operated portable from painting outfit. W9AAB, our Director, is planning outfit. W9FYY's father is trying to get a receiver. W4DS is back after operation.

Traffic: W4JRY is working DX. W4BQO has quit the game. W4AI is looking for a DX station.

Traffic: W4ANL is married to get a DX station. W4BLL has new antenna. W4VZD is working DX.

Traffic: W4RF is working DX. W4BQO has quit the game. W4AI is looking for a DX station.
GEORGIA-SOUTH CAROLINA-CUBA-ISLE OF PINES-PORTO RICO-VIRGIN ISLANDS-SUMI.

Chas. W. Davis, W4PS — W4IR is our best trafficker. W4WPCR, W4HJ, W4XV, and W4XY are Chauncey Acres Radio Club of Columbus going strong. W4VBE is on 14 mc. W4VBRG is handling traffic from Boy Scout Camp, Parris Island, S. C., with portable W4CFC. W4CFC of Columbia, S. C., is operating W5CVN now.

Traffic: W4IR 89 BWN 51 BQX 10 ATZ 6 BRG 12 VX 8 BIJ 5.

WEST GULF DIVISION

SOUTHERN TEXAS — SCM. David H. Calh, W5BHO — W5KBE resigns as O.B.S. and R.M. W5JX and W5IC reports in. W5MNN changed QTL. W5BNJ is going to 14 mc. W5QGZ is vacationing in Monroe, La., and working W5FR. W5YL rebuilt transmitter. W5DLN is fifth dist. call of W9GUR. W5ZZM reports from San Antonio. W5DYJ, DHK, and DGC are new hams. W5CHM, CNX, BZO, CAZ, and COE went to Palacios for field-day contest. W5CVA has schedule with XFA2. W5SON and BRV scheduled the life or death message. VE3LY is handling tourist traffic. VE2VGJ tells us VE3SVP has new MOPA.

VE3GL is QRL exams. VE3LG is observing quiet hours. VE3MP is using portable CHK. WSAPW is on 4 mc. W5QVU is on 14 mc. W5QVU is going to World's Fair. W5CDO reports the tomato farm. WSARS is new RM. W5SCD is going SC.M in touch with XFA2. W5EON and BRC scheduled the QRL, and the Y Fare going to World's Fair. W5CDO reports the tomato farm. WSARS is new RM. W5SCD is going SC.M in touch with XFA2. W5EON and BRC scheduled the QRL, and the Y Fare going to World's Fair. W5CDO reports the tomato farm. WSARS is new RM. W5SCD is going SC.M in touch with XFA2. W5EON and BRC scheduled the QRL, and the Y Fare going to World's Fair. W5CDO reports the tomato farm. WSARS is new RM. W5SCD is going SC.M in touch with XFA2. W5EON and BRC scheduled the QRL, and the Y Fare going to World's Fair. W5CDO reports the tomato farm.
CORRESPONDENCE

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

Till Death Do Us Part

R3, Box 34A, Albuquerque, New Mexico
Editor, QST:

I received my first QST the same day my station license was issued, and I aim to have QST just as long as I am a ham — probably till I make Silent Keys. Hi!

Many radio magazines ballyhoo "wonder sets" for the ham to build — modulated oscillator 'phones and such column-filling stuff. I'm glad there is a magazine like QST which constantly stands for the betterment of amateur radio and its usefulness to the general public...

I could rattle on all day but will say adios, mis amigos.

— D. Elmo Darrah, W5BNT

Twisting the Lion's Tail

106 Maxwell Ave., Rochester, N. Y.
Dear Ed:

Who is this guy Lamb who has been twisting the lion's tail for the past two years or so?

First he comes out and knocks all the old receivers into the old garbage can, now he comes out and puts a crimp in the old crystal hook-up with a new fangled screen-grid warbler. Is there no stop to him?

I got my transmitter finished the other day and now I find that it's obsolete. Bought a new factory-made receiver and that's out of date. Has that man no respect for the depression?

If he keeps it up Warner won't have to wait much longer for that transmitter with the polished brass knob to bend those 56-mc. waves around the old ball.

More power to him and QST.

— Edward Stanko, W8HWQ

"Nor Custom Stale—"

1113 8th Ave., N. W., Puyallup, Wash.
Editor, QST:

Listen, all you old timers, a beginner speaks:

Nothing to get off my chest. Why write? Just this: I want to see a letter in the columns of QST that contains a boost instead of a knock.

I have read the past history of amateur radio, as set forth in the Handbook, a dozen times. What stirring times it recounts! The first transcontinental relays and the Great Migration down the wavelength spectrum! How I wished I had been born about ten years sooner!

But the best thing about this hobby of ours is that it is a live one. You don't have to look backward. What a thrill to be one of those who contacted Lyman in his plane during the first 56-mc. airplane tests! Or just sit down in your own shack and work your first VK!

When I was still trying to figure out just how fast ten words a minute really was, I used to have horrible visions of my first QSO. "— and for goodness sake get off the air. Seram! QRT!! I have no time to waste on fellows who can't even remember how many dots there are in the letter 'H'!!!

But to my surprise I wasn't like that at all! The other fellows had plenty of time to work me and even the fast men with their "thirty-five-minute-bugs" would gladly change over to their hand keys and come down to earth, usually even before being asked. This "spirit of cooperation" that is so often spoken of on the editorial page is more than mere words. It really exists.

And speaking of the editorials, do we realize what a true mirror of amateur progress they are? Just look through some of your back issues and find out. In QST for October, 1931, W9BIR writes: "QST has been harping on 5-, 10- and 15-meter stuff for the last six years or so, and of what use are they? No one seems to care or use these bands, . . . ." Yes sir, I read the editorials first. Time has proved that the 5-meter band was worth "harping on" just as time will prove the wisdom of promoting interest in ten and three-fourths meters.

And one more thing. It's about the League. Don't you "O.T.'s" get the idea that the "Young Squirts" don't realize what they owe to those who made Amateur Radio possible. I believe they do. And I'm in a position to know because I've helped a good many to get through their license examinations.

But I buy my QST at the newstands. Terrible? I admit it. But it can't be helped — just yet. My transmitter is only a TNT with 180 volts on the plate. How I long to send away for a pair of 866's, etc. But N.D. The next $2.50 that goes east is going to make me a member of the good old A.R.R.L!

— Llewellyn Joy, W7BZC

58
STABILITY—

IN A NUTSHELL!

NO MICA — for mica changes its dielectric constant with changes in temperature and humidity. NO BAKELITE — for bakelite creeps with age and introduces losses. NO DIRT — for dirt between plates will ruin the performance of even the most watch-like accuracy.

Look it over. 75 mmf's, air-dielectric, Isolantite insulated, protected from dirt and electrically shielded. And almost as small as a walnut — 1 1/4" diameter, 1 1/4" high.

Lastly, it is built to the same high standard of quality that characterizes the fifty-two other models that make up the NATIONAL line of High Frequency air-dielectric transmitting, receiving, and padding condensers.

