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<table>
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<tr>
<th>Specification</th>
<th>Value</th>
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<tr>
<td>Filament Amperes</td>
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<td>Max. Plate Dissipation (watts)</td>
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**Modulator**

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<tr>
<td>Grid Bias Volts</td>
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<tr>
<td>DC Plate Current (ma.)</td>
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</tr>
<tr>
<td>Osc. Input Watts for each UX-842 (Mod. Factor 0.6)</td>
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**A. F. Power Amplifier**

<table>
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<tr>
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<td>DC Plate Current (ma.)</td>
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<tr>
<td>Plate Resistance (ohms)</td>
<td>2500</td>
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<tr>
<td>Undistorted Power Output (watts)</td>
<td>3</td>
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</table>

**In an amateur phone transmitter, Radiotron UX-842 will effectively modulate 8 watts of oscillator input power. It is, therefore, a most desirable modulator for the amateur who uses Radiotron UX-210 as an oscillator.**

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<td>TYPE 334-V</td>
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QST is published monthly by The American Radio Relay League, Inc., at Hartford, Conn., U. S. A.
Official Organ of the A.R.R.L. and the International Amateur Radio Union

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The American Radio Relay League

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

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

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

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

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ADDRESS ALL GENERAL CORRESPONDENCE TO THE EXECUTIVE HEADQUARTERS AT HARTFORD, CONN.
HAVING just absorbed our usual noonday plate of beans at Mr. Eddie Kane's Pala
tial Pullman Diner which graces the avenue across from these headquarters, and all
being quiet and peaceful through the establishment, it seems a fitting time for us to bat out our
monthly words of wisdom, cheer, philosophy and what-have-you which for so many years have
decorated this page.

We feel the urge to talk about international meetings that deal with radio. Not international
meetings in general, for we can think of lots of other things we'd rather talk about and many
that we could be more cheery about — but two particular international radio meetings which are
a bit in our mind right now. One of these was at Prague, Czechoslovakia, in April, and the other
is to be held at The Hague in September. After Washington we thought there would be a bit of a
breathing spell until Madrid, but the international-conference idea seems to be nicely regen-
nated now and we mere users of radio needs must oscillate in phase with it.

After the fashion of the North American regional conference held at Ottawa recently, the
European governments held a regional conference at Prague in April to deal with European regional
problems. The United States sent over a delegation of observers, headed by Mr. W. D. Terrell,
chief of the Radio Division of the Department of Commerce. The conference related only to Eu-
ropean affairs and mostly to broadcasting, but the effect of some of its actions is reflected towards
amateur radio and some of its doings have a direct bearing upon the radio amateurs of Eu-

c

The United States government already has orga
nized committees parrelling the field of work of the coming Hague meeting, and the views of this
country are being marshalled to take to the conference. The League has representation in
these committees and the interests of the amateur are being looked after. We have nothing to watch
our own government for — the United States view will be entirely sympathetic to its amateurs.

It happens that the Washington Convention of 1927 provides for the existence of an Interna-
tional Technical Consulting Committee on Radio Communication, to meet every two years to ponder
technical questions and give advice to the govern-
ments party to the convention. The Neth-

erlands government was assigned the duty of ar-

ranging for the first meeting. Now the call has come out for the first session, at The Hague in
September, and the governments and radio organiza-
tions of the world are busy in preparation. It was to this meeting that the Hague conference
referred numerous general technical questions about frequency separation, stability control, in-
ternational standards, short waves for national services, and so on. The Netherlands government
itself, in issuing the call for the meeting, includes the subject of amateur licenses, originally sug-
gested at Prague, proposing "uniformity, as far as possible, in the technical conditions imposed on
the holders of amateur licenses; international allo-

c

We have in the picture, then, another interna-
tional confab on radio. This one has no adminis-
trative authority and its views are not binding
upon any nation; it is advisory only and it is still
the Washington Convention that governs. Some
knotty problems are coming up, though. There is
some disposition to upset the allocations of Wash-

ington, Germany in particular wanting the ex-
tension of broadcasting up to 2000 kc. or at least
from 1715 to 2000 kc. and thus threatening the
amateur shared band between those figures. All
these technical stipulations governing stations
may apply to amateurs unless exceptions are
noted, and there are these direct proposals from
the Netherlands of uniform international prac-
tice in amateur licenses, allocations and regula-
tions. Life, it seems, is never to be dreary for
radio folks.

The United States government already has or-
ganized committees parrelling the field of work of the coming Hague meeting, and the views of this
country are being marshalled to take to the conference. The League has representation in
these committees and the interests of the amateur are being looked after. We have nothing to watch
our own government for — the United States view will be entirely sympathetic to its amateurs.

We know that our government will not acquiesce
to any international proposal for regulations that are
more severe than it now has. Regulations for other
classes of stations are not uniform international;
yet why should they be for amateurs? Perhaps it is true that amateur radio in this coun-
try, because of its encouragement by the govern-
ment, is more of a national asset than is the ama-
teur radio of any other country — but all the
more reason why our government should encour-
age this policy. We need, and we justify, more operating facilities than other nations possibly will be willing to give their amateurs. The Washington Convention marks the limit in international yielding for the sake of accord. Within the flexible regulations of that document there is room enough for any government to provide for or to curb its amateurs according to its own lights and their just deserts, and for this government there can be no more participation in those international schemes which receive acceptance only when the lowest common denominator is found for every nation’s proposal. On the contrary we think that our government can testify, from its seventeen years of experience in amateur regulation, that other governments are unnecessarily alarmed about the great administrative difficulties attendant upon amateur control, and it is in position to suggest that these other governments might much more freely encourage amateurs by more liberally providing for them in domestic regulations. But suffer American amateur radio to be cut to that measure of liberty to which such uninformed administrations might agree — never!

K. B. W.

Atlantic Division Convention
(Western and Central New York Section)

AUGUST 9-10 AT AUBURN, N. Y.

THE Finger Lakes Transmitting Society extend a cordial invitation to all “Hams” to attend this year’s convention. The meeting place and lecture auditorium will be in the Chamber of Commerce Building, 160 Genesee St., Auburn, and the banquet will be served at Lake Side Inn, a well-known summer hotel on the shore of Owasco Lake, where ready access to Lakeside Park with its wonderful bathing beach and dance pavilion will add to the amusement side of the convention.

Several lectures will be given by prominent authorities. Plenty of prizes have been provided and there will be something doing every minute.

Don’t forget the dates and bring along the Y.L., O.W., and friends; but be sure to write Albert Gifford, WSAHC, Union Springs, N. Y., and let him know you will be there.

Official Frequency System

THE Official Frequency Station Committee, a part of the Experimenters’ Section of the A.R.R.L. has arranged the services described below for the benefit of the members of the League and others.

1. Standard Frequency Transmissions are sent by Standard Frequency Stations (known as O.F.S.-S.F.) on definite schedules with a high degree of accuracy. All the principal amateur bands are covered, several points being given in each so that frequency meters may be accurately calibrated. These transmissions are based on piezo-electric frequency standards that are regularly checked by one or more of the leading scientific laboratories of the country.

2. Official Frequency Transmissions are sent by Official Frequency Stations (known as O.F.S.) at a somewhat lesser degree of accuracy. These stations do not transmit on regular schedules but announce their frequency at the end of at least every other transmission during their regular amateur operation. Such stations will measure the frequency of your emissions upon request.

Practical suggestions are always welcome and should be sent to the proper member of the Committee which is composed of the following: Don C. Wallace, W6AM, Chairman in charge of O.F.S., Room 410, 209 Pine Avenue, Long Beach, Calif.; Prof. C. M. Jansky, Jr., care of University of Minnesota, Minneapolis, Minn.; and Killian V. R. Lansingham, W6QX, in charge of O.F.S.-S.F., Box 731, Hollywood, Calif.

STANDARD FREQUENCY SCHEDULES

<table>
<thead>
<tr>
<th>Time (p.m.)</th>
<th>Frequency (kHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>8:00</td>
<td>5700</td>
</tr>
<tr>
<td>8:12</td>
<td>4000</td>
</tr>
<tr>
<td>8:24</td>
<td>3900</td>
</tr>
<tr>
<td>8:36</td>
<td>3800</td>
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<tr>
<td>8:48</td>
<td>3700</td>
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<tr>
<td>9:00</td>
<td>3600</td>
</tr>
<tr>
<td>9:12</td>
<td>3550</td>
</tr>
<tr>
<td>9:24</td>
<td>3500</td>
</tr>
</tbody>
</table>

Time is the local standard time at the transmitting station and the frequency is in kilocycles.

DIvision of Time

1 minute — QST QST QST de (call letters).
3 minutes — Characteristic letter sent very slowly and broken by call letters each half minute.
1 minute — Statement of frequency in kilocycles.
4 minutes — Time allowed to change to next frequency. Standard Frequency Stations.

WIXV — Massachusetts Institute of Technology, Communications Experiment Station, Round Hill, Dartmouth, Mass., H. A. Chinn in charge. Uses Eastern Standard Time and characteristic letter “G.”


ACCURACY

The transmissions of both of these stations will be within 1/10 of 1% of the frequencies herein announced, which is considerably better.

(Continued on page 80)
SUMMERTIME will undoubtedly always be vacation time to most of us — that time when automobile trips, camping and week-end journeys are distinctly in order. However, when away from home and the station, need is often felt for a practical receiver fully portable with which close touch can be kept with amateur radio.

The portable receiver shown in the first photo was built to meet these demands — and then some. The metal lunch-kit provides a convenient means of transportation with the added advantage of suitably shielding the circuit within. Thus it can be used as a monitor to listen to the emissions of the transmitter. It is, therefore, unnecessary to put it on the shelf for the larger part of the year as is the case with many portable receivers.

This is a distinct advantage when funds are limited and small.

The circuit employed is shown in Fig. 1 and is unusual in no way. It has been used by amateurs for a long time and employs a throttle condenser to control regeneration. Plug-in coils of the very popular tube-base variety are provided so that the 3500-, 7000- and 14000-kc bands may be covered.

*W3BAY, 3 Tanner St., Haddonfield, N. J.*

![Diagram of the Lunch-Kit Portable Receiver Circuit](image)

**FIG. 1. — LITTLE NEED BE SAID CONCERNING THE CIRCUIT ARRANGEMENT; IT IS FAMILIAR TO ALL**

The parts used are as follows:

- C1 — 33 μfd. Pilot midget.
- C2 — 1000 μfd. Pilot midget.
- C3 — μfd. Sangaono fixed condenser.
- R1 — ¼-megohm grid leak.
- R2 — Carter 30-ohm rheostat.
- J — Variety single circuit filament-control jack.

The antenna and ground binding posts are mounted on the back of the case and are connected to the primary coil which is wound around the circular portion of the UX socket into which the plug-in coils fit. This prevents different an-

**WHEN THE COVER IS LIFTED, WE FIND QUITE AN ASSORTMENT OF THINGS THAT THE MANUFACTURER NEVER INTENDED TO BE CARRIED WITHIN THE KIT**

The strap to hold the thermos bottle in place does excellent duty in maintaining the "A" battery in position.

The antenna post must be insulated from the metal box and this is accomplished by cutting or drilling a hole amply large enough to provide the necessary clearance and fastening a piece of bakelite by means of two screws so it will cover the hole on the inside of the box. The binding post is then mounted on the piece of insulating material.

The tuning and throttle condensers are mounted directly upon the side of the kit, there being no reason for insulating them from it. The tuning condenser which is rotated by means of a General Radio dial is mounted on the front of the box while the regeneration-control condenser is equipped with a small knob (there being no need for any scale) and is mounted at one end of the box. The only other piece of equipment that shows on the outside of the kit is the telephone jack which is next to the tuning dial. It, also, is
The filament rheostat is not mounted on the top of the kit and is held in place by means of the metal strap which would normally be employed to hold a thermos bottle in place providing the receiver were supplanted by a suitable assortment of sandwiches etcetera. To prevent the metal strip from shorting one cell of the battery by making contact to two of the binding posts on it, a piece of heavy paper or light fibre is employed as an insulator. Sufficient space is available each side of the “A” battery to allow a pair of light-weight phones and a length of antenna wire to be stowed away. When being transported, the set is, therefore, entirely self contained.

The use of the single stage of audio amplification allows loud speaker signals to be obtained when the set is employed as a monitor. The advantages of this are many as will be quickly seen.

Another portable set that was constructed about a year ago differs somewhat in its mechan-

in insulated from the box and is mounted in the same fashion as the antenna post.

The filament rheostat is not mounted on the

front of the case at all. It is supported by means of the two heavy leads connecting it in the circuit and may be seen next to the tubebase coil in the next photo. This offers no hardship inasmuch as the telephone jack employed is of the filament control variety which will allow the rheostat to be set and readjusted only occasionally.

A pair of the smallest sized 22.5-volt “B” batteries supply voltage for the plates of the two tubes and the filaments are lighted by means of a single 3-cell battery of the small-size heavy-duty variety. The “A” battery is mounted in the
The President's Corner

A WORD FROM

HIRAM PERCY MAXIM

PRESIDENT OF THE AMERICAN RADIO RELAY LEAGUE AND OF THE INTERNATIONAL AMATEUR RADIO UNION

DX Dreaming

It is great fun to dream, sometimes. I fell to dreaming in terms of DX the other night. I wondered how many of you fellows realized the real DX that is going on about us every day and every night. We think we are accomplishing something wonderful when, with a little bit of apparatus which we put together ourselves, we create an electromagnetic disturbance that sends out a wave that can be detected on the opposite side of the earth. The distance is one-half the earth’s circumference or one-half of 25,000 miles, which is 12,500 miles. That is the maximum possible earthly separation that can be achieved. In other words, no two human beings can get farther away from each other than 12,500 miles.

Electromagnetic waves created by an electromagnetic disturbance travel at a velocity of approximately 186,000 miles per second. This is the velocity of light. Visible light is “radio” of enormous frequency.

If I am in Halifax, Nova Scotia, and you are in southwestern Australia, we are approximately at opposite points on the earth’s surface, or 12,500 miles apart. It takes my wave 12,500 miles of a second to reach your antenna, or .067 of a second.

Now consider the Sun. It is so hot that it radiates electromagnetic waves of a perfectly tremendous frequency. We call them sunlight. When we walk out into this sunlight we receive these radio waves from the sun. The sun is 93,000,000 miles away. Therefore it takes 93,000,000 miles ______ 186,000 = 500 seconds, which is just a little over eight minutes, for the wave to travel the distance between the sun and the earth. This is pretty good DX, but not a circumstance to some of the other DX that is going on around us.

The light from the nearest of the fixed stars, which we see on any clear night, takes over a year to reach us — 186,000 miles every second of all that time! How far away must they be? The answer is: 365 days in a year means 365×24 hours, or 8760 hours. This multiplied by 60 equals 525,600 minutes. This multiplied by another 60 equals 31,566,000 seconds — 186,000 miles for every one of these seconds means 31,566,000 multiplied by 186,000, or 1,604,256,000,000 miles.

This means an unwieldy figure to handle, so we call that distance one light year. It’s a long, long way for a little radio wave to travel, sure enough, but it makes the distance just the same, and every time we fix our gaze on one of those stars that is a light year away, our eyes are detecting the “signals” that left that star a year ago!

But that is not all. Our telescopes amplify these “signals” and enable our eyes to detect faint radiations of light from spiral nebulae as far away as 1,000,000 light years!

When we gaze at one of these spiral nebulae our eyes are detecting “signals” that left those remotely-distant bodies over a million years ago, when our little earth was very young. This is real DX and must inspire every radio man to serious thought.

With radio we have the means of communicating across the incomprehensibly great distances of celestial space. There is no other means that we know of that can do this. And we have been receiving all kinds of radio frequencies across these profound spaces for centuries. The latest are those described by Millikan and termed, by him, cosmic rays. At this time we have recorded almost the entire spectrum. And yet is it not odd that, notwithstanding all the multitude of different radio frequencies which we have detected, we have never had one single grain of evidence that any of them were originated by an intelligence? And hence the question, is ours the sole intelligence in all the cosmos? Will it be an amateur who first answers this great question? I can remember when I wondered if I was the only radio amateur in the world. There were lots of them, I later found. Are there lots of other intelligent beings in other worlds?
Radio Frequency Couplings

By J. M. Grigg

The radio frequency amplification obtainable with a vacuum tube is a subject which in lay circles has always been more or less clouded with a haze of uncertainty. This fact has resulted largely from individual treatment, leading to the conception that each coupling type is a thing for itself. Excepting the band-pass filters, all the useful coupling types are essentially equivalent, and a best perspective of the subject results from an examination of the type form. This requires, therefore, that all these types be reduced to a uniform symmetry that admits ready inspection. In so doing the writer attempts to supply simple equations in which substitution of the proper constants will give the needed information for all the common types of coupling. Thus the theoretical amplification and selectivity become known, and it is possible to conclude at once what probable values will best suit a given tube characteristic.

The equation for amplification is

\[ A = \left( \frac{\mu}{1 + K^2} \right) \frac{1}{1 + \frac{1}{K^2}} \]  

(1)

which applies to radio frequency couplings when tuned to resonance, and will apply also to resistance couplings.

The equation for selectivity is

\[ S = \frac{Z_0 r_p}{R(r_p + Z_0 K)^2} \]  

(2)

In these expressions \( K \) is the coefficient of coupling and

\[ a = \frac{r_p}{Z_o} \]  

(3)

in which \( r_p \) is the internal impedance of the tube plate circuit and in all cases

\[ Z_o = \frac{L}{CR} \]  

(4)

\( L \) and \( C \) are those values by which frequency is determined, namely the effective inductance and capacitance values which satisfy the relation

\[ M = K L \left( \frac{L}{M} + 1 \right) \]  

(5)

in which \( L_0 \), the leakage flux, is equivalent to a separate inductance in the primary circuit. Since in best design the leakage should be negligible the above holds for inductive coupling, too.

while \( R \) is the high frequency resistance of the resonant circuit. In further explanation it might be pointed out that the product \( Z_0 K^4 \) is the input impedance of the coupling.

Figs. 1 to 5 illustrate various coupling types to which this discussion applies, and accompanying these are expressions for the respective values of \( K \), the coupling coefficient. All these types are examples of current or parallel resonance; in radio circuits parallel resonance is almost universal; exceptions being receiving loop antennas and tuned open antennas, both of which may be regarded as instances of series or potential resonance.

Returning to Equation (1) it is found that the maximum amplification occurs when

\[ K^4 = \alpha \]  

(6)

in which case the highest theoretical amplification is

\[ A = \frac{\mu}{2K^2} \]  

(7)

The circumstances surrounding this condition are important enough to dwell upon. First of all there is the condition that the tube delivers its maximum energy when the external (input) impedance is equal to the internal; that is, when the two loads are equal, or \( Z_0 K^4 = r_p \). If \( Z_0 \) is smaller than \( r_p \), any fractional coupling means a loss in amplification. Above the point of equality a step-up coupling of the proper fraction to maintain the balance of load insures the best voltage gain. In any case, whether the balance of load is maintained or not, it is evident from Equation (1) that the output voltage increases with \( Z_0 \), just as happens in the parallel case of resistance coupling.

\[ \omega = \frac{1}{\sqrt{CL}} \]  

\[ K = 1 \]  

FIG. 1
(k = 1), when the coupling resistance is increased indefinitely. Equation (5) merely indicates the most efficient coupling for a given circumstance; whereas the limit of amplification is determined by μ and by the limit which may be assigned to Z₀, as fixed by the possibilities of the combination L₁, C, and R.

Within the proper limits a large value of Z₀ is favorable also to selectivity. By definition selectivity is the ratio of the square-root per cent of the current-squared change to the per cent of capacitance (or inductance) change. Since detectors ordinarily register in squares, two circuits having the same selectivity will show the same separation of signals only when the amplifications are equal. Making the statement general, for the same separation of signals in two or more circuits, the respective sharpness of resonances must be proportional to the respective squares of μ, the amplification constants. An exception is made in the case of the straight-line, or heterodyne detector, but only when the beat signal is the audible signal, as for instance in code reception. The regenerative detector, in so far as it may be classed as straight-line, is also an exception. In these exceptions equal separation of signals requires sharpness of resonances proportional to the first power. In the latter statement is found a plausible explanation of the better selectivity of the regenerative detector; in the former an accounting for the difficulty in getting proper signal separation with the high-μ tube, such as the screen-grid tube.

Returning to Equation (2), if k = 1, S will have its highest value when Z₀ = r_p, and will be equal to

\[ S = \frac{L}{4CR^2} \]

which is the utmost using the coupling of Fig. 1. If Z₀ is greater than

\[ r_p \text{ and } Z_0k^4 = r_p, \]

in which, with a different relationship of constants, a better selectivity may obtain. With the same constants, if

\[ k^4 = 0, \quad S = \frac{L}{4CR^2} \]

which is equivalent to the selectivity of a series resonance circuit of similar constants and which is the maximum it is possible to obtain. From this it may be observed that reducing the coupling from the optimum value to zero nets a gain in selectivity of only two times. Nevertheless, since the amplification will also reduce to zero it is evident that any desired ratio of S to A may be had by proper choice of the coupling coefficient. Considering, however, that amplification falls off badly in the process, the usefulness of this is of doubtful value. At best it amounts to little more than reducing volume to get wider dial separation of signals.

On the other hand, increasing the value of the square-root ratio L/CR will result in a higher numerical value of S, but will not necessarily result in sharper tuning. This may be explained in the following manner. In the case of optimum coupling the two expressions may be written

\[ A = \frac{\mu}{2} \sqrt{\frac{L}{r_pCR}} \quad \text{and} \quad S = \frac{1}{2} \sqrt{\frac{L}{CR^2}} \]

in which the quantities L₁, C and R are common to both. From the first of these expressions it is evident that large voltage gains may be had merely by choosing a large L/CR ratio. But in the actual coil L₁ cannot be increased without a corresponding increase in the value of R; and if L varies as the square of the turns, R² will vary in approximately the same ratio. Moreover, because R in the first expression becomes R² in the second it will be found by trial that the gain in amplification due to increase in the value of L will not be accompanied by a proportionate increase in selectivity; that is, A will increase faster than S with resultant broader tuning. On the other hand, if R can be reduced the case will be reversed; that is to say, S will increase faster than A. Evidently, therefore, the true gain in coil design comes from a reduction in the value of R, which statement is axiomatic, and the widespread understanding of it is amply borne out in fact by the amount of effort spent trying to reduce the losses in coils.
The numerical value of \( R \), the high frequency resistance, is related only remotely to the value of the direct current resistance. At lower frequencies, and in general as the wire becomes very small, it approaches the value of the d.c. resistance. For an example it might be stated that with such frequencies and inductances as are encountered in the broadcast band, the high frequency resistance is not likely to be less than 5 or 6 ohms, regardless of the coil design or gauge of the wire used. \( r_p \), the impedance of the tube, varies with filament heat and the potential applied to the plate; also the value in the case of a detector tube is likely to be very much greater than in the case of an amplifier tube.

From a constructional standpoint the inductive coupling, Fig. 5, offers the best advantages. Inasmuch as \( k \) may be readily adjusted for stability. From a standpoint of stability the circuit, Fig. 4, can hardly be surpassed. As has been previously pointed out by the writer, if the two condensers are chosen about equal in value, there is a balance of potentials such that the potential of the tap is zero with respect to the preceding grid. As \( k \) in this instance is .707, unusual amplification may be expected, and this may be increased by the use of tickler coils to secure the usual regeneration.

In showing applications of the foregoing theory, it will serve as well merely to show actual values as they have been chosen. In a typical case with the last mentioned coupling the frequency is 381 kc. The coupling coefficient is predetermined by the conditions of stable operation; or as has been stated by the requirement that the condensers be equal in value. Thus \( k = \frac{1}{\sqrt{2}} \). Now if \( L \) and \( C \) are .00029 henries, and .0006 10^-6 farads respectively, and \( R \) is taken at approximately 7 ohms, the resulting value of \( Z_a \) is 70.000 ohms. Multiplying this by \( \frac{1}{\sqrt{2}} \), the input impedance is 17,500 ohms. As the plate impedance of an ordinary tube will not differ greatly from the latter figure, the requirements for best amplification with a predetermined coupling are practically satisfied.

For experimental purposes a coil was made up as follows: There were 325 turns No. 31 s.s.c. on a 2" tube. The winding was 3.625" long, and had small loops brought out every 11/2" for tapping. The calculated inductance and high frequency resistance at 381 kc. were 2.32 mh. and 27.1 ohms respectively. With a shunt capacity of .000075 1/2", \( Z_a \) was 1,138,000 ohms.

This coupling unit was tried with a 201-A tube. As \( Z_a \) was excessive compared with the impedance of the tube, the value of \( k \). Equation (1) was quite small, and the optimum coupling was \( k = .35 \). If the tap was taken \( \frac{1}{2} \) the distance from the low potential end, then \( k \) was equal to this value, or .35 in this particular solenoid. It was surprising to find that it was impossible to couple at this point in an unshielded superheterodyne with leakage had been used, the leakage reactance, constituting in effect a free inductance in the primary circuit, would have caused the primary current to lag, and the feed-back would have had a component in the direction to sustain oscillation. This explanation was borne out in the fact that detuning to get a lagging current did cause oscillation.