NATIONAL COMPANY, INC., MALDEN, MASS.
HERE is economy and satisfaction in equipping with accurate, reliable electrical measuring instruments. That's why amateurs the world over standardize on Weston Instruments in transmitting, experimental work and radio servicing.

The matched lines of Weston 2 and 3 1/4 inch panel meters provide Weston accuracy and dependability in a wide range of DC, AC, thermo-couple and rectifier type instruments. They are built to the high standards of design and workmanship for which Weston Instruments are known the world over, and are furnished in flush or surface type, as well as with rugged Bakelite cases if desired.

Keep your instrument costs down and improve results by equipping from the preferred Weston line. Full details on these and other Weston Instruments are yours for the asking . . . Weston Electrical Instrument Corporation, 602 Frelinghuysen Avenue, Newark, New Jersey.

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Special Licenses for C.W.

Editor, QST:

Regarding the suggestion that a special license be given qualified amateurs to operate on the 40-meter band, I believe that it should be defeated for the following reasons:

Those who prefer to use the 40-meter band would consider it unjust to be forced to move, since it belongs to all amateurs . . .

Such regulation is too difficult to enforce.

Considerable expense and years of effort was necessary to obtain what we now have, so why give it away to please a few . . . Why confuse and hamper our activities by more restrictions? Laws, rules and regulations are the bane of the age and a sure way to ruin the wonderful hobby is to impose useless and joy-killing regulations upon it . . .

— H. A. Harrold, W6CZN

307 W. Sherman Ave., Peoria, Ill.

Editor, QST:

The letter from W6DXM in June QST makes my blood boil. Some of these hams get a fool idea and think they are benefiting the amateurs. I will oppose any such crazy idea as an unlimited c.w. license for any band till doomsday . . . The first thing you know one has to have a college education to even operate an amateur station.

Amateur radio is supposed to be a hobby and let's keep it so . . . Fellow, are you going to let a few steal our c.w. bands for their own pecuniary interest? I say no, and let's fight to a finish against any such unscrupulous idea as an unlimited c.w. license.

— Fred C. Roeger, W3BIR

Oceanside, Calif.

Editor, QST:

I have just read the letter in June QST from Mr. D. Galbraith, W6DXM, and am heartily in accord with the sentiments voiced therein.

The forty-meter band, due to its narrowness and peculiar suitability for DX-work, should be subject to limitations that will keep it from being overcrowded or covered by broad, wobbly signals.

Fred J. Elser, W6GVU

Robinson, Kan.
FLECHTHEIM CONDENSERS
Still the same high quality transmitting condensers giving the user excellent service.

1,000 v.d.c. 750 v.r.a.c. m.f.s.

TC-100 1 mid. List $3.00 Spec. $1.50

200 2 mid. List 5.00 Spec. 2.50

400 4 mid. List 9.00 Spec. 4.50

T- 100 1 mid. List $3.75 Spec. $1.87

200 2 mid. List 6.50 Spec. 3.25

400 4 mid. List 11.00 Spec. 5.50

2,000 v.d.c. 1,000 v.r.a.c. m.f.s.

TH-100 1 mid. List $7.00 Spec. $3.50

200 2 mid. List 12.50 Spec. 6.25

400 4 mid. List 22.00 Spec. 11.00

3,000 v.d.c. 2,200 v.r.a.c. m.f.s.

HP-100 1 mid. List $10.00 Spec. $5.75

200 2 mid. List 25.00 Spec. 12.50

CARDWELL CONDENSERS
Now available in over 200 capacities, in a dozen models. Look at these low prices.

41-2 2 mid. dbl. spaced ... $1.53

412-8 100 mid. dbl. spaced ... 2.36

417-2 440 mid. dbl. spaced ... $4.12

T-199 540 mid. dbl. spaced ... $5.50

DT-199 650 mid. split stator ... 13.00

T-193 110 mid. triple sp. ... 5.80

DT-183 278 mid. split stator ... 10.60

MORRILL CONDENSERS
Those who have used these high voltage condensers are more than pleased with the results obtained.

1,000 volts D.C.

1014 1 mid. List $3.00 Spec. $1.75

1015 2 mid. List 5.50 Spec. 2.75

1016 4 mid. List 12.25 Spec. 6.12

1,500 volts D.C.

1514 1 mid. List $5.00 Spec. $2.50

1515 2 mid. List 10.50 Spec. 5.25

1516 4 mid. List 15.75 Spec. 7.87

2,000 volts D.C.

2014 1 mid. List $12.00 Spec. 6.00

2015 2 mid. List 14.50 Spec. 7.25

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3,000 volts D.C.

3014 1 mid. List $17.75 Spec. $6.37

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Save your filter condensers by using a bleeder resistor. Aerox Resis­
tors are equipped with slider and the 200 w. size with mounting feet.

20,000 ohm 50 w. 400 v. $8.85

25,000 ohm 50 w. 500 v. 8.85

30,000 ohm 75 w. 750 v. 1.83

1- 50000 ohm 200 w. 1500 v. 1.59

1-100000 ohm 200 w. 1500 v. 1.77

2- 50000 ohm 200 w. 2000 v. 3.10

3- 50000 ohm 200 w. 3000 v. 4.50

Centralab Elf Midget Potenti­

meters any size from 1000 ohms to 1 meghm. Each $49

FEDERAL 100-A 125 watt R.F. Amplifier, $34.50 102-A Modulator $34.50

353 — 10,000 v. 2.5 amp. shielded mercury vapor rectifiers, $16.95

Mail Orders Filled Same Day C. O. D. Orders Must Be Accompanied by 10% Deposit

Announcing our NEW Ultra H.F. super­

regenerator, Designed by W2AOE

Employ stable shunt tuning, with 237 detector, 227 low frequency oscillator and 89 pentode audio amplifier. Tone control and regeneration con­trols provided. Works on batteries or A.C. supply without changes. Furnished with 5 and 10 meter coils at the new low price of $9.85.

With black crystalline finished metal cabinet... $10.85

R.C.A. tubes ............... 2.52

Sylvania tubes ............ 2.25

Collins Transmitters
Another popular line added to our stock. Write us for information and bulletin.

We do not publish a catalog. Look over our prices and see how priced by return mail on all short wave apparatus. Hundred of other items at Special Prices.

The reg's now require pure D C sigs!

Why write "love letters" to the commission about that R A C note when Choke and Condenser buys like these are available

45 Vesey Street, New York City

Say You Saw It in QST — It Identifies You and Helps QST
FOR SINGLE-CONTROL
H. F. RECEIVERS

NATIONAL 2 SE MIDGET CONDENSER
With Ganged Isolated Rotor

Designed specifically for single-control high-frequency T.R.F. and super-heterodyne receivers. The rotors are completely and effectively ISOLATED and insulated from each other. Construction is heavy, rigid, precise and permanent; electrical performance is constant... Equipped with NATIONAL 270° s.f.l. (equicycle) plates. Made in all capacities from 50 to 335 mmf. per section. Standard model — equal capacity per section, clockwise rotation. Different capacity sections at slight advance in price.

OTHER NATIONAL MIDGETS
For H. F. and Ultra H. F. Work

SEU Ultra H.F. Condenser, 270° s.f.l. plates. 15 to 25 mmf.

SE H.F. Condenser 270° s.f.l. plates. 50 to 150 mmf.

SEH H.F. Condenser. 270° s.f.l. plates. 200 to 335 mmf.

STD Double Ultra-H.F. Condenser. 180° s.f.w. plates. 50 mmf. per section.

SSS H.F. Condenser. 180° s.l.c. plates. 50 to 50 mmf.

SS H.F. Condenser. 180° s.l.c. plates. 50 to 150 mmf.

A Full Line of NATIONAL VARIABLE MIDGET H. F. CONDENSERS

2732 Humboldt Ave., Oakland, Calif.

Editor, QST:
I would like to answer the letter in June QST by W6DXM on “unlimited c.w. licenses.” Our c.w. bands were assigned by the F.R.C. to all licensed amateurs regardless of class of license. In all sense of fairness to our brother hams we can’t change our basic c.w. license law.

Some of you may ask “why not” when you read this, but if you will go back over 6DXM’s letter you will note it reads “qualifications for U.C.W. license, same as U.P.O. license, to get on 40 meters. This license should require all holders of same to put out high quality signals, and it seems to me that if a person is willing to go to all this extra work, he is entitled to the extra privileges.”

Now, I guess it’s time to remind ourselves again, that we are compelled to do this extra work before we go on the air or send a single dot. The law definitely states filtered d.c. plate supply or equivalent effects. Why bother making additional laws if we can’t live up to one already in existence?...

—— Dr. John A. Stewart, W1SK-W1AJT

I would like to say a word in support of Mr. Galbraith, W6DXM, concerning his letter in the correspondence section of June QST. I feel as he does that something must be done to stop some of the QRM on the 7-mc. band... The only method apparent is to increase the technical qualifications of operators and the quality of the radiations from transmitters. For the latter, the proposal of the board for pure d.c. on all stages is a step forward...

It wouldn’t be a bad idea at all to require all operators on the 3.5 and 7-mc. bands to be required to have amateur extra firsts.

—— Bruce E. Montgomery, W9AIIH-BYN
A.R.R.L. Letterheads. Write your radio letters on League stationery—it identifies you. Lithographed on 8½ x 11 heavy bond paper. Postpaid. 100 sheets, 50c; 250 sheets, $1.00; 500 sheets, $1.75.

Message Blanks. Most convenient form. Designed by the Communications Department of the A.R.R.L. Well printed on good bond paper. Size 8½ x 7¼. Put up in pads of 100 sheets. One pad postpaid for 35c or three pads for $1.00.

Log Books. Book with heavy paper covers. 8½ x 10¾. Contains 39 log pages, like below, and 39 blank pages for miscellaneous notes. Also list of Q sigs, message number sheet and sheet of cross-section paper. 40c each or 3 for $1.00. Postpaid.

Message Delivery Cards. Neatest, simplest way to deliver a message to a near-by town. On U. S. stamped postcards 2c each. On plain cards (for Canada, etc.) 1c each, postpaid.

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WEST HARTFORD, CONN., U. S. A.
To Our Readers who are not A.R.R.L. members

You should become a member of the League! That you are interested in amateur radio is shown by your reading of QST. From it 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 the page opposite the editorial page of this issue. We should like to have you become a full-fledged member and add your strength to ours in the things we are undertaking for Amateur Radio. You will have QST delivered at your door each month. A convenient application form is printed below — clip it out and mail it today.

A bona fide interest in amateur radio is the only essential qualification for membership

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

I hereby apply for membership in the American Radio Relay League, and enclose $2.50 ($3.00 outside of the United States and its Possessions, and Canada) in payment of one year's dues, $1.25 of which is for a subscription to 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.

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

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

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

Do you know a friend who is also interested in Amateur Radio, whose name you might give us so we may send him a sample copy of QST?

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

Thanks

319 Hermosa Ave., Long Beach, Calif. Editor, QST:

... I was greatly impressed with the suggestion in June QST made by W6DXM. His suggestion of having unlimited c.w. licenses would be a great advance in amateur radio. We have cast aside the spark in favor of the tube, we have brought our ‘phone situation closer to modern ideas, why can’t we do the same with c.w. and throw self-excited rigs and ancient ideas from our midst?

If we are to make room for future hams as well as ourselves, we must settle our 40-meter problem and make better use of 100 meters. Hundreds of stations on 7 mc. use that band for local QSO’s. They battle the QRMs and have unsuccessful chats with other hams. Using our 160-meter band for work within a radius of 1000 miles would add to our enjoyment from ham work and would clear up the situation on the other bands. ... Let’s give this band a chance to deliver us from our plight and to increase our fun in our great hobby.

— Ed. Woolcock, W6EZL

Mounties

Norman, N. W. T., Canada

Editor, QST:

I would like to state that of the many radio publications that I subscribe to, there is none that compares with QST, and I for one certainly like the technical articles. I may add that the S.S. Super which I built early in the winter from Mr. Lamb’s articles has more than proved itself an ideal receiver. Here in the north a few miles from the Arctic Circle a sensitive receiver certainly is necessary. It is impossible to own a transmitter down here, but I spend a lot of pleasant evenings listening to those who are lucky, even if the CQ’s are long. To those at headquarters I offer 78.

— J. A. English, Cat., R.C.M. Police

Strays

Paul Holbrook, ex-KA1AF, now at W3ATY, Fort Monroe, Va., has installed equipment for recording 3500-ke. ham signals on phonograph record discs, and is willing to make records of the signals of anyone contacting W3ATY provided the ham getting the service will pay for the record and shipping charges — totalling about fifty cents per record. Cash in advance to P. O. Box 171, Fort Monroe, Va.

W2ETS claims to have the smallest shack in the world — 2 feet deep, 3 1/2 feet wide and 8 feet high. It contains the transmitter, receiver and the OM himself when operating.

A punch for knocking out socket holes in sheet-metal radio chassis which should be a useful tool for hams who do much of this sort of constructional work is now being made by the Langelier Manufacturing Company, Providence, R. I. It operates on the same principle as the home-made punch described by W9HMQ on page 50, February, 1933, QST. The list price is two dollars.