Using the screen-grid tube with this coil the gain was of the first order. The point of maximum, as far as could be determined, did not fall at any intermediate point, indicating an impedance in the neighborhood of one million ohms at 90 volts. With the high amplification obtained, the tuning band, as in the previous case, was too broad to be of practical use, nor could a workable separation of signals be had until the amplification was cut down to a figure approaching that of ordinary tubes. Couplings of other constants also were tried, and the conclusion was, that whereas separation of signals is a requirement, the high amplification of this tube cannot be properly utilized with the ordinary methods of tuning. As suggested alternatives, regenerative detection would help, as would heterodyning to a low beat frequency; or since so much energy is available and some must be wasted, it might be wasted with profit in a band-pass filter.

(Continued on page 84)
Time Relay Control of Transmitters

By A. R. Richards

The ambition of most every radio operator, whether amateur or commercial, is to facilitate the handling of traffic at his station, and the greatest help toward accomplishing this end is the installation of automatic control. By means of properly placed time relays the operator can handle traffic with a minimum of delay and at the same time have the advantages of an efficient break-in system. This method of control completely eliminates possibility of error on the part of the operator as the change the value of a current flowing in an electric circuit, a force is evidenced which opposes this change. In Fig. 1 it is assumed that a current of constant value is flowing through the turns of the coil "C" in the direction indicated. An unvarying magnetic field is thus created, and as a consequence no e.m.f. is induced in coil "D". Now if the circuit is broken by the key at K, the lines of force collapse and in doing this cut the turns of coil D. This produces an induced

more depression of the transmission key is all that is necessary to start the set. The relays then close the power circuits in the proper sequence. When the key is left up for a period of time longer than necessary for spacing between words, the relays function in the reverse order, thus taking the set off the air.

The apparatus needed to install this system of control is inexpensive, and can usually be found in the experimenter's box of spare parts. One keying relay and two delayed-time relays are required. The keying relay, if not already used in the set, may be made from an automobile charging cut-out. The time relays are of special construction, but with a little attention to the following instructions a very reliable pair of instruments can be constructed.

As in the average person is unfamiliar with this type of instrument, a brief explanation of the theory of operation will be given before launching into the actual details of construction.

Lenz' Law states that if an attempt is made to

FIG. 1.—THE CIRCUIT UPON WHICH THE LAW OF LENZ IS TO BE DEMONSTRATED

The iron core running horizontally across the page carries two windings. One of these is actuated by the battery current and consists of a number of turns while the other is a single turn of heavy cross section. These are labelled C and D respectively. Any change in the current in C will cause a change in the magnetic field shown in dotted lines. This change in field will cause a current flow in D that produces an effect in C through its magnetic field which tends to keep the current amplitude in C constant.

FIG. 2.—A CROSS-SECTIONAL VIEW OF THE MAGNET ASSEMBLY

One of the magnet windings is replaced by a copper cylinder of similar dimensions which acts as the coil D in Fig. 1. The vertical iron pole pieces should be dressed off with a file so that the armature makes perfect contact with the entire face and no air-gap is obtained. Any air-gap in the magnetic circuit will materially affect the time lag of the relay.

e.m.f. in these turns, and as the coil is shorted on itself a current flows and produces a magnetic flux which opposes the decay of flux from coil "C". In this manner the magnetic field persists for an appreciable length of time after the initial current has ceased flowing. Use is made of this retarding action in the delayed-time relays.

Box 611, East Lansing, Mich.
As the strength of a magnetic field is proportional to the current flowing in the circuit and the current is inversely proportional to the resistance of the circuit, it is evident that coil "D" should be of as low resistance as possible and carry a high current. Since the resistance is so low, the voltage in the coil is not an important factor and hence only a single turn of heavy wire is necessary. This greatly facilitates construction, as a thick cylinder of copper may be used.

Two twenty-ohm sounders, a heavy bar of copper, two radio jacks, and a little patience are the chief requisites for the construction of these instruments. High resistance sounders are naturally more economical on the battery, but if only the low resistance type are available the magnets may be rewound. If the spool of one of the magnets is wound full of number 28 wire the resistance will be approximately fifteen ohms and will allow enough current to pass from a six-volt source to operate the relay nicely.

Both relays are built exactly alike as far as the magnetic system is concerned, and differ only in the number of contacts. The first step is the removal of one electro-magnet from each sounder. Only the iron cores of the removed magnets will be used in the relay assembly.

A bar of copper is now turned down in a lathe to approximately the diameter of one of the magnet windings, and drilled lengthwise so the iron core of the discarded magnet will fit snugly. The copper should not be long enough to extend above the iron core. These copper assemblies should be now mounted in place of the magnet just removed as is shown in Fig. 2. The iron cores must be carefully dressed with a file until the sounder armature rests on both at once when in the down position. No air-gap is permissible under operating conditions.

The contact assembly is comparatively simple. The springs are removed from the jacks and used for this purpose, as they are quite flexible in addition to having the silver contact as an integral part. One relay is equipped with one set of contacts which is closed when the relay is not energized. The other relay is fitted with two sets of contacts so that one circuit is closed when the relay is energized, and a different circuit completed when the relay is not energized. A convenient method of mounting the contacts is to drill and tap a hard rubber post so that it can be mounted directly on the sounder base. The movable contact is easily mounted by the same screw that fastens the armature to the hammer bar. These points are clearly illustrated in the photos.

After the relays have been connected as shown in Fig. 3, they must be timed. This adjustment is made by tightening or loosening the spring on the hammer bar. The double-contact relay should be adjusted to hold closed for about a second and one-half after the actuating circuit is opened, and the single-contact relay should remain closed for nearly three seconds after the energizing current has been removed.

When the transmitting key is open the battery sends a current through the plate circuit time relay which opens the plate circuit of the tube. When the key is closed, the battery energizes the keying relay and the time relay controlling the power to the plate and filament supply circuits. Even though the plate supply system may be operative, no plate voltage is applied to the tube because the plate circuit time relay which has the greatest lag has not as yet closed the plate circuit. However, after the filament of the tubes have reached their full brilliance, the plate circuit time relay operates and the plate circuit is closed and voltage applied to the plates of the tubes.

When the key is opened for periods of less than a second and a half, only the keying relay is affected. If, though, it is opened for a longer time, the time relay controlling the power supply to the set will open and actuate the plate circuit time relay, thus shutting down the transmitter until the key is closed again. The switch S is provided

(Continued on page 29)
High-Frequency Reception on Trains

By Don C. Wallace

RECEPTION of high-frequency radio signals with portable equipment on moving trains has apparently had but little attention from QST contributors and while a little broadcast reception on moving trains has been reported in QST I believe the date of this was sometime in 1920. Since then, no reports have been seen concerning high-frequency reception or transmission from moving trains, other than from semi-permanent installations.

On each of the various business trips taken from W6AM, a small portable (being less than one foot cube) is carried along or checked as regular baggage. This portable has the call W0ZZA, and in January, 1929, a trip was made to Washington, D. C. While there as well as along other points en route to and from Washington, D. C., schedules were maintained with Mrs. W6AM, who has her own license and call signing W6MA.

An interesting thing to note in this connection is that the first call from the Hotel Mayflower at Washington, D. C., was successful. In the last thirty-two 7000-ke. schedules with Mrs. Wallace, portable W0ZZA has not failed to establish communication from Washington State, Washington, D. C., Texas, or even San Diego.

While having a QSO with W6MA from W0ZZA, at that time located at the Hotel Mayflower, Washington, D. C., Mrs. Wallace was asked whether or not she would be willing to send each evening so that tests could be made from the train en route from Washington, D. C., to Long Beach, Calif. She replied that she would be glad to send each evening at 7 o'clock, and so the tests were begun that night.

Accordingly, from January 22nd until January 27th (the arrival at El Paso) W0ZZA listened in practically every night from one to four hours, collecting data on antennas for reception on moving trains. On only one of these nights could W6MA be heard, but on practically every night, plenty of amateur stations could be heard, which shows that reception of strong signals on the 7000-ke. band is entirely practical on a moving train.

The first antenna idea tried was to use the car frame as an antenna connected to the set as any other antenna system would. The results were negative whether the train was in motion or not. Next, the car frame was used as a ground and no regular antenna employed. This also gave no results either with the car in motion or still.

The third antenna tried consisted of a wire stretched across the smoking car, using the car frame as a ground, but during the evening this did not bring anything in loud enough to be decipherable.

The fourth antenna tried was a piece of No. 30 single cotton-covered wire stuck out under the window and allowed to trail behind the train. Tremendous rattle occurred most of the time while the train was in motion, although when the train stood still, numerous stations could be heard. At that time, the conductor of the train thought he would help out the experiments, so he very carefully picked up the antenna wire and fastened it to the hand rail at the end of the car. I did not know that he was in on the experiment and was surprised to notice that no more signals could be heard. Finally, when the train started again, a survey outside of the car window showed that the antenna was no longer trailing, which accounted for the sudden disappearance of all signals.

The fifth antenna, which paralleled this same idea, consisted of a wire run the length of the car and spaced about four inches from the car side. No results were secured with this either, showing that the car side is pretty thorough shielding as far as ordinary evening reception on a portable is concerned.

The sixth antenna tried was a trailing wire on the back observation platform leaving the porta-
ble receiving set in the observation car where it was nice and warm. This trailing wire was capable of picking up signals, but they could not be read due to the fact that the wire bounced up and down as the train went along. With the car standing quietly in the station, however, normal reception was secured just about the same as any ordinary 15- or 20-foot piece of wire would give.

By this time, the train had arrived at Chicago, and after leaving Chicago for Denver, the tests were continued. It was found that two short trailing antennas of about eight feet apiece did quite well as a certain span occurred between them and across the rear end of the car.

About this time, one of the other passengers on the train became thoroughly interested in the whole experiment. He was Mr. H. H. Kob, of 1459 Monroe St., Denver, Colo., who was just returning from two years engineering work in Liberia. While there, he had established an amateur station for the radio engineers, having put up their building, and was naturally interested in the tests. Mr. Kob suggested that we make a grid stretched over the entire rear back platform of the observation car. By using two pieces of string stretched from the corner of the roof down to the railing, a very satisfactory grid was stretched up, using about 60 feet of wire, and from then on reception was very nice.

Somewhere between Chicago and Denver that night, W6MA was heard very nicely, and numerous other stations, such as WIZ, LP1, W6BAM, W3AH, WP9EGU, W8AJU, W1AEF and W8ML were all heard with varying degrees of readability. Plenty good enough, however, to say that the experiment was an entire success and that the type of antenna suggested by Mr. Kob is perfectly satisfactory for favorable reception on trains.

The lead-in was run over the door leading into the observation car and insulated by a piece of paper placed under and above the wire. In this particular case the insulation of the paper sufficed.

The use of a ground was found undesirable as the unsteadiness of the signals increased and the signal volume was not apparently improved at all with its addition to the set.

The portable set used is the regular W6ZAZA portable transmitter and receiver which is mounted in a leather case less than a foot cube. At the present time, the transmitter is using two UX-210 tubes, to operate on the a.c. line of the particular hotels in which it is temporarily located. The receiver uses two CX-300 tubes, hooked up in the familiar type of "Schnell" circuit. Plug-in coils are provided for transmission and reception on the 14,000-ke. band, the 7000-ke. band, and the 5000-ke. band. All of these bands have been used successfully in making QSOs with Mrs. Wallace, who operates the 500-watt transmitter at Long Beach, Calif. This transmitter uses a 6EX water-cooled tube and 6 of the 6LX Rectobulbs in a 6-phase plate supply.*

Upon arrival in El Paso, Texas, the set was hooked up in the Hotel Husmann, and communication soon established with the West Coast (W6ZBJ) and a message given to tell Mrs. Wallace to get on the air. A QSO was then had with W6MA, and the train schedules discontinued as the balance of the trip was made in short jumps.

Time Relay Control of Transmitter

(Continued from page 18)

to open the battery circuit to the plate circuit time relay and conserve energy when the set is not being operated.

To prevent arcing, a 2-mfd. condenser with a 110-volt lamp in series should be connected across these contacts, breaking high voltage circuits.

* See February, 1928, QST for further details.—Editor.
An Inexpensive Test Set for Broadcast Receiver Performance

By Wilfred Taylor

For many years it has been customary to speak of the performance of a receiver as being good, bad or indifferent. Such an opinion would depend upon many other things than the quality of the receiver. One must take into consideration the location of the set, the extent of the collector system, the season of the year, time of day, mood of the test operator and the character of the transmission equipment and type of program material used. Obviously, quantitative results were impossible and with the advance made in receiver design, it rapidly became imperative that some sound basis of comparison be devised which would allow suitable measurements to be obtained. To be of greatest worth it was essential that these measurements be based upon definite standards; it would then be possible to make comparisons between different receivers in various laboratories and obtain figures that would be comparable.

While it is very nice to build test equipment that will give results that may be duplicated at any future time and which will allow for comparison with measurements made in other laboratories, such equipment is very expensive and complex and not suited for the experimenter who is not producing a large number of receivers from the sales of which the cost of extensive test equipment may be obtained.

There is, therefore, a definite need for a simple inexpensive test set capable of giving comparative results over short periods of time. Such equipment would allow some definite information to be obtained to show what the resulting effects from changes were, and whether or not these changes being made were desirable. In many cases, the final decision will be a compromise between two or more factors that are incompatible and some convenient, inexpensive means of measuring the relative values involved will prove to be of inestimable worth.

The test equipment naturally divides into two portions, that generating the signal to be supplied to the input circuit of the receiver and that with which the output power of the receiver is measured. Both should simulate normal conditions in order that incorrect readings do not result.

As it would be impracticable to make measurements on a receiver at all frequencies within the broadcast spectrum, three representative points have been chosen. These points are at 600 kc., 1000 kc. and 1400 kc. It is assumed that they will give sufficient information to allow the characteristics at other points in the spectrum to be predicted with sufficient accuracy.

Oscillator

The driving circuit consists of a simple oscillatory circuit operated from the 110-volt a.c. line.

A simple oscillatory circuit is employed and three small condensers shunted across the main tuning condenser allow the generated frequency to be varied over a small range around each of the three test frequencies.

A step-down transformer supplies 5 volts for the filament of a 201-A and the plate voltage is obtained directly from the line itself. This is shown in Fig. 1.

This oscillator must cover the three test frequencies mentioned above and we may arbitrarily choose a 500-mufd. variable condenser as the tuning element. The inductance across which the condenser is to be shunted may consist of 50 turns of No. 24 d.c.e. wire on a three-inch tube. A tickler of three turns is wound next to it and an additional winding of three turns is so mounted as to allow variable coupling to the first two windings. This last winding is a coupling coil to pick up a suitable signal to be impressed across the input terminals of the receiver under test.

In order that selectivity curves may be ob-

* Thompson, Conn.
tained, it is essential to employ some method whereby the frequency of the input signal may be adjusted with some degree of accuracy over a range of approximately 20 kc, each side of the three test frequencies, it would be possible to calibrate the main tuning control but this is not practical because of the large range of this control which would give a 20-kc, shift of frequency

![Image](image_url)

**FIG. 2.—THE MEASUREMENT CIRCUIT WHICH IS CONNECTED ACROSS THE OUTPUT OF THE RECEIVER UNDER TEST**

The 2000-ohm resistor acts as a phantom loud speaker and offers a constant impedance over the usable range. The output voltage of the receiver is compared with the iron voltage by means of the capacitative potentiometer, the lower half of which is connected across the grid and filament of the tube voltmeter.

with but an insignificant motion of the dial. The better way is to employ a small vernier condenser in shunt of the main tuning condenser and calibrate the main condenser with the vernier at half scale. The vernier condenser will then allow the capacity across the coil to be varied over a small range with the possibility of reasonable accuracy in the setting and reading of the dial controlling it.

It is very desirable that the 40-kc. range (20 kc. above and 20 below the test frequency) of the vernier control be spread over practically the complete dial scale and because of the difference in the test frequencies and the total amount of capacity across the coil to set the frequency at these values, it is impossible to use but one vernier condenser for all three ranges. Three vernier condensers of different capacity ranges are employed. They are of the straight-line capacity type and have capacity variations of approximately five, ten and fifty microfarads respectively for the 1400-, 1000- and 600-kc.

These vernier condensers are all set at half scale (50°) when the main tuning control is calibrated for the test values and then they in turn are calibrated in kilocycles each side of the 50° point. The 5-µfd. vernier gives the desired range about the 1400-kc. test frequency, the 10-µfd. one about the 1000-kc. point and the 50-µfd. condenser is employed in conjunction with the 600-kc. value test frequency. These vernier condensers should always be set at half scale when not in use or else the calibration of the main tuning condenser will be incorrect.

This oscillator supplies a signal modulated 100% at 60 cycles. This frequency can be varied over a 20-kc. range each side of the three test frequencies and the input to the receiver under test can be varied to suit conditions as they may be. The current in the coupling circuit is measured by a Weston thermo-galvanometer giving a full scale deflection on 115 milliamperes. A 2000-µfd. condenser is in series with the pick-up coil and meter so as to make this circuit more nearly approach the characteristics of an ordinary receiving antenna. The amount of current flowing in this circuit should be kept constant during all tests that are to be comparable.

**VACUUM TUBE VOLTOMETER**

The second portion of the test set consists of a vacuum-tube voltmeter employed to measure the output of the receiver under test. A 2000-ohm resistor takes the place of the load speaker because its value will be constant at all frequencies (assuming a non-inductive unit with but insignificant distributed capacity), whereas the impedance of the speaker will vary with the frequency.

As in the case of the oscillator, a 201-A is used and obtains its filament supply from the same transformer winding as the oscillator tube. The same arrangement for plate voltage also holds. A milliammeter having a range of either 5 or 10 mills is located in the plate circuit of the voltmeter tube and a biasing battery in series with a 2-megohm leak is connected between the grid and filament. A negative bias of about 9 volts will be about right. The circuit diagram is shown in Fig. 2.

A capacitive potentiometer illustrated in Fig. 3 is shunted across the resistor or phantom speaker. The stator assemblies of two 500-µfd.

![Image](image_url)

**FIG. 3.—THE GENERAL CONSTRUCTIONAL DETAILS OF CAPACITIVE POTENTIOMETER ARE SHOWN ABOVE**

A single rotor assembly is mounted within two separate stator assemblies and as the capacity between the rotor and one of the stators is being increased, the capacity between the rotor and the other stator is decreased.

variable condensers are mounted upon a pair of end plates in such a manner as to allow the rotor assembly of one of them to rotate and interchange within both stators. It becomes the equivalent of two variable condensers in series mounted upon
the same shaft with their rotor assemblies 180° apart. Such a combination which is indicated in Fig. 4 could be used and might save some mechanical labor as it would only be necessary to drive two standard condensers from a unicontrol dial arranged to accommodate these units.

**CALIBRATION**

To calibrate the vacuum-tube voltmeter, the capacitive potentiometer is connected across the a.c. line by throwing the switch to position 2. The potentiometer is adjusted so that the capacity between grid and filament is a maximum while the capacity between grid and the high side of the line is a minimum. The setting of the potentiometer and the meter reading should be noted; these figures are for 110 volts or whatever the line voltage may be.

A variable resistance or capacitance is then inserted at “C” and serves to reduce the voltage applied across the potentiometer from the line. An a.c. voltmeter is connected across the outer terminals of the potentiometer to measure the voltage impressed across it. When a voltage lower than that of the line is applied to the potentiometer, the plate current as indicated by the milliammeter will be lower than the initial value obtained for the full line voltage. However, it will be possible to obtain the same plate current by adjusting the potentiometer so as to apply a larger proportion of the total voltage across the grid to filament end of it. We can, therefore, calibrate the potentiometer not so much in actual volts but in ratios to the line voltage. In practice the settings of the potentiometer are plotted against the voltmeter readings. At the start of a series of measurements, the switch is thrown to position 2 and the potentiometer set to measure the line voltage. This plate current reading is noted and becomes the standard reading for that period, marking the point from which all measurements are made. Thus, if either the tube or bias battery is changed, it is unnecessary to completely recalibrate the meter; one needs to but check against the line and obtain a new datum point.

**SELECTIVITY MEASUREMENTS**

In making selectivity measurements the vernier condenser of the oscillator are all set at 50° and the main tuning condenser adjusted to one of the test frequencies. The tube voltmeter switch is thrown to position 1 and the receiver under test is adjusted to give maximum reading on the milliammeter in the plate circuit of the voltmeter tube.

The switch is then thrown to position 2 and the line voltage reading taken with the potentiometer set for the lowest meter reading. After shifting the switch to position 1, the coupling coil to the oscillator is adjusted to give the same reading with the same potentiometer setting.

The appropriate vernier condenser of the oscillator may then be shifted an amount equivalent to 1 kc. and the potentiometer adjusted to give the standard reading. The voltage across the potentiometer can then be obtained from the calibration chart and represents the output voltage of the receiver.

By running over the complete range of the vernier and plotting the output voltage against the frequency it is possible to obtain a selectivity curve of the receiver under test. Curves obtained at the three test frequencies will show whether the selectivity varies greatly over the range of the receiver and if the receiver tunes so sharply as to cut side bands or so broadly as to be unable to separate stations on adjacent channels. Theoretically, under present-day conditions, the curve should be flat topped and lie entirely within a 10-kc. band. However, in practice, this is only approximated by employing band-pass filters and an ordinary set, the voltage output of which fell off 20% of the resonance value at frequencies 5 kc. on either side of the resonance frequency, would be considered as very selective.

**SENSITIVITY**

The relative sensitivity of the set at the three test frequencies may be obtained by keeping the current in the input circuit constant and plotting the output voltage against the frequency. This will indicate whether the set is much more sensitive at one end of the spectrum as many sets are wont to be.

**FIDELITY**

It is not possible with this simple test set to check the fidelity of reproduction. It can be done by substituting a d.c. operated oscillator for the a.c. driven one and adding a modulator tube and source of audio frequency current that could be varied over the audible range.

While this test set is not the ultimate in such equipment, it is very much superior to the usual method of guessing as to whether a change in the receiver has improved its selectivity or sensitivity. Its cost is low and it should prove to be of great assistance to those experimenting with the design of broadcast receivers.
The A.R.R.L. Board Meets

THE American Radio Relay League is governed by a Board of Directors, one elected from each of the thirteen divisions in the United States, one from Canada, and the remaining two, the president and vice-president, elected by the other fourteen. On the 3d and 4th of May this Board of Directors had its regular annual meeting at Hartford. All sixteen directors, from every part of the country, and the officers of the League, were present. Two days were spent in an intensive examination into the affairs of the League, the deciding of numerous knotty problems, and the outlining of policies and the issuance of instructions to the officers for the coming year.

The official minutes of that meeting would fill nine pages of QST. Obviously our report of the proceedings must be very abbreviated. All the officers of the League reported at length to the Board on the branches of League activity coming under jurisdiction. Each director similarly reported, for the information of the remaining members, on conditions in his division. All of these reports laid suggestions and recommendations before the meeting, and by the time these were all examined and acted upon, the affairs of amateur radio in this country had had a very thorough going-over.

The finances of our organization were examined and its business affairs plumbed thoroughly; the headquarters establishment was inspected; the actions of the Executive Committee examined and ratified; communications from the International Amateur Radio Union, of which A.R.R.L. is a member, received and acted upon.

Proposed new radio legislation was considered, likewise the plans for an international technical conference at The Hague in September, and the officers instructed thereon. Plans were made to bring amateur radio more prominently to the notice of the powers that be. The general status of our operating rights was studied closely, and instructions issued where necessary. Enforcement of regulations, suppression of broadcasting harmonies, amateur plate supplies, license regulations—all came in for their share of attention. The by-laws were amended to provide that a candidate for Section Communications Manager must be the holder of an O.R.S. appointment. The improvement of QST, anti-amateur ordinances, convention funds, various helps for members—these and many more topics engaged the attention of the Board. The welfare and the needs and desires of members in each division were gone into as each director reported on his territory.

The question of amateur message traffic came in for a big share of the Board's consideration. All of the nice pros and cons of this complex subject were gone into. The Board concluded that neither the text nor the importance of a message was a gauge to the right of an amateur to handle it; that the question of compensation was the only proper test: and that, in the related problem of identifying non-amateur stations, the purpose of the station was the only proper test.

Plans were made for a membership development program, the undertaking of educational work about amateur radio, increasing League membership, and bringing new people into the game.

Numerous requests came to the Board to consider anew the League recommendations to Washington concerning allocations for amateur phone. Telephony is growing; its followers want more space. Careful consideration was given all these requests. The Board did not feel that it would be proper to recommend any increase in the phone band at 8500 kc., and it could not persuade itself that any of the many proposals for time division were workable. It did view with favor, however, the desire of phone men for an opportunity to operate on a high-frequency international band. Manifestly it is suicide to attempt telephony in the vastly-congested 7000 band. The so-called 20-meter band offered an opportunity, however, but it was thought that some precaution ought to be taken to prevent the ruining of this vital long-distance band, something ought to be done to insure that the amateurs attempting telephony in it were reasonably proficient. Consideration was given the suggestion that telephony there be confined to crystal-control (as indeed it just about has to be to have hopes of success), but the Board thought it improper to suggest a regulation which departed from our present American practice of judging a station only by its output and not by its internal apparatus. Eventually it was determined to recommend to the authorities that the 14,000-ke. band be opened to radiotelephony on the part of those amateurs who possess the extra first class operator's license, and the headquarters officers were instructed to endeavor to secure such a modification of regulations. At the moment of writing the matter is still in process and no information can be given as to the outcome. An official broadcast will be made of any changes which result.

All in all, the Board meeting was typical of that careful examination of affairs and that wise planning for the future which is characteristic of A.R.R.L. government. The Headquarters office feels at the moment as if it had just had about five years' work cut out for it instead of one. Progress will show forth, we hope, as the months roll by.

—K. B. W.
Little-Known Tubes
The UX-841 and 842

By Harold P. Westman, Technical Editor

There have been developed a number of special-purpose tubes concerning which the amateur and engineer knows little. This is the first of a series of articles describing some of these tubes which are capable of performing duties for which the better-known tubes are not so well suited. — Editor.

The last few years have certainly been prolific ones as far as the development and marketing of vacuum tubes is concerned. At the present time there are, perhaps, two dozen tubes from which one picks those desirable for use in a receiving set. While for obvious reasons the receiving tube has had the bulk of attention, one must not overlook the advances made along the line of rectifier and power transmitting tubes as well.

Assuredly, it would seem that there could be little reason for the existence of any other tubes than those readily available on the market. However, one may find a number of conditions into which these well-established tubes do not fit and it is to meet some of these that special tubes have been devised.

It would indeed be difficult to find someone who is not familiar with the UX-210. Its uses are manifold and varied and one finds it in the receiver as well as the transmitter. We are also aware of the UX-865, the screen-grid 7.5-watt tube. Few, though, know of the existence of two other tubes in the 7.5-watt family. These are the UX-841 and the UX-842, high-μ and low-μ tubes respectively. They are designed for use in certain circuit arrangements for which the 210 is not so well adapted.

The filaments of these two tubes are identical with that of the 210. There is little need be said about this element other than that a total emission of about 700 milliamperes is available when the voltage applied across its terminals is 7.5 and that this is reduced to approximately 175 milliamperes when the voltage is dropped to 6.

UX-841

We will first consider the UX-841 which has a high amplification factor or μ and is ideally suited for use in resistance or impedance coupled amplifiers when a tube of this power rating is essential. It may, perhaps, some day be the “for use in last audio stage only” tube in sets feeding electrostatic loud speakers concerning which we have been hearing a bit of late. Such speakers require high signal voltages for their satisfactory operation and it would seem that the 841 would be well-suited for the task. This is particularly true if one insists upon ample volume to indicate to the neighbors the possession of a “powerful” receiver as now seems to be the mode.

While it has no advantage over the use of a 210 as an ordinary oscillator, it does have a distinct advantage as far as its operation as a
voltage amplifier is concerned. It is excellently suited for use in the crystal-controlled transmitter and may be employed as the crystal oscillator tube or as an intermediate amplifier between the crystal tube and the power stage. Although in this latter role it does not offer the advantages of the 605, both in gain and isolation between input and output circuits, it is much nearer within the reach of the amateur in price, a consideration of no small size.

Some idea of the ratings of the tube may be obtained from the following:

<table>
<thead>
<tr>
<th>Resistance</th>
<th>Oscillator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Filament voltage</td>
<td>7.5</td>
</tr>
<tr>
<td>Filament current</td>
<td>1.25 amps (max.)</td>
</tr>
<tr>
<td>Plate voltage</td>
<td>350 (max.)</td>
</tr>
<tr>
<td>Plate current</td>
<td>15 watts (max.)</td>
</tr>
<tr>
<td>Power dissipation</td>
<td>12 watts</td>
</tr>
<tr>
<td>Output</td>
<td>Undistorted peak</td>
</tr>
<tr>
<td></td>
<td>350 volts</td>
</tr>
<tr>
<td></td>
<td>7.5 watts</td>
</tr>
</tbody>
</table>

With a filament voltage of 7.5, a plate voltage of 425 and a negative bias of 8 volts, the following characteristics are obtained:

Amplification factor | 30 |
Plate resistance | 21,500 ohms |
Mutual conductance | 1.4 ma.v. |

The direct inter-electrode capacities are:

Plate to grid | 8 nF |
Grid to filament | 8 nF |
Plate to filament | 4 nF |

Figs. 1 and 2 show the effect upon the plate current of changes in either the plate voltage or the grid voltage. For a given value of plate and grid voltage, the plate current can be obtained from Figs. 1 and 2 and by applying this value to Fig. 3 one can ascertain the plate resistance, mutual conductance and amplification factor. This latter characteristic is constant at 30 over the range shown. The curves for plate resistance and mutual conductance are not applicable when the tube is oscillating because they are based upon very small input voltages and if the input is of more than a few volts these values do not hold.

Fig. 4 shows plate current vs. plate voltage curves. In addition, load lines for various values of plate load resistance are drawn in. These lines indicate the drop across the load resistor due to the plate current flowing through it and assume a supply voltage of 425. The voltage applied to the plate of the tube is that at which the plate current-plate voltage curve and the load line cross. Three values of grid bias are considered.

When the tube is used as a resistance-coupled amplifier, the maximum signal voltage that it can handle will depend upon the amount of distortion permitted. Under normal conditions the amount of distortion allowable is that which causes the generation of a second-harmonic of about 5 per cent. In practise in order to obtain as much output as possible, this value is usually held between 4.75 and 5.25 per cent. and it may be calculated by the following equation:

\[
\text{Per cent second harmonic} = \frac{I_2 (I_{\text{max}} + I_{\text{min}}) - I_0}{I_{\text{max}} - I_{\text{min}}} \quad (1)
\]

where

\[I_{\text{max}} = \text{Plate current at least negative grid voltage.}\]
\[I_{\text{min}} = \text{Plate current at most negative grid voltage.}\]
\[I_0 = \text{Steady plate current (no signal input).}\]

As an aid in the design of resistance-coupled amplifiers, the curves of Figs. 5 and 6 are shown.
put voltage for maximum grid input voltage are obtainable directly from the curves. The limiting factor for small values of load resistance is the curvature of the plate-voltage plate-current curves. When larger values of load resistance are employed, the plate current may go to zero which is the minimum current limit.

The use of a 425-volt supply does not allow the full gain to be had because the plate voltage will always be less than the rated value. When additional voltage is not available this cannot be avoided. However, the output of the tube may be fed to the grid of a 50-watt and if we employ the 1,000-volt plate supply for this tube on

The problem of determining the proper bias for the 841 when the supply voltage is 1000 volts, a much larger load resistor may be used and the amplification and maximum output voltage will be materially increased.

These curves show the proper bias and voltage output and amplification when this higher supply voltage is available.

The use of a 425-volt supply does not allow the full gain to be had because the plate voltage will always be less than the rated value. When additional voltage is not available this cannot be avoided. However, the output of the tube may be fed to the grid of a 50-watt and if we employ the 1,000-volt plate supply for this tube on

the 841, a material improvement in its operation will be obtained. It allows the use of much higher load resistors and Fig. 6 shows the bias necessary, output voltage and amplification possible for values of plate load resistance between 0.1 and 1.0 megohms.

In this case it is essential that the input signal be limited to a value that does not drive the mean plate voltage above 425 volts. It is this rather than distortion due to the generation of harmonics that limits the permissible output.

When the higher values of plate load resistance are used, it is possible for the grid leak through which bias for the succeeding tube is obtained to affect the operation of the tube by reducing the load resistance. The blocking condenser usually employed has a low impedance compared with the resistors involved and the grid leak can be considered as being in parallel with the load resistor. While this does not affect the operating point as far as the d.c. voltage applied to the plate is concerned, it does affect the generated a.c. voltage which is applied across the two resistors in parallel. So much for the 841!

UX-842

The UX-842 is a low-impedance type tube and is designed for operation as a speech-operated power amplifier and modulator. It has no ad-

\[
\text{FIG. 5.—THESE CURVES WERE CALCULATED TO SIMPLIFY THE PROBLEM OF DETERMINING THE PROPER BIAS FOR THE 841 WHEN THE SUPPLY VOLTAGE IS 425 AND THE LOAD RESISTANCE IS KNOWN.}
\]

The voltage amplification and maximum undistorted peak output voltage may also be directly obtained.

\[
\text{FIG. 6.—WHEN THE SUPPLY VOLTAGE IS 1000 VOLTS, A MUCH LARGER LOAD RESISTOR MAY BE USED AND THE AMPLIFICATION AND MAXIMUM OUTPUT VOLTAGE WILL BE MARTIALLY INCREASED.}
\]

The plate voltage at which the curves were made are indicated by the numbers near them.

Its constants under rated filament voltage, plate and grid voltage of 425 and minus 95 respectively are as follows:

\[
\begin{array}{|c|c|c|}
\hline
\text{Amplification factor} & 3.0 & \text{ohms.} \\
\text{Plate resistance} & 2500 & 1.2 \text{ ma./v.} \\
\text{Mutual conductance} & 6.21 & \\
\hline
\end{array}
\]

\[
\text{FIG. 7.—THE PLATE CURRENT IS PLOTTED AGAINST GRID VOLTAGE FOR THE UX-842 IN THIS FAMILY OF CURVES.}
\]

The plate voltages at which the curves were made are indicated by the numbers near them.
The direct inter-electrode capacities are:

- Plate to grid: 8. grid.
- Grid to filament: 5. grid.
- Plate to filament: 4. grid.

In Figs. 7, 8 and 9 we have similar curves for the 842 as are given in Figs. 1, 2 and 3 for the 841.

**FIG. 8. — THE VERY IMPORTANT PLATE VOLTAGE-PLATE CURRENT FAMILY FOR THE 842**

The grid voltage at which the curves were made are shown on them. The dotted line is the preliminary load line drawn through the operating point and the 10-milliampere current point at twice the operating grid voltage. The distortion under these conditions was quite small and a lower limit of minimum plate current was chosen. The most suitable line for a plate voltage of 425 is the solid one passing through the same operating point as the dotted line. The inner load line is for a plate voltage of 500.

As in the case of Fig. 3, Fig. 9 is based upon small input voltages and is not, therefore, applicable when the input is large.

When calculating the output power and proper load impedance, a resistance load is assumed as this will result in a straight line for the load characteristic when this is laid out on the plate-voltage plate-current curves. If an impedance load were used, the characteristic would be an ellipse, its exact shape depending upon several factors.

If the plate voltage is to be 425, it is essential to choose a value of plate current which will result in a plate loss of 12 watts, the maximum allowable. This then, calls for a plate current of 28 milliamperes which Fig. 7 indicates may be obtained with a bias of 98 volts.

There are two limits within which one must stay to prevent distortion: The grid must not draw current and it is necessary to operate on the straight portions of the curves. Fig. 8 indicates that it would be inadvisable to go much below 10 milliamperes plate current as the curves become too badly curved to allow distortionless amplification below this value. If the filament of the tube is lighted with direct current, the grid will start to draw current at zero grid voltage. If, though, the filament is lighted by alternating current, it will not be possible to go to zero voltage but this point at which grid current is obtained will be approximately 4 volts negative.

Assuming d.c. on the filament, we find that the operating grid bias of 98 volts will allow a swing from 0 grid voltage to twice 93 or 186 volts. We judge the position of a curve for a grid voltage of 186 in Fig. 8 and set our lower plate current point on this curve at a value of 10 milliamperes which we had previously determined would be the probable lower limit for distortionless operation. A straight line is drawn from this point through the operating point and continued to the 0 grid-voltage curve. This line is shown dotted in Fig. 8. If now, we calculate the amount of second harmonic by means of Equation (1) we find that it is somewhat less than 1%. As our permissible value is 5%, we choose a lower minimum value of plate current and redraw our load characteristic line. If, in this particular case, we use a minimum plate current of 3 milliamperes, we will obtain the solid load line of Fig. 8 corresponding to our operating point of 28 mils and our calculations will show an harmonic content of approximately 5% which is the desirable operating condition.
The output power is then equivalent to:

\[
\text{Power output} = \frac{1}{2} (E_{\text{max}} - E_{\text{min}}) (I_{\text{max}} - I_{\text{min}})
\]

and the proper value of load resistance

\[
\text{Load resistance} = \frac{E_{\text{max}} - E_{\text{min}}}{I_{\text{max}} - I_{\text{min}}}
\]

In the case being considered we have:

\[
\text{Power output} = \frac{1}{2} (628 - 176) (0.059 - 0.003) = 3.16 \text{ watts.}
\]

\[
\text{Load resistance} = \frac{628 - 176}{0.059 - 0.003} = 8060 \text{ ohms.}
\]

Knowing that the power in watts is equal to the current squared times the resistance, we can obtain the value of a.c. current which is 19.8 mils.

When the plate voltage is low, the power output is not limited by the plate dissipation and the maximum power output is obtained when the load resistance is twice the plate resistance. A typical load line for a plate voltage of 300 is shown in Fig. 8.

In Fig. 10 we have curves showing the proper bias and load resistance for any plate voltage between 250 and 425. The maximum undistorted output power obtainable under these conditions may also be ascertained directly. For values of plate voltage below about 300, a plate load resistance of twice the plate resistance was chosen while for voltages above this value, use was made of the formulas (2) and (3).

**MODULATOR**

The S42 is well adapted for use as a plate modulator and Figs. 11 and 12 concern themselves with its use as such. These curves assume that the modulator and oscillator (or modulated amplifier tubes as the case may be) are operated from a single source of voltage which is fed through a modulation choke of infinite impedance over the frequency range desired. The total current to the oscillator and modulator will, therefore, remain constant.

**FIG. 12. — THE PROPER BIAS AND PEAK GRID SWING FOR THE MODULATOR WILL VARY WITH THE MODULATED TUBE'S PLATE CURRENT AND MAY BE OBTAINED FROM THE ABOVE CURVES WHICH ARE GIVEN FOR THREE VALUES OF PLATE VOLTAGE**

Under these conditions, the oscillator plate resistance can be considered as being the load resistance for the modulator tube. Inasmuch as the load resistance has a considerable effect upon the output of the modulator, any change in the constants of the oscillator which reflects into the plate resistance of that tube will materially vary the percentage of modulation obtainable.

In this case when the load line is drawn in on the plate-voltage plate-current family, it is extended beyond the zero grid voltage to the zero plate voltage line. The value of current at which these intersect will be the total current supplied to the modulator and oscillator.

The percentage of modulation may be calculated:

\[
M = \frac{E_{\text{max}} - E_{\text{min}}}{2E_0}
\]

where

- \(M\) = Per cent modulation.
- \(E_{\text{max}}\) = Plate voltage at highest grid voltage.
- \(E_{\text{min}}\) = Plate voltage at lowest grid voltage.
- \(E_0\) = Plate voltage at operating grid voltage.

When high oscillator currents are employed, the modulator current must be kept at a value that limits the plate dissipation to a safe figure. In order to locate the position of the load line, this point for maximum modulator plate current is connected to the point on the zero plate voltage line corresponding to the sum of this modulator plate current and the chosen oscillator plate current. The line is extended in the other direction to twice the operating grid potential. In this case the swing will be limited by the minimum plate current value.

Fig. 11 shows what values of modulation may be obtained when the plate current to the oscillator tube is varied over a wide range. These

(Continued on page 86)
QST

JULY, 1929

QRH Rats, Mice and Bacteria?

By William Justice Lee *

NOT so many months ago, while talking with the operator and engineer of broadcasting station WDBO at Orlando, Florida, we got on the subject of the possibilities of the application of ultra-high frequencies in the treatment of small animals. To make a long story short, a few months later the writer found himself installed at the Saranac Lake Laboratory, Saranac Lake, N. Y. -- with an animal house on one side and a bacteriological laboratory overhead.

The director of the laboratory, Dr. L. U. Gardner (of quartz dust and silicosis fame) and the writer decided to pool our facilities. I was to undertake to generate waves of any frequency desired and furnish the necessary electrical equipment and he agreed to furnish an assistant who would handle the animals and bacteria. The arrangement was concluded and a good portion of WAXE was shipped to Saranac Lake by express.

We did not know just exactly where to start or what to do but had heard that Dr. Scherewchewskiy of the U. S. Public Health Service, had done some work with mice and had been successful in removing tumors of the skin. Later some of the arrangement is shown in Fig. 1 and is probably familiar to most amateurs.

Various sizes of coil diameter between four and ten inches were tried. However, the circuit was found to be more critical than was desired and it refused to oscillate freely unless the ground or neutral tap to the grid leak was connected at exactly the right point.

Next we tried what is known as the "Huxford" oscillator. This proved to be much more satisfactory, flexible and has been adopted as the best high frequency oscillator we have found to date. It is shown in Fig. 2.

In this case a UX-852 is employed. All the radio frequency chokes consist of 20 turns of No. 18 bell wire on a 1-inch form. The brass rods composing the inductors are a quarter inch in diameter by fifteen inches long and are spaced four inches apart. The grid resistor varies between 8000 and 12,000 ohms. The variable tuning condenser is a thirteen-plate double-spaced National transmitting condenser which is fastened to the brass rods by metal slides.

This circuit has a range of from 1.7 meters to 6 meters under proper conditions. It has a range of from 2.5 to 6 meters with no change other than that of the tuning condenser. To get below 2.5 meters it is necessary to substitute shorter brass rods for those described above. These shorter rods are eight inches long and are spaced only three inches apart. In order to raise the wave above six meters it is necessary to add small inductance coils and a small capacity as shown in Fig. 3.

In this case, L3 and L4 are five-turn coils of No. 18 hard-drawn bare copper wire one inch in diameter. Clips are attached to each end of the coils so they may be readily clamped into place. By increasing the turns to ten or more, the wave can easily be raised to 12 meters. The position of
the tuning condenser also affects the wavelength.

It might be best to explain that consistent use of the term "meter" is used because all measurements were made on Lecher wires in centimeters and meters. When the frequency was desired in kilocycles, the wavelength figure was converted into terms of frequency.

A push-pull circuit arrangement which gave good results is shown in Fig. 1. In this case as in the others, the inductances were brass rods and L2 was so arranged as to be revolved, thereby allowing its distance and coupling to L1 to be varied. This is a free oscillator and is the circuit heretofore used by experimenters for the Rockefeller Institute.* We, however, prefer the Huxford circuit described in Fig. 2 and 3.

In order to transfer the energy developed by the oscillator into a useful "treatment circuit" it became necessary to build an ordinary "tuned secondary." This was done as shown in Fig. 5.

The r.f. ammeter was mounted on a sliding panel as was the condenser used for tuning. The sliding wires L1 and L2 furnished the means of tuning. The condenser consisted of two brass plates two and a half inches by four and a half inches and, later on, of two brass plates two inches and a half by eight inches long. All objects to be treated were placed between the plates — always protected by a glass box or glass test tubes.

The currents obtainable in the secondary circuit ranged as follows when a UX-S52 was employed with 1500 volts of a.c. applied to the plate:

<table>
<thead>
<tr>
<th>Wavelength in meters</th>
<th>Current in amperes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.7</td>
<td>1.5</td>
</tr>
<tr>
<td>2.0</td>
<td>1.8</td>
</tr>
<tr>
<td>2.5</td>
<td>2.2</td>
</tr>
<tr>
<td>3.0</td>
<td>2.7</td>
</tr>
<tr>
<td>4.0</td>
<td>3.2</td>
</tr>
<tr>
<td>5.0</td>
<td>3.5</td>
</tr>
<tr>
<td>8.0</td>
<td>3.8</td>
</tr>
<tr>
<td>10.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

* See Journal Experimental Medicine for February, 1929.

Below 1.7 meters oscillations could be obtained to about 1.4 meters but with such decreasing power as to make experiments valueless.

We started off with a mouse weighing 20 grams placed in a glass box. The circuit was tuned to 4.4 meters and the r.f. current in the secondary circuit adjusted to 1.3 amperes. The mouse died in three and a half minutes. This experiment was repeated a few times at other frequencies with similar results. Next some ordinary house flies were caught, placed in the same box and treated. At 0.5 amperes they flew about like mad — at 0.8 amperes they fell down and rapidly passed along into the fly "beyond."

After a few such experiments we figured it was time to sit down and dope out "whither next." We came to the conclusion it would be best to fall back on much simpler organisms than mice and flies. Since then we have run up and down the scale on distilled water, mineral oil, normal salt solution, staphylococcus, acidophilus, micrococcus pyocyanus, gram negative bacillus and some red and white blood cells. Strange things happen at different frequencies. Detailed charts showing the relative temperature rise of the different bacteria have been prepared but as yet sufficient work has not been done to warrant publication of any conclusions save one: Namely; so far, no germicidal effect on any bacteria due to the action of the high frequency energy proper has been

(Continued on page 50)
FACING the coming of 1929 with a swinging antenna and some other undesirable transmitter features, W8CEO started plans for rearranging the station so as to meet, as far as practicable, the theoretical requirements of a 1929 amateur outfit. Consideration was given to the factors which it was thought would govern general operating conditions to the greatest extent. These were considered to be: A steady wave; a creditable note; a practical break-in; and last but not least, frequency adjustable over the band. Crystal control would insure the first two factors but it was believed that the disadvantages of difficulty in operating break-in and the impossibility of shifting the frequency would more than offset the advantages of crystal control. With an adjustable frequency, a quiet spot can almost always be found somewhere in the band. So the crystal was voted out by the one stockholder, and an attempt made to get a reasonably steady wave by other means.

The Antenna System

One of the first things required was a rigid antenna system, designed primarily for use on the 3500-ke. band, but adapted to the higher frequencies also. The tree which supported one end of the old antenna being seriously threatened by the hard-hearted woodman, it was necessary to locate the new antenna elsewhere. The only available space was about 200 feet from the house.

This meant remote control, but upon listing the advantages and disadvantages of this, it was at once evident that it would be a good move, so plans were made along that line. The mast could be located near a garage, the transmitter installed in the garage, and control lines run to the house without trouble. The antenna system decided upon was a vertical radiator, approximately 60 feet long, but adjustable in length by means of a telescoping lower end. This part was for use on the 7000- and 14,000-ke. bands, voltage fed from a tuned tank circuit which is inductively coupled to the transmitter tank.

THE CONVENIENTLY-ARRANGED RECEIVING AND POWER CONTROL LAYOUT

The transmitter control is at the left and to its right is the remodelled Grebe receiver. The monitor is on the shelf at the upper right.
For 3500-ke. work a rigid counterpoise, also 60 feet long, was to be used and this system excited by the current feed method. A 65-foot mast was made in the following manner: A 30-foot chestnut pole, donated by the local power company, was squared up at the top end for 3 feet and a box section 16 feet long, made of 1" boards, was nailed to the top of the pole. Another box section of 3/4" boards was inserted in the top of the first section for 18" and extended above for 24". A fir, 4" x 4" 24 feet long was inserted as far as the lower end of the second box section. The joints were metal stripped with box wrapping, the nail heads sunk into the wood with a nail set and the cracks filled with "roof cement," a tarry, fibrous substance used for patching roofs. The 4" x 4" was lagged on all sides with "quarter round" for about half its length. Porcelain insulators were screwed to the pole at ten-foot intervals.

The radiator was made by soldering two sections of copper roof flashing together, thus forming a sort of oblong section tubing. This was mounted on the insulators by means of wooden sadders, both tubing and saddle being fastened by a small "U" bolt through the hole in the insulator. Two flexible joints were provided to prevent side strain on the insulators during erection. These joints were shunted by heavy copper braid. A copper ball was soldered to the top end of the copper tubing, and a brass sleeve with a set screw was provided at the lower end. Into this sleeve was telescoped a copper rod with a ball on its lower end. The whole radiator was cleaned and polished and everything well varnished with the exception of the chestnut pole. The strength of the mast was demonstrated when it was found that it would be supported in a horizontal position with a "horse" at each extreme end. Set six feet in the ground it is entirely self-supporting. It was set by means of a locomotive crane. Some time after its erection, a high wind blew 7 feet of the copper tubing from the top of the antenna. A lineman climbed the mast, using spurs, and after guying the side opposite him, the mast remained rigid and repairs were made without any trouble.

The Transmitter and Power Supply

The transmitter was built on a white pine base, arranged to slide into a cabinet in the same manner, and for the same reason, as is done with receivers. All transformers, filter, keying relay, etc., are mounted on the lower side of the base, while the tubes, coils, meters, etc., are on the upper side. A panel, fitted with automobile celluloid window material, completely closes the cabinet while allowing a view of the apparatus. The box is large enough so that ventilation seems unnecessary. The vacuum tube used is a 203-A. Plate supply comes from a large home-made transformer giving 1200 volts, which is rectified by four UX-281 tubes, two of which are now over a year old in this sort of service. This rectifier is inexpensive, simple, requires but small space and no attention. The current rating is well above that required for a single "50" so the tubes run cool. In fact, a single pair of these tubes seems to

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FIG. 1.—SCHEMATIC TRANSMITTER AND PLATE SUPPLY DIAGRAM

The transmitter circuit is the High-C Hartley. More complete details are contained in the text.
work just as well as far as can be determined by observation and reports. The voltage drop across them would be less and better regulation is bound to result from using two pair, and their low cost and freedom from trouble over long periods would seem to make their use justified. It is planned to replace them with a pair of the mercury vapor tubes at the end of their active life. By keying in the primary of the plate transformer a high no-load voltage is prevented. Keying is done by a double-contact relay, one set of contacts keying the primary of the plate transformer, the other set opening the grid circuit of the oscillator tube when the key is up, so as to prevent noise in the receiver when working on the transmitting wave. The grid contacts close before, and open after, the plate contacts. By keying the primary, first, key clicks are entirely eliminated and second, the maximum voltage is the load voltage and the voltage is zero when the key is up. A 4-pf. fixed condenser in series with an adjustable resistance is connected across the plate contacts. The resistance adjustment is critical, but when the correct value is reached the sparking at the points is eliminated. By loose coupling, carefully adjusting the transmitter, and using a filter system as large as can be keyed through without putting tails on the signals, a note can be had that practically eliminates undesirable modulation.