Diga que se lo ha leído en QST — Aun se dará Vd. a conocer y ayudará a la vez a QST
VACATION SALE CONTINUED THROUGH AUGUST

due to the requests of many of our out-of-town friends

<table>
<thead>
<tr>
<th>REDUCED PRICES</th>
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<tbody>
<tr>
<td>2.5 V, 6 amp, C.T. (unidet)</td>
</tr>
<tr>
<td>5 V, 3 amp, C.T. for '33 (unidet)</td>
</tr>
<tr>
<td>1 to 2 and 4 5 V, Volt C.T.</td>
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<tr>
<td>7 V, and 7 1/2 Volt C.T.</td>
</tr>
<tr>
<td>15 V, Volt C.T.</td>
</tr>
<tr>
<td>40 1/2 V, Volt C.T.</td>
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<tr>
<td>500 H. C.t. plates for Screen Grid - Gold C.T.</td>
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<tr>
<th>GROSS SPECIAL POWER Transformer</th>
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<tr>
<td>A transformer having the same filament windings as above, for use with '83 tube at 500 volts D.C. at 750 volts each side of C.T.</td>
</tr>
<tr>
<td>Special, 750-1000 V, each side of C.T., 300 watts.</td>
</tr>
<tr>
<td>High grade filament transformers shielded in metal case, with 25.0 volt secondary.</td>
</tr>
<tr>
<td>10 to 12 volts at 8 anodes—either</td>
</tr>
<tr>
<td>Special—10 to 12 volt special, extra special.</td>
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<tr>
<th>GUARANTEED TUBES</th>
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<tr>
<td>Heavy Duty Insulation too, etc.</td>
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<tr>
<td>888 or 971</td>
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<tr>
<td>83 and 47's</td>
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<tr>
<td>281 Phons</td>
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<tr>
<td>210's</td>
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<tr>
<td>De-Forest 60's</td>
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<tr>
<td>De-Forest 250's</td>
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<tr>
<th>BLACK SHRIVEL FINISH SHEILD BOXES</th>
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<td>Length</td>
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<td>4&quot;</td>
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<td>9&quot;</td>
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<table>
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<tr>
<th>PRICES GREATLY REDUCED</th>
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<tr>
<td>Ward (Leonard) Vitreous Resistors: 200-Watt Type 8 3/4&quot; Long with variable Sliders.</td>
</tr>
<tr>
<td>1600 ohms</td>
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<tr>
<td>2000 ohms</td>
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<td>5000 ohms</td>
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<td>50000 ohms</td>
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<td>90000 ohms</td>
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<td>100000 ohms</td>
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<tr>
<th>HOYT ANTENNA METERS</th>
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<tbody>
<tr>
<td>Hot wire antenna, meters, 1 1/2 and 3 amperes range. Why do without antenna meters when you can buy them at this Special price.</td>
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</table>

The “EAGLE” Three-Tube Short Wave Receiver

The “EAGLE” is economical — two dry cells will operate the filament. See March or April QST for full description on this most excellent value in short wave receivers.

"Eagle" Completely Wired and Tested . . . $10.95

The New "20-W Jr." Crystal Controlled Transmitter Kit, $10.95

This efficient little transmitter is very low priced, making it possible for anyone to use crystal control at less than it would cost you to get the same combination. One milliammeter is included on each kit, and jacks are provided for this purpose, for each stage. The plug-in crystal holder is supplied with the kit at no additional cost. The “20-W Jr.” uses one ‘37 as crystal oscillator, one ‘40 as buffer or louder and two ‘46’s in the amplifier. One set of three coils is supplied with the kit for either 20, 40, or 80 meters, 90 extra coils for the set of 160 meter coils. When ordering mention your choice of coils. (Kit now supplied with metal chassis.)

20% discount with all C. O. D. orders. Remit by M. O. Include Postage.

GROSS RADIO INC. 51 VESEY ST., N. Y. C. TEL. BARCLAY 7-0161

Say You Saw It in QST — It Identifies You and Helps QST
NEW JERSEY AMATEUR'S HEADQUARTERS
A COMPLETE STOCK OF EVERYTHING YOU NEED TO MAKE THAT RIG WORK
AUDIO & POWER TRANSFORMERS MADE IN OUR OWN SHOP
LET US SOLVE YOUR RADIO PROBLEMS SPECIAL ASSISTANCE TO BEGINNERS

THIS MONTH'S SPECIALS
10 meter Coils for HAMMARLUND PRO. .................................. $1.50
BLILEY X-CUT CRYSTALS............................................. 4.50
BLILEY CRYSTAL HOLDERS............................................ 1.50
FEDERAL TUBES 108-A .............................................. 34.50

WE STOCK WIDE RANGES IN SIZE OF BAKELITE TUBING, COPPER WIRE, RESISTORS, CONDENSERS, ETC.

KALTMAN & ROMANDER
62 COURT STREET NEWARK, N. J.

10 METERS
For the FB-7 and FB-X, NATIONAL offers a new pair of coils covering the range from 19 to 33 megacycles. Used in conjunction with the five sets of general coverage coils previously available, this additional unit permits the use of FB receivers throughout the range from 1500 kc. to 33,000 kc. Catalog Symbol FB-AA. List Price (per pair), $10.00. (Usual Trade Discounts Apply.)

NATIONAL COMPANY, INC., MALDEN, MASS.

Standard Frequency Transmissions

<table>
<thead>
<tr>
<th>Date</th>
<th>Schedule</th>
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<tr>
<td>Aug. 2</td>
<td>BB</td>
<td>WIXP</td>
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<tr>
<td>Aug. 4</td>
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<tr>
<td>Aug. 9</td>
<td>B</td>
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<tr>
<td>Aug. 11</td>
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<td>Sept. 20</td>
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<td>Sept. 22</td>
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<tr>
<td>Sept. 29</td>
<td>B</td>
<td>WIX</td>
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The New England Division Convention

CONVENTIONS may come and conventions may go, but New England Division Conventions always make a "go" of it, which is to say that this year's convention held at the Hotel
AN INTRODUCTION TO AMATEUR RADIO

— for the would-be amateur
— for the ham who has a friend who wants to become an amateur

THE second edition of "How to Become a Radio Amateur," in 32 pages, outlines the entire field of amateur radio. It makes learning the code easy, tells how to build a simple station, with clear illustrations and easily followed building instructions. And there's concise dope on getting licenses and operating properly, too. In short, it's an introduction to the art — thorough, yet simple.

Get introduced right now — or arrange an introduction for that would-be amateur friend of yours. Price 25c, postpaid. No stamps, please.

THE AMERICAN RADIO RELAY LEAGUE
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If you want to be a High Speed, Expert Operator write CANDLER for Free Advice

GET YOUR SPEED where the Champions got theirs
CANDLER Scientific Method, High Speed Telegraphing

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John C. S. Code Guild, Regular Daily Practice Schedules on Short Waves. < Get Details

WALTER H. CANDLER World’s Only Code Specialist, Instructs You Personally

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6343 South Kedzie Ave. Chicago, Illinois

TAKES NO MORE G AS

We blush to admit it . . . but some suppressors cut down the m.p. gallons somewhat awful.

If your auto radio "eats gas" change to CENTRALAB MOTOR RADIO SUPPRESSORS and note the difference in gas consumption. All good jobbers stock 'em at 40c each, list.

CENTRAL RADIO LABORATORIES
* MILWAUKEE, WIS.