The keying relay was made from an old telegraph sounder. A heavy strip of bakelite was fastened to the arm, at right angles to it, and a Ford coil contact point bolted to each end of the bakelite strip. The sounder frame was screwed to a bakelite base and the lower contacts mounted on this base. The lower contacts are adjustable. The foregoing takes care of three factors: Steady wave; creditable note, and excellent break-in.

**UNIQUE TRANSMITTER TUNING SYSTEM**

Now for the adjustable frequency. It may be reasoned that if several circuits can be ganged up in a receiver, where tuning must be close, it would be possible to gang the transmitter tuning controls. This scheme has been in use at WSCEO for some time so it was decided to do it by remote control. The main primary tank capacity is a large Cardwell of the transmitting type. This is set with the plates nearly all in and fixed. The tuning of this circuit is done by means of a General Radio type 334 T connected in parallel with the Cardwell. The General Radio condenser is fitted with one of their gears, and into this is meshed the hour hand gear of an old alarm clock. By filing the teeth of the escapement wheel it was possible to make it mesh exactly with every other tooth of the General Radio fibre pinion supplies with their vernier tuning arrangement. On the shaft which carried this pinion is mounted a bakelite pulley about 2½ inches in diameter. A small reversible series wound motor is belted to this pulley. It is not easy to find a small motor that will reverse readily on a.c. but this one does it nicely. The clock-work gear train is belted to the frame of the General Radio condenser and the motor is fastened to the baseboard supporting the whole. A belt was made by winding linen thread over the pulleys until a belt of about ½ inch diameter was made, the thread being spirally wound around the strands on the last few wraps. It was then tied and waxed. From the small motor pulley through the clockwork and condenser gear, a very large reducing gearing is provided so that the movement of the condenser plates is very slow. The armature is light, and the friction of the brushes is enough to bring it to a stop in a few revolutions after the switch is opened so that there is no drift of the condenser.

The antenna circuit is tuned with a large re-
receiving type Cardwell, chosen on account of the ease with which it could be taken apart for trimming plates. Tuning adjustments were then made at places all along the band and curves plotted on the two condensers. These curves show where metal is to be removed from the plates of the antenna series condenser in order to make the curves coincide, so that the condensers may be connected together by a direct shaft. Matching the condensers is a tedious job and has to be done carefully, tuning each point as carefully as though it were planned to operate there regularly, but the result in ease of operation compensates for all the work. This allows a change of frequency over the whole 3500-ke. band while at the same time maintaining correct transmitter adjustment. Since nearly all work at this station is done on this band, this feature is not used on the higher frequencies.

The motor is operated from the 110-volt circuit in the operating room. Of course, it is necessary to determine whether or not wires or other objects prevent operating on some frequencies within the band. It was necessary to break up a barbed wire along a picket fence at W8CEO before the whole of the 3500-ke. band could be used. The curves show the final tests on the condensers. Being able to shift the frequency readily to any point in the band, while at the same time maintaining good transmitter adjustment, is a great advantage. For instance: Station A is working Station B. Station C with such a frequency shift, wishes to QSO Station A. The receiver is set at zero beat on the frequency of Station B. The monitor is set at zero beat on the receiver. Then the transmitter frequency is adjusted to zero beat on the monitor. This last operation is done while station A is transmitting so as not to interfere with the signals of Station B. A is called just as B is signing off. It works surprisingly well. In case of QRM while transmitting, a “BK QSV” from the receiving station can instantly halt a procession of unnecessary signals. The transmitter frequency can be shifted up or down with the receiving operator following the wave, and a “BK OK” restores normal operation. This alone is worth all the work necessary to provide adjustable frequency. Then, too, a certain wave may kick into some locations better than others. A frequency that suits the receiving operator can be used. Practical elimination of interference with broadcasts gives 2½ hours more operating time each day.

It was necessary to run four pairs of telephone twist for the control lines, seven wires in use and one for a spare. A 110-volt magnetic switch throws the power on, and a triple-pole double-throw switch controls the condenser motor. The keying relay is operated from the “A” battery while a pilot lamp helps the operator to remember to turn off the transmitter when closing down.

The inductances are made of copper tubing three-eighths inch in diameter, wound on a 4½-inch inside diameter and spaced ¾ inch. 7 turns are used to 3500 kc. The center tap is fixed at the exact center of the coil and grid excitation is varied by changing the grid lead tap on the coil, moving it toward center to lower the feedback voltage. The coils are mounted on a sheet of bakelite which is fitted with General Radio plugs so that the different coils may be changed quickly. Two plugs in parallel are used on the condenser connections to provide the necessary current carrying capacity and metal caps are screwed to the socket ends so as to provide a sealed socket for mercury in case heating of the plugs should occur. No heating has been noticed and the mercury has not been added. It is possible that mercury will affect the metal plugs making it necessary to renew them frequently. The ends of the coils are flattened and bolted down through a heavy brass sleeve to a pair of “L”-shaped copper strips. The two General Radio plugs are fitted to the toe of each strip. One strip extends to the opposite end of the coil base and the plate connection plug is fitted to it. The center tap is fixed, and the grid tap is made by means of a clip.

The antenna coupling coil for 3500-ke. operation consists of 4 turns of the same size as the primary and plugs into a sliding base for varying coupling. It is fitted with grid, plate and center taps so that it may be plugged into the primary base for 7000-ke. work. When this is done, a tuned tank coil is plugged into the coupling coil base and the vertical part of the antenna excited by voltage taken from a tap on one end of the coupling coil. The same thing is done on 14 mc., using smaller coils. It has been found that the use
of a high value of primary capacity does all that is claimed for it when provision is made for the heavy tank current. It was feared that a pair of General Radio plugs would heat when forced to carry this current, but since the leads to the plugs and from the sockets are very heavy and care has been taken to see that a good fit is made by the plugs, no trouble from this source has occurred. Of course, with the keying system employed, it is not possible to use a large filter and while with certain transformers there might be some disadvantage in keying the primary, if it can be done without too great a variation in the first rush of current in the windings, due to the residual magnetism of the core, the inherent advantages are many. A home-made choke estimated at 20 henrys, probably somewhat less, and a total of 3 µfd. capacity seems to be about the maximum that can be keyed through successfully. However, with these values of filter and with a High-C circuit it is not difficult to adjust the transmitter to obtain a note that very closely approaches d.c.; one that will readily pass muster for 1929. Experience with this outfit has shown that it is entirely practical to build a self-excited transmitter to meet the following requirements: (1) To produce a wave of such sharpness and steadiness as to be satisfactory for 1929; (2) to produce a note that will not be objectional to anyone; (3) to allow break-in operation, even on the transmitter frequency; (4) to allow a steady, continuous frequency adjustment from one end of the band to the other. It may not be possible to maintain exactly the same character of note and degree of energy transfer from primary to antenna coil while moving the frequency the width of the 3500-ke. band, as there is an apparent change of coupling as the frequency is shifted which affects things somewhat. The actual result of this coupling change is so slight that the receiving operator will not be able to detect any change in QRM if care is taken in matching the tuning condenser curves.

**THE RECEIVER AND MONITOR**

The receiver in use at present is a rebuilt Grebe "13." The cabinet and panel, with its original arrangement of sockets, rheostats, dials, etc., is used. The 50-ohm rheostats, with their "in" and "out" switches, come in handy for testing all types of receiving tubes without the necessity of changing "A"-battery voltage. The circuit has been changed to the conventional two-tube amateur affair using plug-in coils for different bands. The center dial controls a very small capacity in shunt to the grid circuit tuning condenser. The capacity of this condenser is such that a d.c. signal occupies 10 degrees on the dial; that is audible beat on one side, zero beat, and audible beat on the other side measures 10 degrees. Signal width may be readily measured in this way, and it is useful in following slow drifts in frequency and in changing from one side of zero beat to the other to avoid QRM on a received signal. Use of this small shunt capacity also makes possible accurate tuning even though this main tuning condenser is somewhat larger than necessary to merely cover the band. It comes in handy sometimes to be able to watch the territory adjacent to our bands, and no doubt this will become still more desirable as our affiliations with
the Army and Navy are extended. A peaked audio amplifier is used, one stage having proved enough for all practical purposes. Practical accuracy in frequency measurement is had by making use of a monitor, made from a description of the "growler-oscillator" which appeared in QST for July, 1927. It was built shortly after that and has been a regular part of the station equipment since. Standard frequency signals from WWV and W9XL are used to check the calibration of the monitor dial scale. It has been observed that if the monitor is not fooled with, but it is placed in a convenient place and left alone, the calibration remains practically constant and only occasional corrections to the curve need be made and the deviation is of very small amount. The beauty of the monitor method of measurement is that indications are very sharply made, it being very easy to check the zero beats of both received signals and your own transmitter. The box is made large enough so that rugged batteries may be used, which makes for reliability of the instrument. A vernier type dial, with a well marked scale, is an essential part of the monitor. A spare tube, selected on account of the fact that it works well and does not change the calibration, is kept on hand plainly marked "Spare Monitor Tube." Carefully selected spare receiver tubes are also kept on hand. A home-made frequency meter with a range somewhat larger than the monitor is kept in the station and its curves checked frequently. It is used mostly for transmitter experiments. It is so absurdly easy to make certain that the transmitter is in the band that there is not the slightest excuse for off-wave operation.

It's apparently impossible to keep the "bachelor content" very high here at Hq. Don Meserve, W1FL, QST's new Advertising Manager, stepped off on April 8th. Mrs. Meserve was formerly Miss Doris Lillian Foster of Northampton, Mass.

"There are only a few of us left."
Those Past Issues of QST

By Louis F. Leuck*

N o! Wrong again. Perhaps it was the September issue for 1927 or maybe the one that W1OFF borrowed the other day. It seems to me that there was a picture of an antenna on the cover — if we could only find that index, we'd be all right." — And thus do amateurs look up past articles in their back file of QSTs.

All of this might have been saved if they had taken proper care of their back issues. The simplest answer, of course, is to invest in a sufficient number of standard QST binders at $1.50 each to take care of the stack. However, when the transmitter is in crying need of some new parts, it makes a fellow shudder to think of buying binders for a pile of magazines that has been accumulating for six or eight years. It's like killing off seven and a half watters before they are born!!

Permit your eye to wander to the photograph. In it you will see QSTs for four and a half years all dressed up in their "homespun" bindings. Six consecutive issues make up each section. The indices for all are combined in one folder as shown.

BINDING

The problem of binding these issues together is not as difficult as one might first suppose. A strip of brass or some other suitable metal is obtained and is bent and drilled as shown in Fig. 1. The template is laid along the bound edge of the magazine and the location of the four holes are not always cut to exact size and this method insures getting the bottoms even so that each bound section will be able to stand squarely on its own feet.

After the position of the holes has been laid out by means of the template, the holes must be punched. Each magazine should be punched separately to secure uniformity. Otherwise, the punch may go through a group of magazines at an angle and the error will become greater as the length of the hole is increased. The family ice pick makes an ideal punch for the job. One sharp tap of the hammer will drive the pick through just about right for each hole. To avoid complications it is well to do your bookbinding on a day when you are alone at home.

The next thing is to take two eight-inch lengths of No. 18 bare copper wire and bend them into the shape of the letter "U." The base of the "U" should be straight and two inches long and the corners sharply bent. Now, string six consecutive issues (the first or the last six of a year) on a pair of the "U"-shaped wires. Then press the copies firmly together and bend the protruding ends of the "U" toward each other. Flatten down and apply a drop of solder where they lap. Now, for appearance's sake, take a strip of black gummed cloth tape nine and a half inches long and apply it to the back edge of each section. This tape should be two and a half inches wide and it may be procured from any school supply house.

The year and the names of the six consecutive issues included in each section should be typed on a white gummed sticker. The sticker is then stuck in position on the back edge of the bound section and you are through.

THE INDEX

The yearly indices are all kept in a folder whose covers are made of a piece of flexible cardboard bent double. Take a strip of the same material and fold it lengthwise so as to form a "V"-shaped trough. Glue one face of the "V" along

* W9ANZ, 1718 South 14th Street, Lincoln Neb.
The DX Meter

By D. F. Brocchi*

This is a home-made instrument for finding the distance between two points, given their latitude and longitude.

The calculation of the distance between two points on the earth's surface is to most amateurs a bothersome operation. This is particularly true when a large number of calculations are in order and with this in mind an instrument was devised to allow these distances to be scaled off without the use of any other information than the latitude and longitude of the two places involved. Although it will be impossible to directly measure long distances on a map based upon Mercator's projection, such a map will allow the latitude and longitude to be obtained.

A general idea of the device to be described may be obtained from the photo. The material used is sheet bakelite, fibre board, sheet metal, cardboard, or what you have, but it must be flat — and stay flat.

Two pieces of the material are hinged together along straight sides. The hinges are bent and set into the material so that their axes are at the intersection of the surfaces of the two pieces on the side where they fold together. This is shown in Fig. 1. A straight edge must touch the surfaces all over when they are opened flat and the two surfaces must touch each other all over when they are folded together.

If cardboard is used, the two pieces are laid edge to edge and a strip of thin cloth glued over the joint. When the pieces are hinged, open them out flat and through the center draw the "equatorial line" at right angles to the joint, which is the "polar axis." Fig. 2 shows this clearly.

If there is no protractor in the shack, the bristol board variety ranging in price from 10 to 40 cents, will do, or the plotting may be done by tangents, a more satisfactory method when the protractor is too small for the work in hand.

For the mathematically inclined, who might feel that the earth should be treated as an ellipsoid rather than a sphere, and that geographical latitude is different from geocentric latitude, it may be pointed out that the errors involved are too small to be given consideration, a high degree of refinement not being required in the results for which the instrument is intended. Furthermore the distance scale, to be dealt with shortly, cannot be made to conform with an ellipsoid in more than one direction.

In Fig. 3 is shown the longitude scale. The outer radius is less than that of the "latitude circle" by an amount allowing the markings along the edge of the "latitude circle" not to be interfered with. Its inner radius depends on the width required for strength and stiffness. Before cutting, the scale is graduated from 0° at A to 180°, leaving some material beyond the ends of the graduation.

A slot through which this longitude scale may

* 4331 Thackeray Place, Seattle, Wash., U. S. A.
be passed is cut in the equatorial line (half each side of the line), its outer edge being at a distance from the center equivalent to the outer radius of the longitude scale.

Now fold the instrument, and with a sharp pencil or scribe mark the outline of the slot as at A, Fig. 2. Then, fasten the end A of the longitude scale at this point in such a manner that the slot fits the scale in all positions as the two halves of the latitude circle are folded in and out. Some means must be provided to hold the instrument open at any angle, or a snug fit between slot and scale may serve the purpose.

The "distance scale," Fig. 4, is similar to the longitude scale and is separate from the rest of the "meter." The outer edge may be circular or not and at any convenient distance from the inner edge, which must be circular and cut exactly to the same radius of the latitude circle. The graduation is plotted by protractor on the basis that 180° = 12,130 statute miles with the help of the following table. If the distance is required in nautical miles, multiply the statute miles by 0.849, or if in kilometers, by 1.609.

The "spacer," Fig. 5, is made of the same material as the longitude scale, and the height "h" is the same as the difference between the radius of the latitude circle and the outer radius of the longitude scale. Two flaps of thin card-

![Diagram of latitude scale](image1)

**Fig. 2.** The appearance of the latitude planes joined together at the polar axis is shown above.

The surface material around the edge of the circle is carefully cut away leaving a perfect circle.

![Diagram of longitude scale](image2)

**Fig. 3.** The longitude scale which fits in the slots in the latitude planes.

The end A is fitted into the slot A shown in Fig. 2 and is fastened so that the first line is flush with the surface of the latitude plane. The other half of the latitude plane can then be moved back and forth along the longitude scale and opened up to the difference in longitude between the two points to be measured.

![Diagram of distance scale](image3)

**Fig. 4.** The distance scale which is bridged between the latitude of the two places in question.

The distance in statute miles may be read off directly.

![Diagram of spacer](image4)

**Fig. 5.** The spacer shown above need be used only when the difference in longitude between the two places involved approaches closely to 180 degrees.

For most work this difference will be considerably less and it will be unnecessary as there will be no tendency for the distance scale to slide along the latitude circle.

The meter is mounted on a support consisting of two parts hinged or pivoted together with sufficient friction to hold in any position. The upper part has a projection to which is attached the free end of the longitude scale.

This construction gives the same result as measuring on the surface of a globe, inasmuch as it makes available those points in a globe that would be required in each case. The angle at the poles between the two meridians is given by the folding of the two planes of the instrument about the polar axis and is determined by the graduations on the longitude scale, while the distance scale gives the great circle distance as though it were applied on the surface of a globe.
To use the meter, open to the difference in longitude on the longitude scale, and measure the distance with the distance scale between the longitudes shown on the two halves of the latitude circle. If the distance is very nearly halfway around the earth, it will be found that the distance scale can be made to slide up and down against the latitude circle for a space amounting to several hundred miles so that the correct distance cannot be determined. When this happens, slip the space over the longitude scale at the graduation corresponding to one half the difference in longitude, and let the distance scale rest on the space.

It will be noted that the distance scale can be applied in four different positions in each case, excepting when the longitudes are equal, in which case only two positions are possible. If the meter is made accurately, all readings will be very nearly equal. For greater accuracy these four values may be averaged.

If the difference in longitude is too small to read the latitudes conveniently, it may be assumed as zero, the instrument opened out and the distance scaled along one half of the latitude circle without material error, or the latitude graduations may be extended across the edge of the circle, where they will always be in plain sight.

The author will be glad to answer all requests for additional information on the subject.

**Supervisor Cadmus Passes On**

Mr. R. Y. CADMUS, the only Supervisor of Radio the Third District has ever had and the senior supervisor of the service, departed this life at Baltimore on May 7th after a prolonged illness. He was sixty-six years old.

Burial took place in the Arlington National Cemetery, with full military honors. Floral tributes were many, amongst them one from President and Mrs. Hoover.

Daddy Cadmus was one of the original "wireless men" of the United States Navy. When the Wireless Ship Act of 1911 was enacted, Mr. Cadmus and Mr. W. D. Terrell, the latter now chief of the Radio Division of the Department of Commerce, were appointed radio inspectors. Mr. Terrell was stationed in New York to look after the east coast, and Mr. Cadmus was sent to San Francisco, with jurisdiction over all the ports of the Pacific Coast, to see that the radio communication laws were obeyed.

These two men constituted at that time the complete radio force of our government. During 1913 Mr. Cadmus was transferred to Baltimore, from which place he presided over the Third District until the time of his death, except for a year during the World War when he was granted a furlough and entered the Navy with the rank of Lieutenant. During this period he was stationed at the League Island navy yard at Philadelphia, supervising the training of naval operators. At the conclusion of his duties he returned to Baltimore and resumed charge of his old district.

He was a friend of amateur radio. No amateur who knew him ever doubted that. Is there any more that we can say?

Mr. L. C. Herndon, senior inspector of the district, long-time amateur and League member, has been appointed Acting Supervisor at Baltimore.

**Midwest Division Convention**

With one of the finest settings and the largest attendance, the eighth annual radio convention at Iowa State College, Ames, May 10th and 11th, is now a memory.

Early Friday morning, delegates from all over the division, including visitors from South Dakota, Minnesota, and a large delegation from Chicago, registered and "hamfested" began immediately.

Promptly at 1 o'clock, Professor D. C. Faher, in the name of the faculty and the Campus Radio Club, welcomed the delegates in well-chosen words and then turned over the meeting to Section Communications Manager H. W. Kerr, Chairman of the convention. Now we know why they call him "Kerr the Hustler." Without any frills speakers were introduced. Starting with a non-technical address, A. A. Hebert, Treasurer of the League, gave all the information at his command on "Our A.R.R.L.," which should make one proud to belong to the organization. There was disappointment because Bert Puckett, WIEW, of Cedar Rapids, was unable to come to talk about his DX contacts with Byrd Antarctic Expe-
Reading time, 35 CQ's

As all radio widows know, you can't keep a good ham down. All of us may go haywire once or twice in our lives to the extent of letting such a simple matter as slipping a platinum band over a YL's finger temporarily sidetrack what had up to that time been a promising amateur career — but it doesn't last.

So our friend Bill, who had taken a fall from grace, as it were, found the joys of married life passing, and woke up one day to the fact that his old right mitt had developed a strong itch to pound a key.

There was only one thing to do about it. Bill told his better three-fifths that he had an important engagement at Fred's house, and went out. The business he wished to attend to was that of finding Fred home.

Fred was.

"I'm Freddie."

"Weel-uh! Bill! C'mon in, old timer and stay a while. What's been the matter lately? I haven't heard your fist on the air for a long time."

"Guess you're right, Fred. To tell the truth, I stored all the old junk in the attic when I got married, and haven't touched anything but a door key since. I'm kinda thinking of getting back in the game, though, and thought I'd drop over and see what's new."

"Sure thing; let's go up to the room and see what's on the air."

A few minutes later, the two arrived in Freddie's operating room, where a nice 500-watt job took up most of the space along one wall.

"Geet, Fred, 's nice outfit you got."

"Oh, she doesn't do so badly. I've worked about everything but Mars, and if she keeps on she's liable to do that."

"Say, you haven't got a spare 204 you want to sell, have you Fred? I have one stored up with the old outfit in the attic, but I'd like to add another to it and have a layout like this."

"Sorry, Bill, but I haven't. Tell you what, though — there's a kid down the street that pumps a tweet on the air with a 201-A. He's got a 204, but can't afford the juice to run it; you could probably buy it off him cheap."

"Sounds good to me, Fred. Let's go down to see him right now."

"Oke, Bill."

Thereupon Bill and Fred visited the kid who pushed the 201-A, and after telling him what a nice outfit he had, and looking over his QSL cards and asking him how he got the good note, Bill worked around to the subject of the spare 204, and negotiations were finally completed to relieve the kid of it for twenty smackers.

Determined now to break out the old apparatus, Bill said good night to Fred and hurried home, highly elated over the good bargain he had just made. Arrived in the house, he slung his hat joyously at the rack, grinned to himself in the mirror, kissed his wire twice — most unusual — and questioned her as to the whereabouts of his old radio junk in the attic.

"Your radio apparatus? Oh, yes, dear; you'll find it in a pile down under the south window. I had a young man from down the street clean up, up there, and that's where he put it. There! I almost forgot. He was so interested in your old stuff that as payment for cleaning up I gave him an old electric bulb you had. Why, it was just like that one you have in your hand; you don't mind, do you, de —"

"Bill!"

"Bill! Mary! Mary! — oh, where is that maid? — Mary, run down to the doctor's as fast as you can! Something has happened to Mr. Smith! Oh, hurry, hurry!"

MOHAL

When good tubes come cheap — there's a reason!

Strays

With Senate confirmation of two recent appointees on May 2d, the Federal Radio Commission again returned to its full strength of five members.

From the fourth zone, the middle-western states, President Hoover named Major General Charles McK. Saltzman, retired, Chief Signal Officer of the Army from 1924 to 1928. It was during General Saltzman's tenure as the Chief of the Signal Corps that the Army-Amateur affiliation originated and took form. He was a member of the United States delegation at the international conference at Washington in 1927, and in the numerous preliminary sessions of our delegation held in the summer preceding the conference he was chairman of the technical committee. He knows amateur radio and he will continue to be a good friend at Washington.

From the first zone the President appointed William D. L. Starbeck, a New York City mechanical engineer and patent attorney residing in Connecticut.

* W9GBB, 214 W. Taylor St., Chicago, Ill.
Experimenters' Section

SOME MORE CONCERNING THE SUPER-HETERODYNE

ONE of our experimenters writes as follows:

"I should like to call your attention to a few points about detection that may have been overlooked in the article describing the super-heterodyne receiver in the March issue of QST. The most important point of all is that it is a mistake to use grid detection in the first detector of a double demodulation receiver. I have just been building one for use as a field strength measuring set and, of course, could not resist hooking it up to an antenna and tuning through the amateur bands just to see how the '1929' notes were coming along. The first detector was an amateur receiver that happened to be handy and, of course, it sported the usual 250-muf. condenser and a 10-megohm leak. Signal strength was good but not by any means of the diaphragm buckling intensity. Further, the first detector tuned very broadly, a consideration where its selectivity is the only discrimination available for the elimination of a signal coming in on the second difference frequency. A little thought brought out the fact that the time constant of the leak-condenser combination was nowhere near suitable for detection of the 300-ke. intermediate frequency, whereupon a 20,000-ohm leak was substituted for the 10 megs, and the signal strength observed to take a very gratifying jump of about 10 db. But a little more calculation showed that even with this value of leak the proper impedance was not being offered to the 300-ke. current, so the condenser and leak were removed bodily and the job of rectification given over to the plate. The response from this shifting of responsibility was a further increase in sensitivity and an appreciable increase in the selectivity of the detector circuit, carrying with it some reduction in the noise level.

"It's just another item in the indictment of our old faithful grid detection circuit. We have known all along of the rather severe frequency discrimination that characterizes this type of detection but it takes an unmistakable example, such as this one of detecting at 300 ke., to bring the fact out with the force necessary to impress it upon us. One can go a step further and say that grid detection should not be used in the second detector in a super-heterodyne either, which, of course, is only a soft way of saying that it has no place at all in this type of receiver. The difference between the intermediate frequency and the modulation frequencies is not sufficient to give the grid-series impedance a chance to do an efficient job of passing the one and building up a voltage drop from the other. Furthermore, with the high gain obtained in the two tetrode intermediate stages (3500 in my particular model) tremendous voltages are built up on the grid of the second demodulator, voltages far beyond the ability of the grid rectification circuit to handle. Amateur signals were putting from 0.5 to 5 volts on the second detector grid in my receiver while broadcast carriers swung it anywhere from a volt to 15 volts. And from the fact that you employ but one audio stage in the receiver described in the March, QST, I judge that similar voltages of the order of 15 volts on the plate, with suitable bias, are required to handle these inputs as otherwise the superhet 'biss', due to overloading of the second detector by the impressed carrier with all of its complicated demodulation products, become uncomfortable if quality suitable for loud speaker operation is desired from the set.

"The point I have been trying to make is that whenever a detector is required to be something more than just an expedient for obtaining a maximum of noise from a minimum of tubes it pays to go to plate detection. The loss in sensitivity is far from being the out-of-sight proposition that most people imagine it. In fact, for the average circuit the difference is only about 3 to 1. For special cases such as for the first detector on a super-heterodyne, the plate detector actually comes out ahead by a factor that may be as great as 10 to 1, not to mention the increase in selectivity which becomes important in this instance when the detector under consideration is not oscillating. In this case, the improvement in the decrement of the circuit becomes noticeable.

"Another improvement which might be added to your circuit would be the use of a tetrode as first detector using plate rectification, of course, and some regeneration. A tetrode so used, when working into a suitably high impedance such as the first tuned circuit of the intermediate amplifier, either directly coupled through a choke and condenser or with a primary having the same
number of turns as the tuned secondary, will show a detection factor of 5 or 6. This should be compared with the unity factor of the triode plate detector or the doubtful grid detection factor which may run from 1/10 to 3, with luck. This figure does not consider regeneration and the addition of regeneration should actually increase the sensitivity faster than on a triode detector, which certainly seems to be another legitimate argument for the tetrode detector.

"It might also be mentioned that the a.c. screen-grid tube, the 224, has an appreciably higher conductance than the 222. This, together with the better screening of the a.c. tube gives a much higher detection factor and enables a practical and stable circuit for straight amplification to give about twice the gain as when using the d.c. tetrodes. A gain readily obtainable at intermediate frequencies is about 100 per stage as against the theoretical and actual maximum of 50 for the d.c. tube. I have actually obtained gains as high as 96 with the 222, but this gain would not permit of cascading stages successfully."

"DRESS"

"I have just finished reading the article on 'Dress' which appeared in the April issue of QST and would like to make a little suggestion about cabling. The whip stitch shown in Fig. 1 will work very well but there is one fault with that particular stitch. It is that if the cord used in lacing the wires together should break through becoming worn or pulled too tightly the whole cable will come unlaced and thus make it necessary to do the job over.

"The stitch shown in Fig. 1 will hold 'till Doom's Day.' I learned this when some of the men from the local branch of the Telephone Company were putting in some remote control cable at the studio of WKBI."

— Francis M. King,
R. F. D. No. 1, Tonawanda, N. Y.

GRID CONDENSER AND LEAK MOUNTING

"A handy and flexible way to mount the grid condenser and leak is shown in Fig. 2. The condenser is fitted with G.R. plugs on one side and fuse clips, such as are used to hold fuses on automobiles, are screwed to the other side of the condenser. These small clips cost about ten cents per dozen and are excellent for all types of resistor mounts.

"Two G.R. jacks are mounted on the sub-panel of the receiver along with two more fuse clips. A short strip of brass serves to connect one jack to one clip. The other clip goes to the filament. This arrangement allows the leak to be placed either across the condenser or from the condenser to filament. Thus, any desirable arrangement of the leak and condenser can be obtained in but a few seconds."

— Donald F. Holaday,
320 8th Ave., S. W., Aberdeen, S. Dak.

28,000 Kilocycles

We have received some data from D. C. Wallace of W6AM concerning the antenna system used by him in some of his 28,000-kc. work. The general arrangement is shown in Fig. 3 and consists primarily of three (or more) horizontal radiators fed by a two-wire feed line. The arrangement is such that it is possible to swing the lower end of the system and thus change the angle of radiation. The actual dimensions of the system are comparatively unimportant, inasmuch as the radiators may be any number of half waves long and the feed may be either of the voltage or current variety. The chief requirement is that the feed lines be plenty long enough, so as to allow the lower end of the structure to be swung over a considerable area.

AN INSULATING COMPOUND

"An insulating compound that may be used anywhere in the receiver or transmitter without fear of introducing a loss is made by melting one part of good resin with two parts of good beeswax. The ingredients are to be measured according to volume and not weight. When the mixture is molten, it may be painted on the piece of equipment or, such equipment as wooden panels, etc., may be soaked in it. Its advantages are that it hardens rapidly and is very tough and hard when cooled. It has no greasiness such as is found when paraffin is used."

— C. J. Padden.

TRANSMITTING INDUCTANCES

"A means of greatly improving a transmitting inductance made of tubing is to slot it parallel to its axis and then round off the sharp edges. A machine shop will do the slotting quite cheaply and this is recommended, because it is a difficult job to do by hand.

"The reason for this slot is to prevent the flow of severe eddy currents which are set up circumferentially in the tube proper. These eddy currents cause a large heat loss and the slot, when applied to the inside of the coil, not only breaks the path of the eddy currents but also tends to concentrate the r.f. current on the outside of the tubing where it belongs."

— C. J. Padden.
CAPACITY CONTROL OF REGENERATION

A method of improving the operation of a receiver employing a condenser to control regeneration is suggested by Martin Mytus of White Lake, Wise. It is shown in Fig. 4 and consists of a piece of wire or narrow strip of sheet metal placed about 1/4" away from the rotor of the regeneration control condenser and connected to the grid of the tube. It can be arranged to either increase or decrease the capacity across the input of the tube, depending upon its position in relation to the rotor plates and their direction of rotation. Its correct position must be found by experiment and it will vary with the particular set.

FREQUENCY VS. WAVELENGTH

Alpha Learned of 31 Burnette St., Providence, R. I., points out an interesting fact concerning the transmission of radio signals through water. The velocity of the wave through water is less than through air and this results in a change in the length of the wave which becomes about 2/3 of its "air" value. However, the frequency is still the same and the setting of the receiver does not change. We thus have one more reason for considering the frequency of the emission as being the important factor.

CHEMICAL RECTIFIERS

J. F. Wohlford of W3CA suggests the use of the pint-size Mason fruit jar for containers for chemical rectifiers. He finds that the additional volume over that obtained with the more common jelly glasses is advantageous and allows larger elements to be employed. Because of these factors, the rectifier will usually run cooler.

DIRECTIONAL RECEIVING ANTENNAS

"The following, taken from the Communication Division Bulletin for March, issued by the Bureau of Engineering of the Navy, might be of interest to our members. It certainly should be tried out by some of your experimenters:

"Directional Receiving Antennas. A great deal of the interference now being encountered on long distance, high frequency point-to-point Naval circuits can be eliminated by the simple expedient of creating a directional receiving antenna.

"The antenna should consist of a single copper wire, about No. 14, strung on posts at a height of 4 to 6 feet from the ground for a distance of approximately five half-wave-lengths in the direction of the transmitting station from which signals are to be received. The end of the receiving antenna which points toward the transmitting station should be grounded through a variable non-inductive resistance of 100 to 200 ohms connected to an iron pipe driven in the ground. At the receiver end, a variable 0.00015 mfd. air capacitor should be placed in series with the antenna for the small amount of tuning obtainable thereby, and to avoid grounding the receiver end of the antenna.

"The physical length in meters of the antenna should be close to 5:2 times the shortest wavelength, in meters, of the transmitting station.

"As reception will be greatly improved on the three subharmonics of this frequency, only one antenna, based on the highest frequency employed, is necessary for reception within any one of the three subharmonic bands.

"The optimum height of the antenna throughout its length is 5 feet, but the height may be increased to 10 feet at points where the 5-foot wire may become an obstruction. The 100 to 200 ohm resistor is not critical in adjustment. Either insulated or bare antenna wire may be used, depending on the ease of insulating the antenna from its supports and other nearby objects."

A. H. Babcock.

KEYING

Horatio Seymour of W6VZ brings to our attention a method of keying that has solved his difficulties. It is fundamentally the method described by Hoffman of W9EK in QST some years ago with the addition of some filter to take care of the clicks. The circuit arrangement is shown in Fig. 5.

PROBLEM T-28

The summer weather having arrived (at least we hope it will have by the time this is in print)
the amateurs’ thoughts turn toward vacation time when hiking and camping will be the vogue. This in turn conjures up visions of that perfect portable set that we were going to build for this year. It would, therefore, seem quite seasonable to present this month the outline on problem T-28, covering portable transmitters and receivers.

There are really two distinct types of portable sets; one is the type that can be packed by a man, or two at the most, while the other is transported in a car or some such conveyance. The requirements are distinctly different and are chiefly noticeable when the power supply is examined.

One should first decide into which class the set to be constructed fits as this will determine the amount of weight and the type of accessories that must be carried.

The problem of devising a set to be carried in an automobile is, perhaps, the simplest. The set can usually be packed where it will receive but little jouncing and damaging blows. The filament supply for the tubes, both receiving and transmitting, may be taken from the car battery and if dry battery plate supply is desired, it will usually be possible to pack suitably sized batteries to last during the entire trip on which the set is to be used. If, on the other hand, the set is to be packed by one or two men, it will be impractical to cart along a heavy storage battery to supply filament power. Dry cells will usually have to be resorted to and one should avoid the idleness of carrying along “B” batteries that will last for six months, although the “A” batteries will be good for but fifteen days. It is usually possible to calculate how long the set will be needed and how long one will be away from the source of supplies. With these points in mind, the battery supply should be so calculated as to allow satisfactory operation over the necessary period of time without the inconvenience of carrying any more weight and bulk in batteries than is actually needed.

One should also consider the advisability of employing as few tubes as possible and those of but a single type. This will reduce the chance of the set being put out of commission by tube breakage and allow a minimum of replacement tubes to be carried.

Probably one of the most important considerations when the set includes a transmitter is that of obtaining a suitable radiating system. The conditions of operation will vary greatly and much thought and experimentation can be expended upon this portion of the problem.

In the attempt to provide loud speaker reception and extreme DX, one must not overlook the very important fact that the set should be portable and not just capable of being moved with the assistance of a couple of huskies.

The bibliography which follows is not limited to only those articles that concern portable sets but there are included many references to material that is applicable to the subject.

Emergency Power Supply by Budlong, May, 1925 (47)

Loops and Fords by Oliver Wright, July, 1925 (33)

An Inexpensive Low-Power Transmitter from Receiving Parts by Turner, Dec., 1925 (35)

Speaking of Low-Power Work by Clayton, Dec., 1925 (44)

A Portable Transmitter by Waynick, Jan., 1926 (31)

A Power Amplifier for the Low-Powered Transmitter by Turner, March, 1926 (29)

Of, By, and For the Beginner by McCormick, June, 1926 (17)

Spark-Coil Portable Transmitters by Wilburn, Sept., 1926 (40)

A Portable Transceiver by Gunther, Oct., 1926 (36)

The Flying Loop by Wright, Nov., 1926 (36)

Low-Powered Crystal-Controlled Transmitters by Clayton, Jan., 1927 (14)

A Flexible Transmitter by Maro, March, 1927 (33)

A Complete Inexpensive Transmitter by Westman, May, 1927 (9)

A Flexible Crystal Transmitter by Glaser, June, 1927 (18)

A One Gnat-Power Portable by Westman, Aug., 1927 (25)

A Portable Power Supply by Sturm, Jan., 1928 (34)

A Low-Power Master-Oscillator Transmitter by Dudley, Feb., 1928 (10)

A Portable Transceiver by Radloff, March, 1928 (52)

Low-Power Flexible Crystal Control for Four Amateur Bands by McMin, April, 1928 (15)

A Transmitter without Transformers by Hatry, April, 1928 (28)

A Portable Crystal-Controlled Transmitter by Angus, Oct., 1928 (33)

100-Meter Low-Power Transmitter by Hart, Nov., 1928 (37)
Portable Radio in Winter

By Ralph C. Folkman*

The first and worst blizzard of the season; trains late, traffic slowed, thermometer flitting with zero — what setting more ideal for testing the ability of amateur radio to function in emergencies such as might be created by tornado, flood, or other disaster?

With lofty thoughts such as these, several shivering automobiles loaded with Cleveland amateurs tried to console themselves as they faced a gale-borne snow storm, determined to gauge the dependability of low-powered portable transmitters and receivers which they had devised and assembled.

Special license "to be used during the first week of January, 1929"; portable stations just about attainable; a concatenation of food to be rendered appetizing (food but vain hope!) by a bonfire in the woods; flannel shirts, knee-high shoes, singling ears; all these were among the impediments loaded into our radio caravan in the early morning hours.

The first stop was Fairview Village, where W8BF consented to stand by for signals. Ten miles farther out a powwow was held beside the road. Here it was decided that the party should divide, each mobile station taking a different route. W8GS was the call assigned to apparatus that shared the rear seat with me, and had it been a bit more human there probably would have been harsh words between us, for it afforded no passing space and caused me to assume a painfully cramped position. Ellis A. Smith, W8DQY, and Joe Stedl, who field application to go as "ballast," were the other passengers.

Like an air mail pilot making a "blind" landing in a blizzard, we sighted through the frosted windshield a camp site in a heavily wooded section. According to road signs noted prior to our halt, we must have been on the outskirts of Elyria.

The little receiver was resorted to first in order to determine that the locality was not infested with bothersome power leaks. Then pacing off sixty feet, we designed an aerial and counterpoise system for 3900 kc. operation, with the leads-in passing through convenient crevices near the car's windshield. To provide more room for apparatus and operator, food and tool kit were removed from the car.

While I attempted to string the aerial between wildly swaying trees, Smith and Stedl undertook to build a fire. But their progress was staled by the pounding blizzard, and they soon scrambled back into the car and rejoined to more modern means — the heater from the engine's exhaust.

When the aerial had been erected, a general call was sent out, and the receiver dial hurriedly scanned for replies. W8AKX, another of the mobile transmitters, manned by Russell Karg and Ed Jenkins, was on the air and calling us.

A brief exchange of notes indicated that they were in Chippewa Lake Park, and had established contact with one station in Columbus and another in Marietta.

Then came wages via radio as to which party was suffering the more from cold. Like the famished tramp who invested his last quarter in a thermometer in order to find out just how cold he was, we carried such a gauge, and thus had the advantage over W8AKX, who had to guess at the temperature. After this contact, W8BF in Fairview Village was given a "shout." He came right back, with a report that our signals were good.

We were troubled by interference from the ignition system of the engine, for although the car was not in motion, we ran the engine to get heat from the exhaust. The final approved procedure came to be intermittent speeding of the engine while we warmed up, and then cold silence while we cooled off. The slogan came to be "shut the door," for in addition to letting in the wintry blasts, the opening of the door detuned the receiver, due to shielding effect.

Then we decided to move to a more sheltered section. Once more established, with a higher antenna and less blizzard, another "QO" was sent out. W8BF answered, giving us the cheering news that our code strength had doubled with the change, and that voice transmission was "as loud and clear as a broadcast station." As I described, through chattering teeth, our predicament to W8BF, other members of the party attempted to make a fire. Those wenches had to be roasted! But the blizzard again blew out the matches and numbed the fingers. Smith retreated to the door of the car, freely stating his opinion of the weather and telling me what he thought of trying to start that blanket-blank fire in the woods. W8GS's microphone picked up the exclamations and gave them to the world at large. Baumgardner at W8BF reported "perfect pickup of background talk!" The

* W8COX, Associate Radio Editor, the Cleveland Plain Dealer.

Courtesy of the Cleveland Plain Dealer.
I NTEREST continues to be great, and we think that some of the differences in our club organization may have something to do with it. Therefore, we are constrained to tell the rest of you about it, in the hope that some of the suggestions may be just the remedy needed to put life into flagging club organizations.

You'll all agree that too much routine business is boring in the extreme — for you've all been bored that way! We decided, therefore, to dispense as much as possible with this bunion. So the club officers, comprising the Executive Committee, have regular meetings for this purpose, as well as to make detailed plans for any activities which the club may engage in, and to outline the next regular meeting, as well as to discuss the prospects of getting a speaker for the meeting. We try, whenever possible, to have a speaker who is an authority in his particular branch of radio, at every meeting.

Our officers are President, Secretary-Treasurer, Technical Chairman, Publicity Chairman, Communications Chairman, and Entertainment Chairman. There are no permanent committees, but each chairman may appoint helpers whenever necessary. The duties of the President and Secretary are as usual, but a word as to the duties of the other officers may not be out of place.

It is the duty of the Technical Chairman to have a prepared technical talk on some subject which has been suggested by the membership at the previous meeting. He uses a blackboard, and a general discussion usually follows the talk. His duties also include the supervision of any work done by the members, such as five and ten meter experiments. He answers questions placed in the question box by members.

The Publicity Chairman, who, in our case, is a newspaper man, sees to it that notices of each meeting appear in the local paper, and that there is always a write-up of club activities and banquets, as well as of any outstanding achievement by an individual member.

The Communications Chairman keeps tabs on the members who are on the air, the traffic lanes, etc., as well as arranging for any special traffic activities, like the placing of message boxes at special functions which may occur (lodge conventions, etc.).

The Entertainment Chairman sees to it that the "cats" are always ready after the meeting adjourns, and arranges for any special entertainment, such as occasional movies, etc.

The secretary has one duty which is not usual. This is the sending of cards announcing each meeting. These are sent to all interested persons as well as to members. In addition to the time and place of the meeting, any special features which would be instrumental in bringing a crowd are mentioned.

Meetings have been held in the homes of individual members, and the plan has worked well, since the club is not large. We hope, however, to have a permanent meeting place soon. A small club cannot afford to pay rent and live without imposing too great a strain on members' pocketbooks. Our dues are only two dollars a year, and we have plenty in the treasury for any emergency which may arise, because expenses have been kept at a minimum. The refreshments, which are a regular feature of every meeting, are furnished by the member in whose home the meeting is held. To date only one member (and he willingly) has been asked to do this duty.
The treasury is augmented considerably by frequent radio or auctions, many of the articles disposed of being donated by members for the good of the club.

In short, we try to make every meeting so lively and interesting that no one will want to miss any of them, and we never spend time nagging over small unimportant points. Such things are disposed of in short order by the Executive Committee, and only matters of general interest are brought before the membership for consideration. This plan is used with success by other organizations, but we do not believe that it is general in amateur radio clubs. It is worth a trial.

Expeditions

MUCH of the pleasure and interest we amateurs find in our amateur radio work is in making the most of those opportunities we have of doing something for somebody else. There is a thrill that comes from contacting with individuals, expeditions, or ships in far off places, and a still warmer feeling if we are able to help these folks by handling messages to friends or associates as the occasion may demand.

While U. S. A. amateur stations are not permitted to communicate with commercial or government stations except in emergencies or for testing purposes (when the latter stations must make the first move), looking toward QSOs with amateurs, this restriction does not apply to communication with expeditions and small pleasure craft such as yachts and motor boats holding limited commercial licenses but which are unable to handle their communications with commercial or government stations.

To facilitate this work between amateur stations and small craft, expeditions, etc., we plan to print in this department a short directory of expeditions, listing the call signal and the frequency used for amateur contacts. Of course, we cannot and do not wish to give space to all of the small craft licensed as any one time—that would use up more space than we could afford—and it would defeat the purpose of the column in showing amateurs just what calls are active, and where one may find them on the dial.

A cordial invitation is tendered to all expeditions and small craft. We request that information on the call signal, frequency, route and duration of proposed trips, and operating hours be sent to us so that each month we may print an up-to-date list in QST which will be mutually helpful to expeditioners and amateurs alike. Information should be sent at least six weeks in advance of the start of a cruise when possible to allow for the necessary lag in publication schedules, although often it can be used to advantage. Expeditions and telegraphic broadcasts to members if it is timely and of general interest. Amateurs working unlisted stations of the type in your list are requested to endeavor to secure full information on the identity and plans of the particular station, and to include the frequency and operating schedules in a prompt report to Headquarters on the matter. Any information which will help us to add to that in our tabulation will be greatly appreciated. A number of well-known expeditions on which we have some useful information are included in our first list which follows:

<table>
<thead>
<tr>
<th>Frequency (kc.)</th>
<th>Call Signal</th>
<th>Station</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>5820</td>
<td>WJDJ</td>
<td>Yacht Temptress</td>
<td>On cruise to Tahiti. Opp. exW6CZK.</td>
</tr>
<tr>
<td>5820</td>
<td>WDEE</td>
<td>Schooner Bougainville</td>
<td>Flew west to eastern Labrador and Baffin Land about June 15th. Opp. R. E. Brooks, of W9AFA, QSL cards requested and should be sent via QST.</td>
</tr>
<tr>
<td>5820</td>
<td>WIDC</td>
<td>Yacht Aboona</td>
<td>Cruising through West Indies, may take world cruise.</td>
</tr>
<tr>
<td>5820</td>
<td>KFLF</td>
<td>Yacht Ripple</td>
<td>Cooled from Bradenton, Fla., for Maine, June 1st, stopping at larger cities along coast. Opp. J. R. Foran.</td>
</tr>
<tr>
<td>7350, 8810</td>
<td>WPA</td>
<td>Base Station, Byrd Expedition</td>
<td>Byrd Antarctic Expedition.</td>
</tr>
<tr>
<td>40 Mc.</td>
<td>WFD</td>
<td>Portable</td>
<td>Ford Motor Company, bases at rubber plantation, Santa Ream, Brazil.</td>
</tr>
<tr>
<td>(Abo 290, 4405, 6580, 5850, 11,300, 16,717, 21,905)</td>
<td>WFB, WFC, WIP</td>
<td>Plane Floyd Bennett, Plane Stars and Stripes, Plane Virginia</td>
<td>International ice Patrol, Of Grand Banks, Newfoundland when on active duty.</td>
</tr>
<tr>
<td>3840</td>
<td>WFBT</td>
<td>S.S. City of New York</td>
<td></td>
</tr>
<tr>
<td>3840</td>
<td>KVUA</td>
<td>S.S. Lake Orme</td>
<td></td>
</tr>
<tr>
<td>3840</td>
<td>NITC (NIDQ)</td>
<td>U.S.S. Tampa (Tampa and Madrid)</td>
<td></td>
</tr>
</tbody>
</table>

28 Mc.

JAPANESE amateur station J2BY reports establishing the first two-way communication between Japan and Australian VK5HG on 28 mc. at 0150 Greenwich (10:30 a.m.) May 12, 1929. J2BY used a single 201A in an ultra audion circuit. The plate input was five watts, voltage being supplied from a B eliminator. Contact was held for an hour following which VK5BG worked J2BY for 25 minutes. After this VK5BP worked J2BY, the last contact terminating at 0645 Greenwich (12:45 p.m.) J2BY's antenna was Zeppelin fed, vertical, half-wave or 5 meters long. The Zepp' was 2.5 meter long. Signals were about QSA4.
Mr. Walding (ZLIFT) of Auckland, N.Z., asks us to convey his thanks to U.S.A. "Amateur Champs" for the numerous pleasant chats he has had with them during the past season. He suggests a 28-mc. QST party and we shall be glad to announce one if readers comment generally and favorably on his suggestion. ZLIFT has heard W8BCS, W8EPE and W8XJ on the highest pitches the sky has to offer. W8XJ has been heard in NZ. ZLIFT has been heard at J1TX and has been QSO with quite a number of the VK's who work on 28 mc. ZLIFT uses four 21A's in parallel and has no difficulty in getting down so low as eight meters. The set operates from 2,200-cots d.c., the natural period being 28 mc., and is tuned being 65 meters. ZLIFT believes the 28-mc. band is a splendid band for daylight DX and suggests that all bands give it a real try out. He has operated here regularly for the last five months and can depend on his listening from 0600 to 0830 Greenwich Sunday noon until 6 p.m. N.Z. time. ZLIFT lists the most active of the 28-mc. stations he hears: VK2TW VK3PM VK3CP VK3BG VK4BB VK4AW VK5MY VK5BQ VK7DX VK2RN ZL1AX ZL1AO ZL1AN ZL1AC ZL1FT. A simple two tube receiver brings all in.