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* MOTOR RADIO
* SUPPRESSORS

Bond, Hartford, Conn., on April 28th and 29th, under the auspices of the Hartford Country Amateur Radio Association, was a huge success. L. A. Richmond, the chairman, started things going with an address of welcome making every one feel at home and then the open forum, which is becoming more and more a feature at many of the conventions, was well handled by Communications Manager Handy. During the discussions Lowery, W1AFB, RM for Connecticut; White, W1BOF, RM for Maine; Mullen, W1ASI, SCM for Eastern Mass., all gave interesting reports on conditions in their respective sections. John Stadler, VE2AP, a visitor from Canada and acting SCM for Quebec, gave a good outline of conditions in Canada which made us feel that radio is about one of the best binding links for international friendship. Bob Eubank, the very active SCM from Virginia was also a visitor and what a fellow he is for statistics.

George Grammer, Assistant Tech. Ed. and Jim Lamb, Technical Editor of QST, gave talks. Mr. F. S. Dellenbaugh, President and Chief Engineer of the Delta Mfg. Co. gave one of the best lectures of the session on "Rectifiers and Filters," and incidently, his "amplifiers" helped many of the speakers. Roy Corderman, W3ZD, President of Washington (D. C.) Radio Club who had made a careful study on "Radio Clubs" presented a symposium clearly outlining how to make a club successful. Mr. L. S. Fox, of National Carbon Co., knows his "Battery Facts and Fallacies."

The army was well represented by Lt.-Colonel Boyden and Lieut. Gloydell, Jr. of the First Corps Area. Lieut. Gloydell’s wife and her staff of entertainers should have received a standing vote of thanks for the surprise entertainment they furnished during the banquet and it is hoped they felt repaid by the spontaneity of the applause. Lieut. John L. Reinartz and Lieut. Hebert represented the U. S. N. R.

Trips to Headquarters, W1MK, Pratt & Whitney Aircraft and Chance Vought plants were made and proved of interest to all. The banquet was one of the best with Director Bailey as the Toastmaster. Our worthy president, Hiram P. Maxim, gave us one of his inspirational speeches. Radio Inspector Chas. C. Kolster reported over 75 amateurs taking examination. Treasurer Hebert of the A.R.R.L. spoke on the wanderings of the fieldman. Thanks also go to “Woody” Darrow, Bob Chapman, Springfield Radio Ass’n, W1CM and several others for their parts in entertaining the guests.

Great credit is due to the convention committee for one of the best conventions ever held in this division. Springfield next year.

— A. A. II.

Temperature Resistant Filter Condensers

AMATEURS in tropical or semi-tropical locations will be interested to know of a new line of filter condensers built especially for service

QST 紙上に及び御覧に及ぼし仰せラテ然時ハ読者ヲ誇明シQSTヲ補助致シ候
Are You Troubled with L. W.*?

THEN GET YOUR COPY OF

THE RADIO AMATEUR'S
LICENSE MANUAL

(No. 9 in the A.R.R.L. series entitled The Radio Amateur's Library)

It covers every aspect of the nowadays-complex system of amateur licensing. The entire procedure, from applying for the first temporary to securing the extra-first ticket, is laid out in simple understandable guide-book form. Not only does it contain completely revised questions-and-answers from our old "Passing the Government Examinations..." pamphlet, but it goes further and describes the procedure of station license application, modification and renewal—a digest of the various amateur operator classes—complete text of the amateur regulations—pertinent extracts from the radio law—everything, in fact, about ham licenses. AND—there's an entire section devoted to the specialized knowledge you'll need if you're boning for the unlimited 'phone authorization.

Twenty pages, dolled up with a snappy cover, and printed in the familiar QST style, it supplies a long-felt want for your bookshelf and is now presented as a reference publication every amateur should have, whether he be a new ham or one with whiskers.

By the A.R.R.L. Hq. Gang

Price 25c (no stamps, please) postpaid

THE AMERICAN RADIO RELAY LEAGUE, INC.

West Hartford, Connecticut, U. S. A.

*License Worries

ALUMINUM BOX SHIELDS Genuine "ALCOA" stock, silverclad finish, 5 x 9 x 2, $1.65, 10 x 6 x 7, $2.65. Advance Sale to Order, SOMETHING NEW! Your call letters, or any marking for your panel, on BLACK aluminum ribbon. Looks like engraving on bakelite. So. each, sample, 5c.

Pull for condenser or velocity mike Scull... 25c. ft. 2 ¼ MH 4 section r.f. choke, 25c. ½ watt Neon lamp, 35c. New Master Teleplex on demonstration.

BLAN, the Radio Man, Inc.
177 Greenwich St.
New York City

PANELS—BAKELITE—RUBBER—ALUMINUM All Sizes Cut to Order. BAKELITE TUBING & RODS Drilling, Engraving & Special Work.

ALUMINUM CANS—6 x 5 x 9, $1.70—6 x 10 x 7, $2.75—7 x 9 x 14, $1.45, and any other aluminum special from stock, order.

ALUMINUM CHASSIS—Threaded brass studs for 6/32 screws. Lengths from ½" to 3"—price 5c to 75c. Insulating bushings for all steels, slides from 75c to $1.90 per 100. Couplings in brass or bakelite 15c.

Mail orders filled same day. Transmitting frames and racks.

UNITED RADIO MFG. CO., Est. 1923, 191 Greenwich St., New York

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BIG NEWS!

AMATEURS

We can supply all parts for the new circuits Send for your Catalog of Nationally Advertised Transmitting and Receiving Parts at LOWEST PRICES

Amateurs' Headquarters of the West

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City and State

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PORT ARTHUR, TEXAS

In 3 to 7 months...
MYCALEX Insulation

WELL known to the professional radio engineer, Mycalex is now offered to the amateur and experimenter by Isolantite, Inc., as the result of an arrangement made with the General Electric Company, manufacturers of G. E. Mycalex.

Mycalex incorporates the desirable electrical insulating properties of glass and mica, together with a high value of mechanical strength and toughness which neither of these two materials alone possess.

G. E. Mycalex is admirably adapted to service in the construction of insulating details for the high frequency receiver and transmitter. It is characteristically rigid, like glass or porcelain, but unlike the latter it is neither as hygroscopic nor as fragile. The power factor of G. E. Mycalex is .2% and its loss factor 1.6, whereas, the corresponding values for these same properties in organic sheet insulators are several times higher. Moreover, G. E. Mycalex will not carbonize like plastics in common use and it is, therefore, particularly recommended for transmitters where high voltage circuits are to be insulated.

Available in convenient sheet form, Mycalex, in small sections, may be fabricated by the amateur in much the same manner as any sheet insulation with the simple tools ordinarily at his disposal. G. E. Mycalex may be obtained promptly from Isolantite, Inc., in the sizes and at the net prices given below:

- 1" wide, 12" long, 3/32" thick ........... $ .90 each
- 1 3/4" wide, 12" long, 3/16" thick ........ 1.40 each

A copy of this announcement has been mailed to dealers in amateur radio products in the United States, in the hope that they will keep a stock of G. E. Mycalex on hand for your convenience. If your dealer cannot supply you, order direct from this advertisement. All orders for any quantity accompanied by check or money orders will be shipped prepaid anywhere in the United States at the prices quoted above.

ISOLANTITE, INC.
NEW YORK SALES OFFICE: 75 VARICK STREET,
NEW YORK, N. Y.
Factory: Belleville, New Jersey

You Can’t Compare Ordinary Resistors With TRUVOLTS

No other resistor has these advantages:

1 — Patented construction permits air-cooling, larger wire, greater radiation and longer life.
2 — Spiral winding provides better electrical contact.
3 — Sliding clips assure accurate adjustment.
4 — 1000 volt insulation.
5 — Full-length fibre guard prevents injury from contact with tools or hands.

Write Dept. Q-8 for Complete New Catalog

An Electronic Divertissement

(Continued from page 27)

in the iron ball, and closed the others. The valve remaining open as the ball drops, allows it to sink in the water at the rate of fifteen words a minute. As the ball sinks it pulls down on chain (19) drawing saw (20) along with it. (In case there should be any trouble in procuring the chain, let me suggest the use of the chain on the stopper in the family bath-tub.)

As the saw descends it makes contact at (21), which is in the transmitting circuit, said circuit already in an operating condition due to the action of the hydraulic jack (9). The teeth have been removed from the saw in somewhat the same manner as any sheet insulation with the simple tools ordinarily at his disposal. As G. E. Mycalex is admirably adapted to service in the construction of insulating details for the high frequency receiver and transmitter. It is characteristically rigid, like glass or porcelain, but unlike the latter it is neither as hygroscopic nor as fragile. The power factor of G. E. Mycalex is .2% and its loss factor 1.6, whereas, the corresponding values for these same properties in organic sheet insulators are several times higher. Moreover, G. E. Mycalex will not carbonize like plastics in common use and it is, therefore, particularly recommended for transmitters where high voltage circuits are to be insulated.

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- 1" wide, 12" long, 3/32" thick ........... $ .90 each
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1 — Patented construction permits air-cooling, larger wire, greater radiation and longer life.
2 — Spiral winding provides better electrical contact.
3 — Sliding clips assure accurate adjustment.
4 — 1000 volt insulation.
5 — Full-length fibre guard prevents injury from contact with tools or hands.

Write Dept. Q-8 for Complete New Catalog

World-Wide A.R.R.L. Convention

Chicago World’s Fair, August 3rd, 4th, 5th

PLANS for the greatest convention in the history of amateur radio are being rushed forward to completion in Chicago these days. Already an imposing list of nationally and internationally famous speakers have been invited, including such notables as Dr. Lee De Forrest, Commander Byrd, John C. Warner, Fred Schnell, Dr. Jordan Kenrad, Lieut. J. B. Dow, Herbert Hoover, Jr., Don Wallace, Boyd Phelps, Murdo Silver, F. D. Billey, W. E. Heising, and others. Fieldman Hebert will be the official A.R.R.L. Hq. representative.

A partial list of the topics to be discussed by these speakers, who will be limited as to time and...
It's another of those League publications you simply can't do without—

Information — ideas — suggestions. Practical tips, brainstorm that worked, money-saving dodges, time-saving thoughts . . . A whole book full of them!

HINTS AND KINKS FOR THE RADIO AMATEUR

(No. 10 in the A.R.R.L. series entitled The Radio Amateur's Library)

For years hams have told us that one of the most practical and valuable features of QST is the Experimenter's Section. But — try to recall when it was you saw that swell (but, alas, only dimly remembered) suggestion for band-spreading, or a click filter, or break-in. What was needed, we were told, was a compilation of all the best ideas, brought under one cover, segregated by subjects, and indexed. And here it is — an intensely practical book, filled out with selected additional material, with dozens of valuable and workable ideas gleaned from the practical station experience of successful amateurs. Chapters on workshop ideas, receivers, transmitters, amateur, phone QRM elimination, keying, power supply, and so on.

An ever-present help in time of trouble, and worth its weight in crystals when you are desperate for an idea.

80 pages in attractive paper covers. Price: 50 cents (no stamps, please), postpaid anywhere.

THE AMERICAN RADIO RELAY LEAGUE, INC., West Hartford, Conn., U.S.A.
Amateur Headquarters

“Everything for the Ham”

5-Meters Is Hot—So is the

NEW NATIONAL SRR

5-METER RECEIVER

$14.70


NEW NATIONAL AIR-TUNED

I.F. Transformers

Small. Both Trimmers on top. Adjustable coupling.

$2.94

Thordarson Special

Ham Transformer

$3.95

800 volts each side center. 160 mls. No filament windings. Weight, 11 lbs. Special.

Dunco Midget A. C. Keying Relay

110 volts A. C. Keys up to 40 words a minute.

$3.50

Famous National SW-3, 3-Tube, Short Wave Receiver

All coils available from 9 to 2000 meters.

$14.41

M. & H. SPORTING GOODS CO.

512 MARKET ST., PHILADELPHIA

QST

OSCILLATING CRYSTALS

“Superior by Comparison”

WHY YOU SHOULD USE SCIENTIFIC RADIO SERVICE CRYSTALS

1 Since 1925, we have been specializing in producing Pure Electric Crystals exclusively.
2 Since 1925, Scientific Radio Service Crystals have stood the test and are recognized the world over for their Dependability, Output and Accuracy of Frequency.
3 Since 1925, owners of Broadcast and Commercial Short Wave stations have found that no chances can be taken in getting the cheaper grade of crystals and that invariably they call on Scientific Radio Service for the Best.
4 Since 1925, we could be depended upon to make Prompt Shipments. This coupled with a crystal Second to None considering Output and Accuracy of Frequency has earned during these years a reputation which we jealously guard. Therefore, Get the Best.

Price list sent upon request

SCIENTIFIC RADIO SERVICE

“The Crystal Specialists”

134 JACKSON AVENUE, UNIVERSITY PARK

HYATTSVILLE, MARYLAND

will be brief and to the point, includes transmitting antennas, receiving antennas, transmitting tubes, airways radio, r.f. amplifier coupling and neutralization, A.R.R.L. traffic, quartz and tourmaline crystals, photoelectric cells, power supplies, 50-mc. equipment, frequency stability, electron-coupled oscillators, recent developments in broadcast transmitters, a new type of monitor, microphones, a.f. amplification, modulation, beginning receiver and transmitters, audio filters, cathode ray oscillographs, receiving tubes, single-signal reception and s.w. supers, Army Amateur and Naval Reserve activities.

Perhaps foremost in interest among the individual features of the convention is the Code Speed Contest, at which the World’s Champion Radio Operator will be selected. It is open to all operators, both amateur and professional. A giant silver loving cup will be awarded to the champion by Rufus C. Daves, President of the Fair, at a special ceremony in the World’s Fair grounds. Theodore R. McElroy, now holder of the world code speed record will be on hand to defend the title he won during the contest in 1922 with a speed of 56.3 words per minute. The championship will be unquestionably authentic, since the convention committee has the backing of R.C.A. Institutes, the Candler System, Aeronautical University of Aviation Radio, and others. The preliminary trial is scheduled to begin at 9:00 a.m., Friday, August 4th.