Mr. Kimmel (W2ACN) of Palmades Park, N.J., reports little success since he worked E12B and G2OD on March 10th, N4P and W2ALW are heard weekly through a high noise level (due to heavy motor traffic). W2JN and W2ACN have been calling "K1AA" on schedule but thus far without much success. W2ACN had worked W6's, many European hams and locals and been reported 6500 miles from N. Y. C. out in the Pacific up to March 10th. He operates each day 1530 to 1730 hours and has noted some favorable changes in the "side Heaviside layer." Give him a call.

When the Chamber of Commerce of Enid, Oklahoma, recently organized an 800 mile "Trade Trip" through the "past handles" of Texas and Oklahoma, 120 Enid businessmen were kept in touch with home by the portable high frequency transmitter and receiver installed and operated by J.R. Lottridge, Assistant Director of Station KCRC and later of Edward W2JF, The Eady Plod. W5PA: Elmer Richey, W5AN; and John Harding. Radio communication was established along the entire route, and at some points where telephone and telegraph communication would have been virtually impossible, the radio set did the trick in line fashion. Complete prose stories were sent back to Enid newspapers by reporters who accompanied the train of thirty-five automobiles. Amateur radio is now thoroughly liked in Enid, and whenever a good word is needed for the radio program, the 120 business men who will listen for them, FB boys! We hope to hear of more good work like this.

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Traffic Briefs

Remember the announcement of the 1928-1929 Roberts Cup contest? This contest is a competition between individual Philippines and American operators of amateur radio stations conducted in accordance with the rules which appeared in June, 1928, QST. Logs and message files covering the period June 16, 1928, to June 15, 1929, inclusive will determine the winners. The closing date for logs and message files (entries in the 1928-1929 contest is September 15, 1929. Any A.R.R.L. member in the Philippines or in the North American continent holding an operator's license and operating an amateur radio station is eligible to enter. Rules are on page 45 of June, 1928, QST and get your entry in the mail today.

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Organization of an intercollegiate amateur radio society has been proposed under the sponsorship of the George Washington University Radio Club. The name of the new organization is "College Amateur Union," with headquarters at the above university. Other college radio clubs interested in this most enmeasurable organization should get in touch with Mr. Albert W. Snod, George Washington University Radio Club, Washington, D.C.

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Southeastern Division Convention

The Gulf Radio Club at Tampa is planning a state convention July 19th and 20th and would like all of the gang to be there for a good time. For information and reservations write the secretary, Harvey Chalm, 5602 Suwanee Ave., Tampa, Florida. We are looking for a good time so everyone come and bring someone else.

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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 declared elected. Accordingly, election certificates have been mailed to the following officials:

<table>
<thead>
<tr>
<th>Section</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA-S. C-Cuba-</td>
<td>J. G. Cobble, W4RM</td>
</tr>
<tr>
<td>Isle of Pines</td>
<td>May 15, 1929</td>
</tr>
<tr>
<td>1014 Maryland Circle,</td>
<td></td>
</tr>
<tr>
<td>Atlanta, Ga.</td>
<td></td>
</tr>
</tbody>
</table>

In the Maine Section of the New England Division, Mr. Grover C. Brown, W1AGL, and Mr. John Singleton, W1CDX, ran together on the second ballot. Mr. Brown received 26 votes and Mr. Singleton received 17 votes. Mr. Brown, therefore, has been declared elected, his term of office beginning May 15, 1929.

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New Sections Created

As provided in the Constitution and By-Laws of the A.R.R.L. the operating territory of the League is apportioned into Sections for the purpose of administration of the League's field organization. Action may be taken by the Communications Manager acting with the advice and consent of the Division Director concerned in the United States. Its territories, and Cuba, with the advice and consent of the Canadian General Manager in Newfoundland, Labrador, and the Dominion of Canada.

Changes are announced in the Maritime and Southeastern Divisions and become effective at once on publication of this notice.

The territory including Georgia, South Carolina, Cuba, Porto Rico, and the Isle of Pines is apportioned into two Sections to be known hereafter as (1) the Georgia-South Carolina-Conclave of Porto Rico Section, and (2) as the Porto Rico-Virgin Islands Section. As announced elsewhere, Mr. Cobble of W4RM has just been elected Manager of the first named Section. Nominating petitions are solicited naming a candidate for Manager of the Porto Rico-Virgin Islands Section, the closing date as stated elsewhere is our tabulation.

Newfoundland, New Brunswick, Nova Scotia and Prince Edward Island are consolidated into one Section, holding hereafter as the Maritime Section. Nominating petitions are solicited naming a candidate as Manager of the newly consolidated Section, the closing date as stated elsewhere in our tabulation. Mr. A. M. Crowell of W1DQ has been appointed acting Manager of the whole Section to function until such time as the membership of the Section acts in nominating and electing an official.

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Election Notices

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

(See list gives the Sections, closing dates for receipt of nominating petitions.)

This notice supersedes previous notices.

In cases where no valid nominating petitions have received from A.R.R.L. members residing in the different Sections in response to our previous notices, the closing dates for receipt of nominating petitions are set ahead to the dates given herewith. In the absence of nominating petitions from Members of a Section, the present incumbent continues to hold his official position and carry on the work of the Section subject, of course, to the filling of proper nominating petitions and the holding of an election by ballot or as may be necessary. Petitions must be in Hartford or before noon of the dates specified, all of which are 1929.
Due to the resignation of Mr. Enno Schuellek, W4LK, in the North Carolina Section, the petitions are hereby solicited for the office of Section Communications Manager in this Section and the closing date for receipt of nominations at A.R.R.L. Headquarters in Hartford is hereby specified as noon, July 15, 1929.

CANADA

Nominating petitions for Section Managers in Canada should be addressed to Canadian General Manager A. H. K. Russell, VE8AL, 5 Mail Building, Toronto, Ontario. To be valid, petitions must be filed with him on or before the closing dates named.

British Columbia July 15 F. S. Brooks Dec. 2, 1928
Saskatchewan July 15 W. J. Pickering Dec. 2, 1928
Manitoba July 15 D. B. Sinclair Jan. 7, 1930

Maritime Section

Due to the resignation of Mr. D. B. Sinclair, VE4FV, of the Manitoba Section of the Prairie Division, effective at once, nominating petitions are hereby solicited for the office of Section Communications Manager in this Section and the closing date for receipt of nominations by Canadian General Manager Russell is hereby specified as noon, July 15, 1929.

To all A.R.R.L. Members reading the Sections lists:

1. You are hereby notified that an election for an A.R.R.L. Section Communications Manager, for the next two year term of office is about to be held in each of these Sections in accordance with the provisions of By-laws, 5, 6, 7 and 8.

2. The elections will take place in the different Sections immediately after the closing date for receipt of nominating petitions as given opposite the different Sections. The Ballots mailed from Headquarters will list the names of all eligible candidates nominated for the position by A.R.R.L. members residing in the Sections concerned.

3. Nominating petitions from the Sections named are hereby solicited. Five or more A.R.R.L. members residing in any Section have the privilege of nominating any member of the League who holds an O.R.S. appointment in their Section as candidate for Section Manager. The following form for nomination is suggested.

4. Members are urged to take initiative immediately, filling petitions for the officials for each Section listed above. This is your opportunity to put the man of your choice in office to carry on the work of the organization in your Section.

-- F. E. Handy, Communications Manager.

BRASS POUNDERS’ LEAGUE

<table>
<thead>
<tr>
<th>Call</th>
<th>Orig. Del.</th>
<th>Rel. Total</th>
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</thead>
<tbody>
<tr>
<td>W6ZJ</td>
<td>702</td>
<td>10</td>
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<tr>
<td>W4A9F</td>
<td>95</td>
<td>52</td>
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<tr>
<td>K1HR</td>
<td>224</td>
<td>100</td>
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<td>175</td>
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The several amateur stations responsible for the best traffic work - the ones that are "setting the pace" in worthwhile traffic handling - are listed right up near the top of our B.P.L., the figures giving the exact standing of each station accurately.

All these stations appearing in the Brass Pounders' League are noted for their consistent schedules-keeping and dependable message-handling work in amateur radio. Special credit should be given to the following stations (in the order listed) responsible for over one hundred deliveries in the present month: W6EFO, W6DUR, W6BB, W6YY, K1HR, W6DHM.

Deliveries count! A total of 200 or more bona fide messages handled and counted in accordance with A.R.R.L. practice, or just 50 or more deliveries will put you in line for a place in the B.P.L. Why not make more schedules with the reliable stations you hear and take steps to handle the traffic that will qualify you for B.P.L. membership also!
WIMK

A.R.R.L. Headquarters’ Station WIMK operates on frequencies of 3575 kc. and 7150 kc. Robert B. Farmen, "RV", is the chief operator; his list is familiar to most of the amateur fraternity. Occasionally other members of the Headquarters’ staff operate at WIMK. Their personal signs may be found in the QST Section of QST.

Throughout the following schedule: Eastern Standard Time will be used.

OFFICIAL AND SPECIAL BROADCASTS are sent simultaneously on 3575 kc. and 7150 kc. at the following times:

3:00 p.m., Mon., Tues., Thurs., and Fri.
10:00 a.m., Mon. and Fri.
12:00 p.m. (midnight); Sun., Tues., and Thurs.

GENERAL OPERATION periods have been arranged to allow every one a chance to communicate with A.R.R.L. Headquarters. These periods have been arranged so

that they usually follow an official broadcast. They are listed under the two headings of 2000 kc. and 7500 kc., to indicate whether the traffic is devoted to listening on the 30-meter band or to the 40-meter band.

3500 kc.:
10:00 p.m. to 9:00 a.m. on Sun., Mon., Tues., Thurs., and Fri.
10:00 p.m. to 11:00 p.m. on Sun. and Thurs. (No QSB before these periods).
12:00 p.m. to 1:00 a.m. (or later) on Sunday night (Monday morning).

7000 kc.:
10:40 p.m. to 11:00 p.m. on Sun., Mon., and Fri.
12:40 p.m. to 1:00 a.m. (on the following nights) on Monday evening (Monday night).

Divisional Reports

ATLANTIC DIVISION

M.

D—DEL—J. O. C.—Acting SCM, F. Calboum, W3BBW—W3BBW has cancelled all slots for traffic but will be on occasionally. W3M1H is busy with Naval Reserve work. W3M1X is a young fellow going in Hagerstown. It is rumored that W3LB is going with the N.B.C. W3W1T seems to lead us in traffic this month, although other reports are missing. W3GTT is "all up in the world" with planes and not at all, so we want his QSL in store for awhile. Well, ladies and gentlemen, this is my first report as Acting SCM so please let me have lots more dope and more traffic next month.

Traffic: W3BBW 26, W3W1T 85. W3BBW 30, W3M1H 24, W3M1X 17. SCM, M. J. Lotysh, W3CFG—First place goes to the SCM again but a few new stations have appeared and it looks as if we are due to have some better results soon. W3CFG abandoned his famous "go in" in favor of a pair of self-recalled 825's. W3BBW is enlarging his shack and says he will be off for a while. W3GAG has been appointed an Ohio and looks like a real jewel. W3U1T has been working everything possible on 14,000 kc. W3BVG is busy with WPG's new studio and mammoth public address system. W3AEP handled a message to Br. G. and C. O. F. in San Domingo in good time. W3TAP also turns a few. Let's hear from more new stations.

The SCM appreciates the many letters received from different members.

W3MEM 70, W3ASCQ 26, W3BBW 28, W3U1T 17, W3BIG 11, W3AEP 10, W3TAP 8.

WESTERN NEW YORK—SCM, C. S. Taylor, W3EP—Very few stations reported and things seem to be quite good. W3AG0 is doing good work, teaching new crews the rules. W3DB has returned to the air again with a crystal. W3BBG has just put two UX66's in a new transmitter. W3LBY is reminded his transmitter to crystal. W3BBH is back on again with some traffic. W3BBK makes the 852 this month. W3BG1 managed to work Hawaii handling one message. W3SIP will be on 14,000 kc. for the summer with RAW AC. W3SIP handled one message. W3BBG worked Spain and Belgium. W3BBW keeps many schedules. W3SDDC is back again with Army 50-watt power amplifier set. W3SNNX will be off the air until next fall. W3SVD says DX is good on 14,000 kc. W3YGC worked CZECO. W3DSP has been called for active duty in the Naval Reserve June 1st to 15th at Sandy Hook. N. J. W3CMW, W3DHI, W3DSP, W3SNNX and W3ASCQ handled some traffic.


WESTERN PENNSYLVANIA—SCM, A. W. McCoy, W3CBO—Bad state on the 3000-kc. band has failed to stop traffic handling. Going over to daylight time has been the cause of some confusion but in general it looks as though traffic handling will continue through the summer with a less serious drop than usual. W3XCE, old reliable, heads this section this month. Their report came in just in time to make the report to HQ. W3CBO, a new OHB, takes second place with a nice total. He has a new push-pull transmitter in the 14,000 kc. band. W3CTR is the star DX traffic station in this section. W3DKQ is another new OHB doing good work. W3CFO invites the gang to look over his new "three band" receiver. W3BBW has arranged schedules with British listeners to try to contact him during June. W3BBR keeps a sked with the SCM. W3AGO is rebuilding. W3ARH has joined the Army Nat. W3DZV is a new OHB. We could set the station clock by W3CQ's report. The R.I. visited Erie and gave exams. When he left he had added quite a number of stations to his list and thousands of miles in blue dealing with a number of others. The Erie gang has a blue ticket operator aged 18 years. His name is Otto Herbst, Jr., Martin Long is another new operator with a blue ticket. Both of these boys were members of W3SRH's radio class at Y. M. C. A. and used the A.R.R.L. Handbook as one of their textbooks. W3VF is building a fifty watt station for operation on four bands using crystal control. W3CBE is located at Rocky Point, L. I., at station WNL, working on transatlantic phone. W3IV, W3BSON, and W3RIV received second grade tickets. W3WYK is Officers' replacement power boat. W3CRA reports working fourteen VK's and three ZL's in one week. W3ATH has a new transmitter. W3DLG says that you get about twelve as far with DC instead of AC, and twice as many QSO's. W3YGLC is working a trip to northern New York. W3AFQ says radio and farm work don't mix very well. A fine letter reports W3AIF active in Altoona. About fifty hams attended the auction of the A.T.A. It was a good night for buyers but a poor one for sellers. W3ASQ's 250 watt is going off the air. W3BDE is leaving. W3BIC is a new call here and will soon be on the air.


CENTRAL DIVISION

ILLINOIS—SCM, F. J. Hinds, W3APY—Many of the busy traffic men gave up this month. Don't let the warm weather scare away the traffic. OMI W3GCR is operating on the S. S. Ashbelkoch, W3LCY, an old sparkler, has been on 7000 kc. with C. W. H. W3GCX has a Zemi and a brand new 1929 Harley. W3FCQ has a mercury arc and an 852. W3CTR is doing some nice 2210 kc. work together with 14,000 and 3500 kc. W3FAA wants to know why it is the gang don't QSL more. W3DWA has an 852 and BCL troubles. Every time he QSY's, he has to go around and retune the traps he puts in BCL's antenna leads. W3DKQ works fine DX with the old 210 and a Hertz. W3CNY is on 240 kc. part of the time. EB, OI, W3ERU is studying up on crystals for his new sets this fall. W3DDI has an 852 and
a crystal on his end of 6 day Hawaiian schedules. W9AQL works England on 14 mc. W9ERU has a new mast and is rebuilding the sets at W9BXR. W9FEP is out for an ORS. W9ALK is rebuilding his receiver a to May QST. W9DFJ obtained an 852 and rectabulls and worked all continent but Asia on 14,000 kc. W9CQL has increased power and is trying out a Herta. W9CFB has a new TGTFF and says HCL and all are well now. W9BTH, W9FEP, W9APY. Fred Schelln and "Matty" were delegates from Chicago to the Ames Convention. W9RNI is starting up on the Army Amateur Net. W9F7 works Nenana consistently. W9HJO has cancelled all schedules for the summer. W9BNR is missing a monitor F,H,OM, W9CQRF reports Army schedules going along nicely now. W9PDY will be on 14,000 kc. W9NY has a new Zeppelin. W9CWO visited Chicago for awhile, W9FCE states it is hard to get and keep reliable schedules. W9ACB is making up a self-settied transmitter to take to summer school and keep in touch with home via W9CZK. W9RVP has changed his QRA. W9CQH states DX is good up right now. W9BHE is busy operating most of the time at WYJ where he is chief up.


INDIANA — SCM. 1. J. Angala, W8CYG—The Indianapolis Radio Club closed out on last May 18th and 19th which was well attended by hams from all over the state. W9WV who has taken over the Rm job for the northwestern part of the state, wants all hams who are not ORS and living north of the Wabash and west of Mishawaka, to get their reports in to him by the 16th of the month. W9GJG worked his first station and got the bug so bad he didn't do much good. W9AXZ has sold out to the future traffic men of South Bend as he is preparing for the commercial work. W9WREWS is doing a new job of sales. W9VIEA has one of the best ships on the lakes. W9FPO is raising a wife. W9DUZ is now at Nappannee on 14 and 7 mc. and getting good DX. W9FDPV is on regularly with sleeds on 7 mc. W9SIB has a 7-L which cramps his style. W8ALN blew his filter condensers so he is off. W9AWEY is on 7 mc. with a 250. W9AEF is still rebuilding. W9GCO will soon be back at his home station. W9EGE, W9AHEB rebuilt for 14 mc. but finds no traffic. W9WZQ reports that the Rich- mond ham is very active and the new ORS station he is a new ham at Richmond. W9PF reports so much V.L QRM that he can't work. W9FXW still keeps foreign skeds. W9EKW still hits the ball on 3705 kc.


KENTUCKY — SCM. J. B. Whitman, III, W9BZJ — Keep your eye on W9FS. He has two moons to his credit. W9AZY gets crystal reports on his new xmitter. W9WBJ will be off the air for two months. W9CRI is trying C. C. with varying success. W9ULF reports "pre-war hats" in Lexington. W9GBG is building receiver to match his xmitter. W9AKU is busy replenishing his home-brew supply. W9CCE is engaged to report to the 201A for kicker. W9FQN is q5W with Jr., Jr. W9EYX is off the air until he gets word from the R. J. W9BEE's total is small due to installing crystal. W9FZYV has a five-tube receiver now. W9ENR is watching the mails for a WAC tag. W9GAL was heard in England QSA. W9OXN switches wave for each sked. W9BANF ought to edit a newspaper. W9GJG is trying his hand at C.D. Several ORS are slipping. Be careful. ORS. Don't low down go. W9KQ report 25, W9IF 109, W9BZJ 62, W9DDX 43, W9AGL 39, W9CQL 28, W9EXW 18, W9CRL 15, W9GGB 10, W9CRLJ 11, W9FCG 10, W9FVZ 5, W9AUK 2, W9EYW 2.

OHIO — SCM. H. C. Storeck, W8SYN — Well, gang, the schedules are pretty much totals under the drags. The SCM is pleased with the way reporting is keeping up. There are several ORS certificates up for cancellation again, and some of you had better watch your steps. If you simply cannot originate some good traffic to help your section, you can at least report for your own sake, and save your certificites.

W9CMB is the only man to make the HFL this time. W8BNY kindly called for a QST on the last. W9CRW devotes most of his time to AA work. W9BKM A's wife says he spends more time with the radio than with her. W9CRI reports things pretty quiet along the Potomae, W8ADS reports school almost out and rejoices. It requests W9I to QSL and come over to the country with his set. W9BAU is all set for DX and AA work. W9RAR reports traffic slow and hard to get. W9DDK turns in 27 with no news. W9BBR says QRM and local QRM win over Kid Radio by a knock-out. W9DFF's antenna blew down before he had a chance to put it up, and he has to work with W9EXW while he is back with us. W9RZ is runner-up for ORS and comes thru with 14 for his first report. W9CPT says spring fever had him in its fote clutches. W9CSS has been rebuilding and is now on for good. W9CNQ had tough luck, blowing thump filter condensers, etc. and is now rebuilding. W9CQS hasn't had much time to operate, but says the new 852 is going fine. W9PL has another station, W9DWCX, going at his garage, and expects to have more time for the air. W9CMU has been rebuilding and has cancelled all his schedules but will be on again and working time. W9CFL is busy with college baseball as usual this time of year. W9ARP says he gets tired of hearing "QRF hr nw, CUL, etc." W9VRB has been DXing on 14 and 28 mc. bands. W9LH has been busy with the air due to cleaning, but is again looking for schedules. W9DVL had to stay off the air for a while because of his license running out but is ok now. W9DSSY says he has a report that someone is using his phone on 250 volts of B battery for plate supply. W9CET says QRM and not much doing. W9DQQ is trying to keep, and get, all high school schedules. W9DTH wants to know why he doesn't get more 3500 kc. in moraines in summer and would like to hear from anybody that feels same way and is anxious to carry on in the early morning hours. W9BBH hasn't had much time for radio. W9WAF has changed his address. W9AM1 has been busy with school but will be on more when it is finished. W9BN is pounding brass at WTB1, W9EJ reports his new set FD. The SCM urges reports from all stations who hear ICW operating on the 7000 and 14,000 kc. bands and also about off-wave operating.


WISCONSIN — SCM. C. N. Crapo. W9VD — The SCM has a new set, including a 167.7 meter crystal oscillator U3010, two UX210 frequency doublers and an 852 power amplifier. This large outfit permits working over 7000 and 14,316 kc. W9DTK breaks into the HPL for the first time in several months. W9WWZ helps out the SCM by sending in three reports via amateur radio. W9WGT, an old timer (formerly W9ZJW) is back on the air again and now has three schedules. W9EYH was in town this month and paid a visit to the Milwaukee Radio Amateurs' Club. W9EOM is on the job as usual and always ready for QSP on 3500 kc. W9FRC has schedules with W9DKZ and W9DFJ and building portable transmitters for use at Lacrosse Radio Club picnics which is to be held on May 25th. W9DLD has temporarily cancelled all schedules except W9ERU and sends most of his time now entertaining visiting hams. W9PFI says there is nothing new around his station. W9CVI is keeping two schedules. W9DKI says the Lacrosse boys have no job.


MICHIGAN — SCM. Dallas Wise, W9CEP — W9AUB now has a TPT outfit using 281's for rectifiers but has trouble in getting out. W8AUT worked K6DSW with two 20A's using 250 volts of B batteries for plate supply. W9WSP has the set working again, W9ADM and W9DWS is forming a club for "shut-in operators." If you know of any such fellows, have them get in touch with Walt.
PORTS hit the summer as well as winter to get the dope before dispute the right to the bed. Remember gang, it takes count countries last month. W9DGR says he has a new DX and he has held it ever since he retired from the SCM job. However, Cy has been off part of the month getting ready to take the two weeks' training in the Naval Reserve at Great Lakes, Ill., and it is hoped that he will continue the good work of the station when he returns.

W9EHO reports no changes in his set this month. His DX is using an 852 and says he will have a M.O. room. W9DOQ reports the Duluth and Superior hams have organized a radio club and meet at his house, W9CY handled some NKF traffic to M. Paul in jig time and thinks all the hams have good receivers now, as he always gets QSA5 reports. W9CTW attended the Ames Convention and took the amateur extra first grade exam and passed. W9DJP just got back on the air at his new location and says it's a WOP. W9EH1 is still inactive and will probably be off until next winter. W9BTT is busy seeing as off, too, W9BH is on very little as he is getting ready for the trip to the Pacific Coast. The Twin City hams are talking convention a lot and if words turn to deeds, we may have a Dakota Div. Convention next fall.


DeltA Division

Louisiana — SCM, M. M. Hill, W3EB — W5WF pounds the brass regularly and ran up 214 messages with only four schedules, W3ATQ and W3ANC on back on the air again. W3ODN sent in his report from the Sierra Nevada on account of the death of his mother. He is now working on 7000 and 14,000 kc. and was QSO 111 from the SCSI job. However, W3BDD will be busy getting the antenna away from the antennc. W3AEK reports the Duluth and Superior stations have organized a radio club and meet at his house, and says it's a WOP. W9EH1 is still inactive and will probably be off until next winter. W9BTT is busy seeing as off, too, W9BH is on very little as he is getting ready for the trip to the Pacific Coast. The Twin City hams are talking convention a lot and if words turn to deeds, we may have a Dakota Div. Convention next fall.


Delta Division

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rebuilding. Let's hear about it, OM. And don't forget to change the SCM address in your QRA list.

Traffic: W5JK 10, W3ARA A.

MISSISSIPPI — SCM, June W. Cullett, W3ARF P — W3QG, who is a radio engineer at WCOC, has been very busy with the BCL station. He is selling his transmitter to W5K0Y and will be leaving the station as soon as he gets settled down in Meridian. W3AQH heard frequently at the key of W4KY, will have a new transmitter on the air in Meridian within the next two or three weeks. W5QEY wants an ORS certificate and says 14,000 kc. is FB. W5QG has a crystal of making up with three high-waymen in Atlanta where he is attending college and was pretty badly cut up by them. W5AED is the proud possessor of a Western Electric 212D and it is all rigged up in a high C Harbor circuit. W5LY is on 14,000 using UX210 and a UV202 audio and he worked both ORS.