The Committee is offering a prize of $25.00 to the radio club having the greatest percentage in attendance. Delegates may order their tickets by mail in advance; in fact, they are urged to do so, in order that the committee may have information on which to base their plans. The entire convention fee is $4.50. Send your reservations at once to Wm. E. Schweitzer, Chairman, World’s Fair Radio Amateur Council, 3600 North Western Ave., Chicago — and be on hand August 3rd, 4th and 5th for the biggest event of your amateur career!
Don't Start on Your Vacation Drive Without a Road Map

AND LIKewise

Don't Pursue the Gentle Art of Amateur Radio Without the

RADIO AMATEUR'S HANDBOOK

Many people have gone before you over the various routes to the enjoyment of amateur radio. Let their experiences (all in the Radio Amateur's Handbook) keep you off the bad roads and out of the blind alleys.

The Radio Amateur's Handbook is a careful sifting of the world's accumulated knowledge of Amateur Radio. You'll get lost and waste much time and money if you try to get along without it.

240 pages, 230 illustrations  
Price $1, postpaid anywhere ($2 in stiff buckram binding)

AMERICAN RADIO RELAY LEAGUE, WEST HARTFORD, CONNECTICUT

CONDENSERS FOR EVERY PURPOSE

A complete line of oil and electrolytic transmitting condensers described in our new 1933 Catalog. Sent free on request. Write for your copy now.

CORNEILL-DUBILIER CORP.
4377 Bronx Blvd.  New York City

Register NOW . . .
Classes Start Sept. 15th for Our
ONE YEAR RESIDENCE COURSE
in
Practical Radio Engineering
Be among the first to take advantage of this thorough Residence Course. Registrations must be in immediately—classes limited in size. (If nearby see special Summer class now in session.)

Combination Home-Study . . . Residence Course!
A special complete course! The regular Home-Study plan PLUS a Post Graduate Residence Course at small additional cost.
Send for New
FREE CATALOG
CAPITOL RADIO ENGINEERING INSTITUTE
14th and Park Road  Dept. QS-8
Washington, D. C.

AMERICA'S OUTSTANDING VALUE MICROPHONE

A Special Introduction Offer

A double value double button mike for only $195

A master oscillator power amplifier transmitter for the 56 mc. band. Can also be supplied with coils for 14 mc. and 28 mc. Mounted on stained baseboard, fully wired and tested $16.00. Speech amplifier and modulator unit for above, using the new 53 Class B tube developing 10 watts of audio power. May be used to modulate up to 20 watts input to any transmitter. Mounted on baseboard to match above transmitter, fully wired and tested $17.00.

Radiophone Trans-receiver as advertised in June QST $16.50. The unit is very small, the overall dimensions being approximately 4½ x 5⅜ x 6 inches. An ideal portable station for 56 mc. Custom built equipment of all kinds to QST or your own specifications.

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12 Boylston Street
Brookline, Massachusetts

Say You Saw It in QST — it Identifies You and Helps QST
Convert 0-1 MA to
Universal Type Meter with
UNIVERSAL METER
CONVERTER
FOR 0-1.
MILLIAMMETERS
CONVERTER
UNIT and DIAL
$3.00 Postpaid
Dial Scale reads AC or DC. Volts 5, 10, 50, 100,
250, 1000. M.A. 0-1 AC; 0-1, 10, 25, 100 DC.
Ohm range 0-100. Just mount Converter on
terminals of your meter.
Complete Resistors and Shunts to read above
ranges including 3 ohm ranges
$7.95. Specify make and
model of meter when ordering.
Send for New Meter and Analyzer Bulletin
UNIVERSAL METER WORKS
2208 W. KINZIE ST. CHICAGO, U.S.A.

FUSSY HANDBOOKS
for FASTIDIOUS PEOPLE
The regular 10th Edition of the Radio Amateur's Handbook in
cloth binding with gold lettering. $2.00 postpaid anywhere.
AMERICAN RADIO RELAY LEAGUE
West Hartford, Connecticut

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U. S. A. | NEW ORLEANS, LA.

BLILEY CRYSTALS
POWERFUL ACCURATE UNIFORM
A quality product throughout — 40, 80, 160M. Xcut crystals supplied
within 10Kc of specified frequency.
$4.90; $5.90; $8.90; $9.90. 30M, quartz crystals within 10Kc,
$8.50. Each crystal frequency
within 0.05% of calibrated value.
$8.45—9.95 mounted filter,
$6.90. 100Kc Std Freq. mounted bar. $6.50, with instructions.
BLILEY Molded Bakelite Holders
for modern transmitters. 20-40M, $1.50; 80-160M, $1.50. With
GR plugs spaced (4") $2.25.
Quarter crystals manufactured to
specifications from 20Kc to 15Mc.
Blileys are used by W9USA and on display at
WORLD'S FAIR RADIO AMATEUR EXHIBIT
BLILEY PIEZO-ELECTRIC CO., ERIE, PA.

will find that the interference problem is alle-
viated by no small amount. Selectivity of the
order of "3-kc." on amateur 'phone signals is not
difficult to obtain, with c.w. selectivity in propor-
tion, and sensitivities of the order of a few micro-
volts should be the rule rather than the exception
— providing the receiver is well constructed and
the specifications have been followed.

More on QSL

(Continued from page 84)

considerable quantity of cards accumulates for
some particular ham (who hasn't sent in an
envelope) the QSL Manager has sent notification
of the fact by radiogram, letter or telephone,
requesting an envelope. In spite of notification,
a number of hams don't do anything about it.
We have told all QSL Managers that in cases
such as this, it is not expected that they should
clutter up their files with uncalled-for cards for
months at a time, and that after fair and reasona-
ble notification such hams may expect that any
cards being held for them will be disposed of, or
returned to the original sender.

Third, a small but steady percentage of hams
forget postage. Please cooperate on this point,
OM's. This system has been set up to enable you
to get cards as quickly as possible. In turn, it is
expected that John Q. Amateur will cooperate by
supplying his own postage. Failure to do so
means more grief for the QSL Manager, who has
plenty already.

Fourth, many amateurs are neglecting to put
their calls in the upper left-hand corner of the
envelope as requested — or, for that matter, are
not putting their calls on the envelope at all.
The call must be there, gang — cards are sorted
and filed by calls, and if no call is on the envelope
the QSL Manager has to stop and dig through a
callbook.

Fifth, quite a few hams are not supplying size
No. 8 envelope. As a matter of fact, it is possible
we will soon request a larger size, in order that
a lot of these foreign cards with "oversize tread"
can be mailed without bending. But at least
nothing smaller than No. 8 should be sent.

In general, and except for occasional lapses on
the part of some amateurs as enumerated above,
the new system is working smoothly and speedily,
and we honestly believe that we now have a QSL
system which is about as close to perfection as it
is possible to get it. No card is held here at
League Hq. more than a week after it is received
from abroad, and it is the custom of practically
all the QSL Managers to send out envelopes to
amateurs at regular intervals even if the weight
limit has not been reached.

The U. S. QSL Managers unite in asking that
we express their thanks to the many amateurs
who have written them brief notes of apprecia-
tion for the service and who, in many cases, have
volunteered their own services if they could be of
assistance. FB gang! It helps!

— A. L. B.
The text content of the page is a classified advertisement section from a magazine or similar publication. The content includes various products and services offered by different companies, such as microphones, transformers, and mixing equipment. The text is organized into sections and details various products available, along with their prices and specifications. The layout is typical of a classified ad section, with each product or service listed with a brief description and contact information. The text is dense and technical, typical of an engineering or hobbyist publication aimed at radio amateurs or类似的群体.
A GREAT PERFORMER!
at a new Low Price

SHURE CONDENSER MICROPHONE
Another triumph
by Shure Engineers

$50
less usual discounts...
Sound and tubes extra

Very High Sensitivity! True Reproduction! ... for Broadcasting and P.A. Installations. Formerly found only at much higher priced makes! Excellent frequency response from 40 to 10,000 cycles. Satisfaction Guaranteed or your money back!

Complete with 2 stage Amplifier and Cable
ORDER IT TODAY!

SHURE BROTHERS COMPANY
Manulalre's Engineers
337 WEST MADISON ST
CHICAGO, ILLINOIS

WHERE
ARE YOUR FIRST SEVEN ISSUES OF THE 1933 SERIES OF QST?

If they are in a QST binder, you need read no farther. If not, dollars to doughnuts you won't be able to find them all at the end of the year.

If you want to have and to hold QST use QST BINDERS

$1.50 EACH
POSTPAID

The American Radio Relay League
West Hartford, Conn.
Your Nearest Dealer
Is Your Best Friend

Your nearest dealer is entitled to your patronage. You can trust him. He is equipped with a knowledge and understanding of amateur radio. He is your logical and safe source of advice and counsel on what equipment you should buy. His stock is complete. He can supply your needs without delay. His prices are fair and consistent with the high quality of the goods he carries. He is responsible to you and interested in you.

Patronize the dealer nearest you—You can have confidence in him.

<table>
<thead>
<tr>
<th>Location, State</th>
<th>Dealer Name &amp; Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHICAGO, ILLINOIS</td>
<td>Chicago Radio Apparatus Company, 415 South Dearborn Street, Dependable Radio Equipment, Established 1921</td>
</tr>
<tr>
<td>PHILADELPHIA, PENNSYLVANIA</td>
<td>Eugene G. Wile, 10 S. Tenth Street, Complete Stock of Quality Merchandise</td>
</tr>
<tr>
<td>PITTSBURGH, PENNSYLVANIA</td>
<td>Cameradio Company, 603 Grant Street, Tri-State &quot;Ham&quot; Headquarters</td>
</tr>
<tr>
<td>PROVIDENCE, RHODE ISLAND</td>
<td>W. H. Edwards &amp; Company, 32 Broadway, Room 23, A full line of reliable Amateur Equipment &amp; Supplies</td>
</tr>
<tr>
<td>ST. LOUIS, MISSOURI</td>
<td>Walter Ashe Radio Company, 1100 Pine Street, W9FIS in charge of the oldest and largest parts store in St. Louis</td>
</tr>
<tr>
<td>ST. PAUL, MINNESOTA</td>
<td>Lew Bonn Company, 2484 University Avenue, Rex L. Munger, W9LIP, Sales Engineer</td>
</tr>
<tr>
<td>SAN FRANCISCO, CALIFORNIA</td>
<td>Offenbach Electric Company, Ltd., 1452 Market Street, &quot;The House of a Million Radio Parts&quot;</td>
</tr>
<tr>
<td>SCRANTON, PENNSYLVANIA</td>
<td>Radio Service &amp; Supply Company, 608 Linden Street, The only &quot;Ham&quot; Supply Store in N. E. Pennsylvania</td>
</tr>
<tr>
<td>SPRINGFIELD, MASSACHUSETTS</td>
<td>T. F. Cushing, 345 Worthington Street, An amateur, endeavoring to sell good parts</td>
</tr>
<tr>
<td>SYRACUSE, NEW YORK</td>
<td>Roy C. Stage, W81GF, Complete stock of standard Ham &amp; BCL parts, Standard Discounts. Free technical service by WBAOW</td>
</tr>
<tr>
<td>UTICA, NEW YORK</td>
<td>Vaeth Electric Company, 701 Varick Street, Wholesale Distributors of Radio Parts and Supplies</td>
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This advertisement is paid for by the firms listed above. Qualified dealers are invited to apply for rates, etc., to Advertising Department, QST.

Say You Saw It in QST — It Identifies You and Helps QST
You Are Protected When You Buy From QST Advertisers

"Advertising for QST is accepted only from firms who, in the publisher's opinion, are of established integrity and whose products secure the approval of the technical staff of the American Radio Relay League."

Quoted from QST's advertising rate card.

Every conceivable need of a radio amateur can be supplied by the advertisers in QST. And you will know the product has the approval of the League's technical staff.

- See Editorial April issue of QST
These A. C. solenoid relays are ideal for remote control of transmitters, for control of crystal ovens, and for any general remote control application except for keying. THESE RELAYS WILL NOT OPERATE IN KEYING SERVICE. Silver-to-silver double break contacts are used throughout.

The maximum contact rating is 10 amperes at 220 volts. The relay coils are wound for 115 volts 60 cycle alternating current. Relays for other voltages can be supplied on special order. Use coupon below when ordering.

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Poles</th>
<th>Normally</th>
<th>Circuit Diagram</th>
<th>Price Open</th>
<th>Price In Cab.</th>
<th>Type No.</th>
<th>Poles</th>
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<th>Circuit Diagram</th>
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**Radiostat**—A stepless graphite compression rheostat for primary of 550 watt filament or plate supply transformer. Range 4 to 150 ohms. **Price $6.50**

**ORDER BLANK—MAIL WITH REMITTANCE TO**


Enclosed find money order for $________________ for which please send me, shipping charges prepaid, the following items:

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Address: ____________________________________________________________________________________
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EXCLUSIVE COLLINS FEATURES

1—Fixed Buffer Neutralization
2—New Treatment of Metal Parts For Tropical Service
3—Positive Parasitic Suppression
4—Quick Frequency Change
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6—Full Unit Type Relay Rack Construction

- In the first place Collins outfits deliver far more actual power output than other transmitters using the same tubes.
- Secondly, the character of the signal, both telegraph and telephone, is instantly recognized by its superior quality.
- Further, the excellence of the design and appearance of your Collins transmitter will be a tribute to your taste and technical discrimination. Men who have had years of experience in the technical end of radio are installing Collins.
- And finally, the cost is surprisingly low. Collins transmitters are built under limited production methods, and outfits built singly from composite parts cannot hope to compete either in cost or in uniform quality.
- The soundness of these reasons is attested by the performance of hundreds of Collins Transmitters throughout the world.

Type 300B Transmitter
Two 203A's final, modulated by two 203A's Class B

The 32B is on display at A Century of Progress in Chicago
Write for latest copy of "Collins Signal." Contains full details. No charge.

COLLINS RADIO COMPANY
Cedar Rapids, Iowa