W5PFI is on 7000 kc. with a 50 watt and reports working England. W3AAP reports working all U.S. districts, Porto Rico and Jamaica on 7000 kc. recently. W5FHI is a new station in Bloomington using two UV202 tubes. W5HIB has a new power transformer and he says it is too big for its UX-210 as it makes the plate of some yet hot. And his transmitting condenser looks like it is worn when he steps on the key.

Hi, W3AWF who is working a phone set in the 3500 kc. band reports that he has worked ORS and hasn't been doing much work. W5AYB has moved to New Orleans. LIA, W5AZV is using two UX-210 tubes in a self-rectifying circuit. W5BHEL is a new station in Jackson. W5AJJ would like to get in touch with someone near using phone on 50 or 150 meter band. W5CCH is beginning to get his transmitter to oscillate lately. W5QG has moved to a new location and he has a transmitter going in the 7000-ke. band. W5QFQ's 250 watt quit on account of the grid and plate touching when it got warm. W5KP is rebuilding and will operate in the 7000-ke. band. W5AL in Arizona has moved to a new location in Burbank, Calif., and we are sorry to hear this go. Just watch the Mississippi gang for real results in the near future.

Traffic: W5AMJ 10, W0AZY 2.

TENNESSEE, Alabama, Michigan, Polk Purdie, W4FL — The SCM waited for reports too long for the past two months and has failed to get his reports to QST on time. All of you have been notified that the 15th is the reporting date so get busy, you. W4AQJ has been busy and reports no traffic. W4SF has sold his 202A and is using a 210 as he can get down to 14,000. W4FX has bought a car and forgotten about radio. W4DG has been on 3500 and made some fine contacts. W4HIK is rebuilding. W4GL spent two days with the 210 he can get down to 14,000. W5WJ has tried to get some ORS in on the inactive list. W4NH has been appointed ORS and is one of the most active stations in Nashville. W5RP-W4ZDC has also been appointed ORS and is an active station. W4FL is on regularly with two UX210s using crystal control and is getting fine results.

HUDSON DIVISION

NEW YORK CITY AND LONG ISLAND — Acting SCM, V. T. Kenney, W2RGO — of 26 ORS, we only received 17 reports this month — that will not do — and again we must get busy on cancellations of ORS. Someone or eight new ORS will be appointed within the next few weeks, and we hope to see more applications coming through. This is the slow season of the year for traffic, as the report shows, but is the best time to prepare for the busy season in September and October. Send in your applications for ORS and begin preparing your schedules for next fall, so that when the time comes around you will be able to take traffic for almost any place. Make schedules by mail now; do not wait for the frost or the first snowstorm, for that will be too late. In Manhattan: W2BGO (Portable W2NXR) leaves Manhattan with the place. W2FNT has been appointed ORS and is one of the most active stations in Westchester. W5RP-W4ZDC has also been appointed ORS and is an active station. W4FL is on regularly with two UX210s using crystal control and is getting fine results.

QST

July, 1929

IOWA — SCM, H. W. Kerr, W9DZW — W9FZQ puts Sioux City in the lead and aspires to the RPL — watch his town! W9BCA keeps his CAB, NIC and W9BSX steeds. W9DXF works three hands and does fine work. W9EQJ is on occasionally. W9HRT, is now operating on the waves with call W9DDD. W9CZC renews the old crown to 9C6 by arbitration, since saving operations keep him from getting on the course. W9EIW missed the convention. Sister, W9DVA, is on the lookout for ORS. W9JUD has not been heard, or was merely reporting at the C. D. H. W9FQC is off till cooler weather. W9DEA is on again. W9DGR is getting along good with a 201A. W9BNW is going to Rockey Point, L. I., in Comma. Eng. Dept. of R. C. A., W9BNH is leaving for Grand Rapids, Mich. W9DKW has taken up the W9BCA's town, and is heard as "KS" from W9BCA. The Midwest Convention for Iowa was a great get-together, and the SCM appreciates the support he received. We look for-
word to more ORS and greater activities during the coming summer, as a result. The Navy enlisted about 30 in the USNR, and Mr. Turner's exams will add to the real ticket. The 1929 is an interesting and hopeful within the state. The Tri-State Club at Sioux City is active for a harvest for four states this fall. The Campus Radio Club received their call — W9DTT. They're an active bunch in banqueting, at least. Mr. C. E. Felter, Director of the King Ext. Sr. of the Iowa State College at Ames, and the boys at WOI have the thanks of the gang for the great interest taken in amateur affairs.


KANSAS — SCM. J. H. Ames, W9CET — Due to ORN, which has been exceedingly bad on 3000 kc, during the past month, traffic has fallen off considerably. W9FLC, our commercial RM, leads the state in traffic, and is building a new S.G. receiver. W9ESL, on 3500 kc, and 7000 kc, e.c., takes second honors and is putting up two new 6A4, lattice tubes. Both W9FLC and W9FET make the RPL. W9FLC passed his commercial exam and is now working at WKEN, W9FTY will be off the air until he gets his plate transformers rebuilt. W9CFQ is building a 1929 iron rig. W9GFO reports for the first time, and is putting in a 30-m. W9HBS has been off the air for four months, but has a new W9HBS rig, Q9EFO still works, and is glad west on 3500 kc, for Calif. traffic. W9CFN reports heavy ORN from school. W9BTG is using a 292 with 900 c. R. W9CWH is on 14000 kc, a lot now, and finds a good DX bug. W9EFO has worked a lot with W9ESL, and is glad the old DX bug again. W9CKV has a new transmitter perking. W9BRH serviced 2 SM Round-The-World Fours and says the eure is 81 eg, leak for one and no 1 s for the other. W9GFO lost a mast, and has been ORQV with school. W9DBE reports for the first time, and wants ORN. It is with deep regret that we must report the passing of Walter Heline, W9ERK, on May 2. He was a real ham, a true amateur, and a gentleman, and will be missed by all the gang in this connection.

ORN is beginning to get bad on the low frequencies, so let's move up on the higher frequencies soon until fall and keep the ball rolling.


MISSOURI — SCM. L. B. Lauter, W9RR — W9DQN led St. Louis traffic, and sends regrets on being unable to attend the ORS convention. The amateurs here were there and took first steps toward becoming Executive Officer for the Volunteer Communication Reserve, U. S. N. W9EDK, a new ORS, and his antenna changed off the pole by the power company. H9HGC is keeping two Wenner ORS and Q9WBB is working for the first time, and E9ORS reports. W9QDE now that school is QR, W9GSK got on the air, May 1, on the 14 mc. band and joined the USNR. W9BBU tells that his ORS is put in storage until fall, as he is rebuilding.

Traffic: W9DQH 80, W9DVC 12, W9GKP 6, W9IDU 5.


NEBRASKA — SCM. C. B. Dielt, W9BYG — W9QYJ has spring work caught up and is on the air more now. W9EEW is very busy this spring, but has time for QRR. W9DVR handles little traffic, but is very busy observing. W9JNC is very busy starting for commercial exam with a new Radio Club. W9DJI is still in school but looking forward to summer vacation and radio. He reports W9PHA a new station at Graham. W9BQ reports, but has nothing to say. W9DLT got a kick out of observing BCs. W9CBB is very busy getting the new club going. He is going 8QHR is very busy in the post office. W9BYG is busy at this time. W9HBS has not said if he is a conductor yet or not.


NEW ENGLAND DIVISION

RHODE ISLAND — SCM. C. N. Kraus, W9BCR — W9DQO reports traffic and DX better. W9BKR will be on regularly during the summer. W1AWE has come up to the 7000 kc, band because he doesn't get on much during the daytime and finds 14000 kc, dead at night. W9BYJ was heard in Europe with 115 watts on a 21-A. W1MO is still off due to rebuilding. Will the fellow, using his call please apply to the inspector for one of his own? Hi.

The Radio Club of Rhode Island has purchased a new club house, EX-W9MO, at East Providence, and is getting ready for its regular work on the air for traffic. Hams straining through R. I. this summer should drop around and see our layout. QRA is Pearl St., on the Ten-Mile River (Huntford), East Providence, R. I. The club plans a series of five-meter transmissions with various types of transmitters. Anyone interested should get in touch with C. N. Kraus, President of the Club.

Traffic: W1DQ 27, W9CR 10, W9LWE 8, W9BLV 5.

EASTERN MASSACHUSETTS — SCM. E. L. Bates, W1UE — W1AUS and W1APK have realized their ORS on account of moving out of the Section. An ORS certificate has been issued to W1WT, who is doing some line relay work. A new station, W1LQ, has opened up in Wollaston. He uses a 210 and has already worked England. W1AZE worked his first Asian when he hooked 12G2Q. FB. W1BY is high traffic man this month. Most of the messages were to his old Harvard classmates announcing a reunion. W9BTG worked on his E9P9 division, and the signal shows a fine metallic spirit. OM. W1AHC has a new 1929 receiver which gives full-dial coverage of all bands. W1R will soon have his ORS. He, W1FI and W1UE took a cruise on the Eagle 46 with the Naval Reserve on May 12, and all enjoyed the trip. W9TAX, of the new Radio Club in Boston, has added a new 500's with Kruse's tuned filter. W1BY has added several new skeds. She keeps pretty busy with her RM work. W9WQ worked F, PA and K, and is always ready for traffic. W1BIU has applied for ORS. W1AAW says he is busy these days. W1AUS has very good DX at best. W1AUS is having trouble with a local power leak, which haunts his traffic work. W1LM is on summer sked, which means a let-up on message handling. W1AOT has put new blinds and awnings on his shack, and is all ready for visiting. W1OM joined the R. C. C. Quite a few of the fellows attended the convention in Springfield, and our own E. Mass. went for first prize for putting on the best stunt — prize was a complete receiver. Non-reporting stations are urged to report next month and all stations requested to report on time.


WESTERN MASSACHUSETTS — SCM. W9DL 10.

MAINE — SCM. G. C. Brown, W1AQL — The new SCM wishes to extend to all those concerned his hearty thanks and appreciation for the loyal support in the recent election. He fully realizes that it will be quite some job to carry on the work which has been started by our President and co-worker. Fred Best. However, with the usual exasperation and spirit of good fellowship which characterizes the Maine Section, there is no doubt what his term will be
successful as well as pleasant. WIAQD is top liner this month. Fine work. We are glad to see you in the BPL. WIBG has a lower total than usual this month due, we presume, to his absence at Hartford the last two days of the work. WIAOT is the next in line with a good total. WIAHX has skeds with WIAQD and WIAUR. WIART comes across with a good showing this month. Mrs. WIAQJ has a good load on OM WIAQJ this month. WIAQJ and the SCM are running very well this month. WIAQD is on the air now, WIBFZ is working on a key thumb filter. The SCM wishes to say that work on the convention is coming along fine and the real dope will soon be on its way to all the SCM members.

We report in this issue that we have to report the passing of Leonard Randall, formerly of TAD, whose death occurred on March 30th. "Dutch" was a very nice chap, and we find it very hard to realize that he has departed forever from our ranks. In his passing, the Queen City Club has lost one of its best workers, and amateur radio has lost a real friend. Our sympathy goes out to his bereaved family.

Many who remember Delmont Parsons, old KAY of Portland, Maine, and Currier's deaf and dumb man in the Atlantic Radio Company in 1919 and 1920 will be sorry to learn of his recent death in a Ford airplane accident at Newark.

Traffic: WIAQD 302, WIBG 105, WIAOT 187, WIAQY 71, WIAART 48, Mrs. WIAQJ 27, WITB 15, WIAJQ 12, WIAOL 12, WIBFZ 6.

CONNETICUT — SCM, C. A. Weidenhammer, WIZL — Summer weather with its daylight saving time, its varicose veins and its static has started the let-down. There seems to be an upsurge now among amateurs that frequencies below 7000 kc. must be shunned at this time of year. Happen what may, we hope that a few of the gang will be faithful to 5500-ke. skeds. Some are getting out of warm bed clothes and getting into cold shoulders to take advantage of the most favorable conditions on that band. More might try it with the exception, of course, of those of us who leave our homes before that hour. WIBGC is on 7000 kc., WIMK reports that most of the schedules are working well. The QRM is making the copying of the DX schedules a bit difficult, WICTF is one of the early risers, and he reports the air crystal clear and uncrowded at that time. WIAIC and WIAVT have formed a partnership. WIAWD worked thirty-four foreign stations and handled some DX traffic. WIBFV moved thirty miles in one evening recently. FB, WIBOD states that preparation for college exams will demand most of his time now. WIOS finds 14 m, a bit tedious and must return to the gay whirl on 7000 kc. Hi, WIAOJ hears few of WIBRG on 14 m out of WITB. FB, WISTB is on 14 m out of Westport Sunday. WIRP expects to install a power house soon to supply voltage for his UX582. Hi. He keeps a schedule with 55X, our mysterious friend, WIBJK is still active, WIBL is building a MOFA outfit. WIBOT's schedule with W6AKW is still sturdy. WICP handled a good traffic total. A Better Homes Exhibit in Vermont helped WIAOX amass a splendid total. WIAMG handled a lot of traffic for Europe and the Canal Zone. WIBNS crashed into the BPL with a whole of a total. He and W1YV ran the messages sent out by the Harvard class of 1929 Reunion Committee. FB, WIBI-18Q promises much activity in his quarter now that school is out. WIZL has finally installed an antenna that is wind-proof. Operation on 2500 kc. will be continued during the summer. WISBC in Strodefield, WICPO and WIASC in Bridgeport, and WIAJF in Middle- town, are new amateurs. WIBPK is preparing for his annual transcontinental trek. He will be gone until fall and will use WIZJ, his portable call. W1LE enjoys the food on his packet. He reports well.

Traffic: WIAQG 137, WIBNS 816, WIAMC 5, WIAQX 90, WICPK 51, WIBDI 23, WITD 4, WIBK 20, WIRP 62, WIBEM 36, WIAQJ 55, WIEBP 73, WIAWD 6, WIART 3, WICTF 2, WIMK 321, WIBMC 8, WIZL 16, WIBOT 6.

WESTERN MASSACHUSETTS — SCM. Dr. J. A. Tesser, W1UM — WIAO is still operating at WIFG. WINU has just finished rebuilding transmitter using std tube batteries. WIFG is reducing for 2,000 watts with d.c. supplies. WICTF worked 27 stations out of 29 called with a new set using 320 volts. W1ANI is going on Naval Reserve Radio compass station duty for 14 days, W1BVR is getting great DX and is on 41.6. W1KZ is handling traffic to Europe, W1BJS thanks everybody for the fine cooperation given by all who contributed toward the convention in successful completion. W1BWX says a monitor is now at the call of the members of the club, WIBNL continues schedules with his new Zopp. W1IM is going to rebuild this month to 5000 kc. and 14,000 kc. Traffic: WIDG 22, WINQ 7, WIAN 20, WIAKZ 2, WIAWW 15, WICTF 3, W1UM 9.

NEW HAMPShIRE — SCM, W. V. Hodge, W1ATJ — Outside activities have claimed some of the gang's time during the winter. Radio conventions have been held during the winter, though, WlUE is working nights, and has to operate daylight hours. WIAQ3 will be going as soon as college lets out. W1P sends in a report, but says not much time for radio now. WIAU will have a crystal soon for a 2000 rig. WIBFT was busy as usual. W1BY has a new transmitter on 3500 kc., and expect to work on 25 mc. soon. A new model A is taking up WlVAY's time now. WIBNK is on with a 1-twr. tube. He expects to be "in the air" with Bob Fogg at the Weirs this summer. A bunch of the fellows are buying amateur radio sets. W1MT plant and WGY at Sch Raiders and W2S is in Troy. W1APK is a new ORS in Pembroke and is on 5000 kc. W1UN has an amateur extra first now. FB, 0M.


VERMONT — SCM, C. A. Paulette, W1T — Traffic seems to be slowing up considerably, but it was at this time of the year. The ORS in Vermont are swarming into line in fine shape, and it looks good for next fall. WIBX reports a club station now on the air on both 3500 and 7000 kc. at White River Junction. WIDX has rolled up a fine total this month and takes the highest honors for the state. W1BEB still does his bit in both the traffic line and RM line. W1YD reports that W1BIQ is at the Randolph, Vt., hospital with pneumonia. We all extend our wishes for a speedy recovery. 0M. W1E reports that he will be home from Pit. Benning, Ga., sometime in June. W1T is leaving a hamset at his camp on Lake Memphremagog the second week in June. Any ORS who wishes to be in active traffic with us can be placed on the list. W1ATJ is busy as usual. W1BY has a new transmitter on 3500 kc., and expect to work on 25 mc. soon.

Traffic: WIDX 107, WIGCX 49, WIAQW 26, W1T 10, W1YD 6, W1EB 3.

NORTHEASTERN DIVISION

MONTANA — SCM, O. W. Viers, W7AAT — W7DD has a new screen audio receiver with built-in monitor. W7FL has a new monitor and is waiting for W9NY, and W1XY to do their stuff. W7AE, W7D1 and W7BT, all of Hardin, are too busy to be active, W7AA7 held schedules with K6DGT-K6AVI-K7AMW and NJFL.

Traffic: W7AAT 395, W7DT 93, W7FL 25.

OREGON — SCM, R. H. Weinert, W7PZP — From this date forward, address all communications and traffic reports to the new SCM, W. S. Claypool. W7TN. W7TN has been playing Dan Capid for a distant boy-friend. This accounts for his rapid increase in the number of message deliveries. W7UK as usual had an amateur Radio Day at the Railroad and some messages were handled and accepted messages from the patrons. W7AQQ is on now on 14,000, 7000. and 3500 kc. W7AAR now has a Hartley on 10,000, 7000, and 3500 kc. W7AAL will soon have a Mesirn in the air. W7VPK has a WAC certificate, having worked in his last continent. W7AEU is back on the air. W7VLW has added four new countries and two continents to his list this month. W7IF has also had several European QSOs this month. W7UB is using 28's now. W7WR has six sets with which he is keeping W7KM, OM. W7PG has moved to Walla Walla; he will be on the air there soon. W7MVH has started construction on a new transmitter. W7ABN is rebuilding the entire station. W7WIE has sold out, another case of radio visa. W7ED is on the air with a 50 watt. W7TU sold out his old set but is using a 5 watt on 14,000 and 7000 kc. W7EIK

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is very QRV with FFIJ but he will be on soon with an excellent tone output. W7EC is one of the consistent stations in the area. W7PP is rebuilding his transmitter in a new location and will have his QSOs in push-pull instead of one as oscillator as heretofore.


WASHINGTON — SCW, Otto Johnson, W7FD — W7BB takes the traffic honors for this month, handling 284 in a period of 17 days and NIGHTS!! He will soon take the equipment to the Federal Aeronautics Department and will visit as many stations in Japan, China, the Philippines as his job will permit. A new traffic station, W7JJ at Keet, takes second, W7TX, W7AG, W7VK, W7BR and W7LZ keep Seattle on the beam. K7HL at Taku Harbor, Alaska, is going strong and will help run up our traffic totals, W7CA at Prosser will be off the air for a while. Hurley back, OK, W7AC8, W7AFO and several other stations are on in Tacoma, W7G1P at Olympia is getting a set going on a yacht and will make the trip to Juneau, Alaska, during the Annual Capital to Capital yacht race. He will work skeds with amateurs, using 13,360 kc. and 6092 kc.

W7AOB in Tukw is improving his station and handling traffic in good shape. No reports were had from Spokane, but a new report from W7EM in Prosser reveals that whatever QSL war is raging there. Amateurs have their antennas cut down and everything. Very poor power regulation is said to cause most of the trouble. A city ordinance affecting amateur radio operation was being investigated by the Director, Karl Weingarten. It is hoped the situation will improve soon. In Everett we find one of our most enthusiastic groups of hams, W7PE sends in all the dope, for which the SCM is very thankful. The Zeppelin antenna has hit the Everett gang big. W7AA has a nice 70-watt rig and will be in business. W7LK is still going. W7JY blows his 17 now but is on now with a 5 watt. W7NN has a bug now. W7ACY, W7MW, W7PH and W7AKP are the Zeppis. W7AAB is building a MOPA. W7JG handled a few. W7TT in WA6SD is on. W7EG1 is expected to be on soon. The SCM will have W7FX on near LaConner during the summer. W7ED will be on at the old QRA soon, too.

Traffic: W7BSC 54, W7JJ 100, W7VK 74, W7TX 70, K7EL 71, W7PH 51, W7EK 20, W7JR 16, W7AOB 16, W7AG 11, W7JR 13, W7AFQ 8, W7ACY 6, W7MW 6.

PACIFIC DIVISION

LOS ANGELES — SCM, Don C. Wallace, W6AM — Six stations made the SCM rounds this week. W6AWK, W6AJV, W6ZBI, W6DHE and W6UJ. W6CHAA has been taking over W6A9's sked with K1CJ during the absence of W6A9 at maneuvers at Fort Mather, Calif. W6AKW worked a British ship, amateur stx2C near Victoria, B.C. W6AWA has a new 150-watt installation of the new Raxton S, Mercury Vaper rectifying tube and says they are FB, W6ZBI has been up in the mountains at Hoyt Camp. W6DHE can't argue much so is thinking of putting in a 2 kw. spark, W6UJ has been working on a portable with W6DYL. W6DYY sent a radiogram and telegram to Seattle, and had an answer by radio before the telegram was delivered. W6DKY has a new call, portable W62Z. W6CUIF worked all continents in one week with new stx transmitter. Ground 3500 kc. sat for W6AOJ. W6EQF sends in the news that he came on the air March 3th as an amateur for the first time since 1929 and has been QSO four continents, and eleven countries. W6EE2 is still working around with airplanes and studying for commercial license. W6HAA has built a 14,000 kc. set and the couple of skeds in morning, afternoon or week ends. W6AEC is working over with airplanes and studying for commercial license. W6EAE has built a 14,000 kc. set and would like a couple of skeds in morning, afternoon or week ends. W6AEC is working over with airplanes and studying for commercial license. W6EAU is working the YL the code. W6FT has good sked with K1QD. W6MM is working for them. W6AA board Rwx on 14,000 kc. W6AWP made his first European QSO the other night. W6AM is keeping weekly skeds with Ryder expedition. W6A9D changed over to 14,000 kc. for ten days and worked all continents with a Q5A 6 from all. W6APF is kaput. W6AOJ just started his first sked and is trying to get more traffic. W6IYE is doing some good work for the Long Beach Associated Radio Club. Director in his W6AM is getting a master in Science and W6DOJ graduated from the old reliable 210 to a 50 watt. He was recently appointed Asst. RM for the San Bernardino district. W6EFA sends his first report — we down on 14,000 kc. for ten days and worked our first Aussie. W6ZZA maintained sked. W6DOJ while W6ZZA was near Canadian border. W6DOJ took daily bulletins from W6MA at hospital. W6EKC says DX has been good during past month. W6FT and W6DJ are considering consolidating. W6DJ1 put a call out to Zeppe to hurry in. W6EKC says to tell the gang that if any of them are going to spend their vacations in the High Sierras, to be sure to drop in and see him. He fired two miles north of Bishop, Calif. The fishing there is FB. W6XIE is going to make new skeds.

W6CHW, W6EPH and W6EPN send in good reports. W6DSC, W6COT and W6AGR are rebuilding, W6EKE and W6DGY are going to take a transmitter and receiver to military camp when they go in June. W6BOG has been spending lots of time every Saturday for the past month aboard the Yacht Nomad, W6DC, putting the set in shape. One of his messages was telegraphed to its destination at Ontario, Calif., and another sent by special delivery to the Marine Base Hq. in San Diego. W6DU3 and W6DKE have good totals. W6DU3 has a new station and made another QSO last week. W6F is finding out that W6A9 is keeping good skeds. W6DLK has not been on the air much. W6ASM is out for a commercial ticket.

W6BJX, W6JF, W6PEW, W6ZU, W6MA, W6PDY mark as usual.

Dates of the coming Pacific Division Convention at Los Angeles are November 29th and 30th.


HAWAII — SCM, F. L. Fullaway, K6CFQ — Summer time is approaching and it is about time for a heavy run on traffic to start. The SCM hopes to be an operator on N1N for the summer so the duties will be temporarily placed on someone else. Proper notification will be given to all active stations. K6AV has handled traffic for years and has a fine MOPA that is a wonder. He keeps skeds with WSSBS, the Carnegie, with about five others. K6CQF made the RPL after a long absence. He keeps skeds with W6IU weekly. A sked was arranged by commercial cable on several occasions that he will keep with all amateurs. He wants to get one family to return on thirty hours notice was handled. K6DW5 on Maui is a new QRS. Has a generator rigle that refuses to disappear. K6E2E is rather active but with AC. K6DUJ will soon be more. K6ACW is on 7000 and 14,000 kc. with a 210. K6FGT reports a new ham on Maui, K6AQG. Kahului. K6DPD says his skeds are all haywire. K6DQG is on again with Hi C and a 222. K6LCJ was QSO two G stations on 14,000 kc. K6AFF will be on soon with an stx. K6DEY is in Honolulu for good now, working for KNN.


PHILIPPINES — SCM, M. L. Felixandro, K1AU — This report came by radio via K6CC, K1HR and W6EEO — K1AU is on most every night. K1HR uses two fifties in parallel on both sides of cycle. N1BD is a new station at Camp Nichols. K1AEF the old reliable at Ft. Mills has a sked with W6AOW and works good traffic. K1CM has a new op — Gised went back to States taking the transmitter from K1BG with him. K1INC is still fiddling around, looking for something he can't find. Hi, K1AU is of the air entirely. K1HR in between time. Everybody is working on the radio school, they put the station out of commission. K1BG is taking a vacation in Baguio. K6PIL is still on. K1PW gets out with a bang. K6AA is closed for two years until M.T. turns him out with a R.E. degree. K1JR is more
active lately. KICY has daily links with W6FM, K1FL is a new ham with a 210 and good prospects for improvement.

Traffic: KLHR 691.

EAST BAY — SCM, J. W. Fries, W6CZ — The summer doldrums are beginning to be felt. Hams of the section are beginning to desert their transmitters and receivers for the blandishments of the beaches, the forests, and those other local points of vacation since the heavy work of W6CTX and associated operators at the Boy Scout Merit Badge Exposition at the Oakland Auditorium, a good traffic total was run up. In addition a number of the fellows made the BBE tour through the counties. Station W6DUI operated by Bill Dukfe and his interests was a real kick. Burks and MacClara, two very prominent here in this part of the state, had a fun day out in W6DUI's shack. W6DUI was the first of the two operators. Bill Dukfe was second a very good ham indeed. W6AC has evidently given up in disgust and decided to wait until the power level season is over. Hi. W6DPE has mastered crystal grinding at last and is now seriously engaged in building his second crystal layout. Now that W6PWF is knocking receivers off the table our old friend the new crystal rig, why not a little traffic report, Jack? (Owing to W6DZQ having moved, his totals run far below last month, W6DHF reports. Keep it up, OM. W6HEI also joins us for the first time this month. W6DSS says 14,000 is the money for DX. All ORE exceptions are those whose numbers are 4020 or over are now being cancelled. If at any time any of the former OREs want to resume activities, they shall be glad to issue them another certificate.) W6DZQ is rebuilding into MOPA outfit and seems quite optimistic about the outcome. W6WN is now swinging into the RM job with full force, and is attempting to bring all the delinquents into the fold. W6WB was fairly successful on 14,000, working four Frenchies and two Englishmen. W6DNN is rebuilding and expects to have the power up and a good signal. W6KJ is too busy with domestic affairs to handle any traffic. W6CYP is now a traveling salesmen so doesn't get on much but has a nice crystal job ready to use. W6KJ still has one more DX to go through and then tearing them down and is keenly interested in the higher frequencies. The third tri-section hamfest is to be held in the latter part of June or the first part of July. It will be sponsored by the Associated Radio Amateurs of S.F., assisted by the S.R.C.C. in all respects.


WASHINGTON — SCM, Russ Shorten, W6BWS — W6EU plans to resume traffic schedules soon with a 20U4A, W6BFP reports a visit from W6DTH, W6DOE, and W6CLR. He is on 14,000, now, W6DWS wishes that KO-222 would QSL. He needs the card for his WAC. W6AIC says push-pull circuits are best. He makes the 350 to deliveries. W6BIP reports his new master oscillator with the two UX52s is working to his satisfaction. W6DUI reports good DX on 14,000. W6FCD sold his UX210 transmitter and is getting on again with a couple of 20U4A tubes. W6DUL is still lamenting the fact that he has no power and he threatens to get on the air with a UX52S about July 15th. W6QDA has finished his new shack and is going to have the new W6BSY TPTQ working by June 1st. W6CRA is planning to move from another location to a larger building in Phoenix and is on the air using the transmitter he purchased from W6FEC. W6CWG is another new fellow who has been doing BCL service work. W6DIP has returned from a YUG to Hartley and sure has a nice signal with much better note. W6ANO is one of those sweet voiced broadcast announcers.


SANTA CLARA VALLEY — SCM, F. J. Quenou, W6NQ — W6AM came back strong this month to handle 401 messages which should place him near the top of the PBL, W6RNE reports a crop of new ops materializing in Modesto — which is good news, this includes a YL, W6BY Y is an American demonstration. W6EY is on about fifteen messages per day, but power is very weak and he is seeing a lot of QRs, especially on 14,000. W6BIW is having a lot of power and is getting on again with a couple of 20U4A tubes. W6DUS is still lamenting the fact that he has no power and he threatens to get on the air with a UX52S about July 15th. W6QDA has finished his new shack and is going to have the new W6BSY TPTQ working by June 1st. W6CRA is planning to move from another location to a larger building in Phoenix and is on the air using the transmitter he purchased from W6FEC. W6CWG is another new fellow who has been doing BCL service work. W6DIP has returned from a YUG to Hartley and sure has a nice signal with much better note. W6ANO is one of those sweet voiced broadcast announcers.

attending Carnegie Tech, but will be in Huntington during vacation. Ex-WSCZE makes a trip through Fairmont about every two months and stops off for a visit. WSCAZ has his fifty watter in working order again with a chem. rectifier and has been working a number of stations on 3500. W9OK can be heard on the air, W9RF has a 710 watt Ultradite for 28 mc, W9RAM has an 852 and bought a new Ford. The acting SCM would like all in the San Diego Section to send in reports. Several of the gang here are in favor of starting a club. What do you say, gang? Let's get together and start the club rolling.


NORTH CAROLINA — WAZD had rather rough luck; a storm blew up and brought a 50 bottle down. Our ARRL club officers say that they are OK now. W4TS says that a Zeppelin antenna overcame bad location when all other types, powers, etc., failed. W4OC received a leather skin from QFPM. He has worked all continents now. W4AEW says QRM is very bad and is going to work on 14 mc. This summer to keep away from it. He reports two new hams coming on soon. W4AGH received some silk handkerchiefs from one party for delivering a message for them. W4TN says college QRM will be here soon and he hopes to hang on some more messages.


ROCKY MOUNTAIN DIVISION

COLORADO — SCM, C. R. Steedman, W3CAA — The Radio Inspector paid another visit to Denver, with the result that there are a number of new first-class ham tickets in town as well as higher classes. W3CAA has gone back to a 210 tube, just to see what it's like. W3BAM is going to rebuild and increase to a 30-watter. W3OKS got an amateur extra first ticket. W3CAA's father got him a ham first ticket, and will be on the air some. W3CCM is off with a short MG set. W3RBC, W3DGJ, W3BNJ and W3CNM are all ready to do more work. W3GQY and W3QNO are a couple of extra tickets. W3FXX reported by radio this month. He is out in the country and has to use a Ford coil to get high voltage, no power being available. W3CBE paid a visit to the Denver Club. W3DQG says he is still off until he can get some receiving tubes. W3CNJ is busy now. W6BDY is moving from Brash to Greeley. Two other hams at Greeley will be on as soon as they can get their station licenses. W4EBE-W3FSC is going full blast on 3500 ke. W9DLM is leaving the state, heading for California. W3BEC just purchased a push-pull outfit, but says it's not much different than the other.

Traffic: W3CAA 18, W3FSC 16, W3CDE 5, W3FXW 2, W3CSR 6, W3EAM 42.

UTAH-WYOMING — SCM, P. N. James, W8BJ — Now that the summer is getting QSA, the fellows are beginning to QSY to 14 mc. The traffic totals should be good this summer, now that all the school QRM is over. W8BTX turned in another fine report this month. He was all set to make the BPL again, but he had to cancel all those on account of school work. W8BJ finds that his new mercury arc is the only thing for a good power supply. W8DXM has moved down to 14 mc and thinks that band is very FB. W8DFV has had a hard time trying to scan up to 14 mc. W8CNX has a new transmitter, two UX82 in push-pull circuit with mercury arc and a repp antenna. W8EFK was bothered with school QRM so was W8DPO. W8DYE just returned from a vacation trip to Portland, Ore. He will be on regularly now. W8DVS has been here.


SOUTHEASTERN DIVISION

GEORGIA-SOUTH CAROLINA-CUBA-ISLE OF PINES — SCM, J. G. Cobble, W8RM — They will appreciate reports from all divisions of this Section, W4KY heads the list of traffic. FB, OM, keep it up.

Traffic: W8RM 102, W8JF 84, W8BLX 8, W8LSW 5, W8RBN 1, W8NX 3.

SAN DIEGO — Acting SCM, H. A. Ambler, W6ECP — W6A6I leads this month and is getting skeds lined up for through traffic east. FB, OM, W6DPSN got several messages from the radio display, W6FEP is on the air, and W6GEP had a new call 1 in La November QST, and bad FB QSO with Malay States. W6EPZ blew up power transformer but expects to be on again soon. W6EC still holds sked with KIPW and N4F, W6FEP says he is going in for panic handling. W6CMB has 7½ watt Ultradite for 28 mc, W6RAM has an 852 and bought a new Ford. The acting SCM would like all in the San Diego Section to send in reports. Several of the gang here are in favor of starting a club. What do you say, gang? Let's get together and start the club rolling.


VIRGINIA — SCM, J. F. Woehlfort, W3CA — The report this month is rather slim and the SCM wants to again warn the ORS that unless reports are received promptly and every month, the ORS will be canceled. W9NSM during the last month worked on two regular schedules that work every day with good QSO and two others that work every day except Sunday. W3KR has two regular skeds and says W3AG and himself would like to see W3AG, an SCM, work W3BZ. W3AG has three regular schedules working W1MK, W3CMP and W3ZZ. W3ZA is using MOPA circuit for his phone and likes it fine, W3CKL blew his two fifties that were used in self-excited circuits and is back now with 210 tubes.


WEST VIRGINIA — SCM, F. D. Reynolds, W3VZ — What do you think about trying a little party some night on 3500 ke, and including all stations in the State? I am going to try to work many of our own gang and would like to get some real work up there. Would you like to try it some night, say some Monday night after the Army-Airmen have finished their work and could join us? I believe we could air up about twelve or fifteen stations in various parts of the state which would represent the following cities: Huntington, Wheeling, Hinton, Mannington, Fairmont, Charleston, Parkersburg, Charles Town and Clarksburg. If you fellows really think you could drop me a line with your suggestions on it. Let's have a word from you. Ex-5L1 boasts the call W8ATZ now and has applied for ORS appointment. There's a new man among us, W8ASB in Charleston, who showed up with his other outfit, and says he is an old WU'op and pre-war ham. W8CAY was responsible for West Virginia's message getting to Pres. Hoover. W8CQ is trying to get a new phone. W8CDY said he was on several nights during the past month and handled a few messages. W8SD reported being on 3500 most every night and every Mon., night at 6:30 when he has a schedule with W8OKX. W8CLO is trying to get his phone on his UX210 and says that most of the fellows give him good reports. W8BPFU and W8VZ are sending their time dipping out crystal control cite for W8MMN. W8DDN still sticks to married life which accounts for his not being on the air so much lately. We heard W8T7 on 7000 ke. about a week ago. W8BQ is still playing with his UX210 and has made one or two skeds and seems on 7000 ke. W8DCM has a fifty watter now in place of his old 1 kw. W8ALQ continues to work good DX with his 250 watter. W8RK brought a class from the Physics Dept., at WVU down to see the BC plant the other day. He hasn't touched a key for about six weeks but2 will build another as 852 ret. W8ASG is trying to get along with YLs and ham radio at the same time. W8BDP hooked up with England, France, Spain, Brazil, Tunisia-Africa, and several ships. W8APN now sports the two letter call, W8WJ and works well. He lost his two UX281's and is now digging out Mason jars. W8HEP is being heard quite often on phone. W8MDN says it will be some time before he gets on the air again regularly. W8BHJ has his mind on fishing these days! W8ATC is
R9. During last month he was QSO Ireland, France, England, Denmark, Spain, Germany and the Canary Islands.


ALABAMA — SCM, S. J. Bayne, W4AAQ — W4AJM has arranged several good schedules. W4AHZ has played bridge consistently this month, W4JW now operates from 10 p.m. until W1AAH reports much business QRM, W1WS, ex5AC of Mobile, is now on and doing nice work in Birmingham. W4AX says a company of marines furnishes him with plenty of traffic from Nicaragua. W4AJY’s noisy receiver has been the source of much trouble to say nothing of plenty of QRM. W4AJY is experimenting with tone. W4AII is working a 210 while waiting for a 304A. W4JIC has a XL operator, who is none other than Joe’s sister. W4AVU took a message for W6HSM from X7W7FF in the Indian Ocean and delivered it in less than five hours. Nice work. W4AG retains its place in the BPL. They lose five ops through graduation but we hope these will carry on among themselves. W4AHQ has a xmitter on 14 mc. for DX now. W4AKM is a new reporter. Welcome, OM. The shack of W4TT, W4TH and W4F were recently entered by some sneak-thief and their losses were heavy. The police have been working on the case and it is hoped that the culprit will soon be brought to justice. Please report any information you may secure. W4LT has moved to 7000 kc. for W4WVI and W4WVII is in a new location. W4AII returns to Selma this month where he and W4TT will combine efforts. Four of the Montgomery gang recently visited the Auburndale. A fine time was had by all (combining W4AC’s words for W4AUQ). W4WVI and W4TT have many schedules to earn a berth in the BPL. W4AHQ is suspicious of his soap rectifier. W4AJJ says he’s getting out better than ever. W4AAK has rebuilt his High C Hartley. W4MR is busy with W4FI but manages to be heard often. W4AAQ worked thirteen countries this month, having been on daily. W4AIEX excavated his old 203A and has again put it into action.


FLORIDA — SCM, Harvey Chain, W4AIH — W4AJJ is back on the air again with a UX210 and “TV” eliminator. W4AF is a new ORS and QRS, and he sure is handling the traffic. He is installing a 270 watt set. W4IIC is now about six miles from town. W4CJ is on 14 mc. most of the time. W4AAS is now stationed in Porto Rico in the airplane sector with schedule to W1EF. Yellow Knight twice a day on two trips to Cuba, handling all of her traffic in both ways. W4D0Z worked a VK and two KGs. He says that the early morning is better for DX and traffic than night. W4DU is using a 204A, W4O3B expects to be on the air very soon. W4D0Z has been busy building a station and cleaning up the for the North. W4NE worked three continents in two nights. He has just been elected vice president of the Miami Radio Club. W4CCE handled a rush message from the Virgin Islands to Birmingham, Ala. W4UW is a very busy fellow. W4ZP keeps skeds with W4AIH, W4CT and W4UW. W4AIK has given up using a chemical rectifier. W4B8T has moved from Lebanon, Fla., to Indianapolis. W4SO is working on 14 mc. W4IX is on the air at WORF, with W4ABL at the key most of the time. W4AGN is training a 7T baby at present. W4GD got married. W4AAB is keeping seven skeds, four are with foreigners. W4AFS built a MOPA. W4AFC is a married man now. W4AR and W4AFS have combined now as one station. W4ACQ is a station of the A.A. net. He QSO’ed W4PI in St. Augustine, Fla., and exchanged messages and got W4PI a job with the Pan-American Air-Ways. W4PAO is a portable call of W4AGY. W4CT makes BPL this month and reports via radio.


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ONTARIO — SCM, E. C. Thompson, VE3FC — Southern Dist: All resources have been turned to discovering the why and where of Zepho, VE3KB and VE3CS are both doing good work with 7000 kc. fundamental. VE3AQ is back on 14,000 kc. again. VE3AQ reports another Ontario club in action — the Southern Ontario Radio Association, with VE3RY President, VE3BG Vice-President, and VE3AU Secretary-Treasurer, and the club boasts 12 members to date. FB, OM, keep up the good work. Central Dist.: VE3AL heads the traffic list with a good total. A 3900 kc. schedule accounts for most of it, we believe. VE3RC will not be heard from again until Fall, as he is off to Northern Ontario on exploration, VE3BP has been working many regulars of late and has worked up some good DX as well as some traffic on 14,000 and 7000 kc. VE3CL has been playing with his receiver but still he’s not entirely satisfied. VE3XJ has gone and got married, but still he’s aware that amateur radio is not doomed for him. VE3VS is on the air with a vengeance, using a VE2XG as oscillator on 14,000 and 7000 kc. VE3AL was a portable station established for a week at the Toronto Home and Garden Exhibition. 20 kc., was used exclusively and a good deal of traffic handled. VE3FC has been keeping a schedule nightly with VE2BT at Rouyn, Que., and some good traffic delivered has been the result. VE3CG is now located at Hydro, Northern Ontario, on the Nipigon River. VE3BP is on the air again. Northern Dist.: VE3ET is away from home a large part of the time but nevertheless heard a station in Turkey. He, and the owners of VE3AR and VE3BH all passed their radio operators’ examinations OK and are all happy.

MARITIME — Acting SCM, A. M. Crowell, VE1DQ — The operators of VE1CA formerly of VE1AC wish to tender to amateurs a vote of thanks for their cooperation in handling messages from this station. VE1DQ expects to be on the air again by the time this is in print and some intensive reorganization work will be done.

ALBERTA — SCM, E. J. Taylor, VE4HA — The good DX weather has had some effect on message totals, although VE4CC leads the gang this month with a good showing. VE4AF is still getting good DX. VE4GD is sure getting out FB. Mr. and Mrs. VE4EI sure do FB, both with message total and DX. VE4AF gets out with a 2JO. VE4AH and VE4AG are on as usual and doing FB. VE4RA is after a DC note. The hams in Calgary have oil fever. VE4EY is on regularly but likes 14,000 band the best. VE4HH and VE4GT are out of town most of the time. VE4AR expects to be on again soon.

SASKATCHEWAN — SCM, W. J. Pickering, VE4FC — The Regina District Radio Assn. is holding a convention during the Regina Exhibition week, August 2nd, and are having a booth equipped with a 250 watt M.O.P.A., affair to handle traffic during fair week. As many of the gang as possible should try to be there, as there will be prizes for code work, good speakers and an opportunity to pound brass on the big set. VE4GO leads those reporting traffic this month and has been QSO VE2TW, VE4HG and VE6YQ who have sent him good reports. VE4Rh reports very little activity down his way owing to this being his busy season. VE4GR says that traffic is scarce at his station. VE4FC has been on the sick list and therefore not on the air.

Traffic: VE4AC 16, VE2B 31, VE2BB 64, VE4AL 21, VEAE 21, VE2BG 9.

LATE AND ADDITIONAL INFORMATION

W2SZ handled quite a bunch of traffic during an exposition at R. P. I. WICAG will be glad to arrange skeds with anyone. W6CBW makes the BPL with 56 deliveries, so that brings up the number of stations making the BPL for L. A. to seven. W6FAT has fast traffic skeds to north and east. W6FBI applies for an ORS. W6CTX handled quite a few exposition messages. W6CMD mailed W0EYE’S report so that is the reason for his being listed here.

Conducted by A. L. Budlong

Although full details of the Prague Radio Conference are still to be obtained, it would appear now that the conference dealt principally with broadcast matters, and gave little or no attention to other services.

As far as the amateur was concerned, the conference seemed to have adopted resolutions that each country should publish call lists of its amateurs, when and if they are officially licensed; and also that the regulations governing amateurs should be forwarded to a central bureau so that countries desiring to institute amateur licensing could have something to guide them.

Little if anything seems to have been done about the Dutch proposals for uniform amateur bands and regulations for Europe. We think this somewhat unfortunate, as the Dutch proposals, in the main, were very excellent indeed, and at least gave a good starting point.

It is probable, however, that the amateur question will be taken up again, and in detail this time. at the Hague Conference scheduled to take place this fall. The scope of the Hague Conference will be much greater, of course. Preliminary indications point to an active investigation into amateur matters, with some effort being made for a "standardized" type of amateur license. How far this can be carried throughout the world is problematical. It is quite possible that it will have considerable backing in Europe, however.

I.A.R.U. Headquarters urges amateurs everywhere to take steps now to find out what their individual government's intentions are with respect to the amateur question at the Hague meeting. In particular, the various national societies now constituting the Union membership are urged to get in touch with their officials. Preparedness is at least half of the battle, and it may save much trouble later.

HELP!

Have you noticed that foreign station photographs have been rather scarce in this column lately? The reason is that the compiler of this column hasn't been receiving any. He wants to take this opportunity to solicit them from our foreign readers. This is no idle request. 0Ms. Photographs of many of the internationally known stations are always interesting. Send in your. The photographs should be clear and sharp, but need not be unusually large. A few details of the outfit, antenna, etc., will make sufficient description to run underneath the photograph.

We also want photographs of foreign conventions, hamfests, etc. These make highly interesting material, and enable us to see what the other fellow looks like.

A NEW FEATURE

We want to make this department as interesting and useful as possible, and are always glad to receive suggestions along this line.

WSCZ has made an excellent suggestion. He hints that great numbers of amateurs would be interested in a table which showed the best times to work foreign DX. For instance, what is the best time for QSO between Europe and the Eastern part of the United States; the best time for United States-South African (500-700 A.M., E.S.T.) is the most favorable time, if some reports of Chinese and Japanese stations. The compiler of this column thinks that from 1000 to 1200 GMT (500-700 A.M., E.S.T.) is the most favorable time. If you want such information, let us know, and then help supply it by writing us your own experiences with foreign DX, so that we can arrive at some conclusion as to the best average time.

CORRECTION

In the May I.A.R.U. column, we stated that Dutch amateurs could be proud of the work that their society had accomplished in getting such excellent proposals from the Dutch government on amateur matters, but very unfortu-
nately we gave the wrong initials in referring to the society. This error is regretted, and for the information of readers of this column we would state that the I.A.R.U. Section for Holland (and the only real amateur society in Holland) is the Nederlandse Vereeniging voor International Radioamateurisme, or the N.V.I.R.

AUSTRALIA

By the Wireless Institute of Australia

During the past twelve months two amateur bodies have been in existence in most of the States of the Commonwealth representing radio amateur interests, namely the W.I.A. and, later, the Australian Radio Transmitters' League, but such a state of affairs could not, of course, continue for very long. After a considerable amount of negotiation, during which the spirit which permeates the amateur movement everywhere prevailed, a successful agreement was reached between the Federal Executives of the two societies, and an amalgamation is now almost complete. Owing to the widely differing conditions which operate in each State, the various divisions had perforce to work out their own difficulties, which have either been successfully overcome or, as in the case of West Australia, are still the subject of amicable negotiations. The net result is that the W.I.A. is now the sole representative of amateur interests in this country with a wide-awake division in each State. The amalgamation has greatly increased our prestige with the public and official radio, with which Department we are in full cooperation in the administration of the radio telegraph regulations.

Tests: The 10-meter test with the R.S.G.B. is at present occupying the attention of the high-frequency men in an endeavor to establish contact, but up to the time of writing nothing has been heard of the G's in Australia on the 28-megacycle band.

The Second District (New South Wales Division) conducted a contact competition on the 3500- to 4000-ke. band between March 31st and April 14th, prizes being awarded for the greatest number of contacts made with stations outside the State.

A similar test has just been concluded in the Fifth District (South Australia) and a third is in progress in the Third District (Victoria), the arrangement of the contests being similar in each Division. Points are allotted for every contact made in any one day with stations outside of Victoria on the following basis: European contacts gain 10 points; U. S. A., North and South America, 8 points; New Zealand, 1 point; Western Australia, 3 points; and New South Wales, Queensland and South Australia and Tasmania, 2 points.

Second and Third Districts have been conducting Technical Instruction classes in the capital cities, for which a fee is charged to reimburse the lecturers, with the idea of training new operators. The scheme is meeting with very considerable success and has had the effect of encouraging a good number of B.C.L.'s to take an active interest in the amateur game.

The formation of a section of the Institute to investigate aeronautical radio communication is in progress in two States, Victoria and New South Wales, and a committee consisting of members of the Institute and the local Aero clubs is now working on the details. Experiments will be undertaken in which members will install transmitting and receiving equipment in planes made available by the club.

The organization of the Air Force Communications Reserve in this country is being gradually completed and the first maneuver took place in April, when the local squadron, including the Federal President, H. K. Love, VK3BM, went into annual training.

The efficiency of the scheme was amply demonstrated recently through a serious accident in which the Chief of Signals to the Air Force was, strangely enough, concerned. VK3JK, J. K. Herd, whose station happens to be located at the scene of the crash, was instructed to report and was instrumental in establishing communication with the plane's headquarters.

A considerable amount of activity on phone is being experienced on the 50-meter band between 4000 and 3750 kc. between States and New Zealand and good results are being obtained.
especially between the 3rd and 7th Districts (Victoria and Tasmania).

**BRITISH NOTES**

*By J. Claricoats, GO6CL*

On the 7-mc. band it was noted that fade-out occurred around 2100 G.M.T. on some evenings, but on most occasions all Europe could be heard from daybreak until midnight. American stations were again weak, whilst Asiatic Russia was not so easy to work as during March. The number of raw a.e. stations is decreasing, but the band is becoming badly jammed by commercials and high-power broadcasters. A large percentage of stations is still working off-wave and Russia continues to use illegal call signs.

The 14-mc. band has been excellent. Many more of our low-power men have W.A.C. certificates. Considering that the majority of our active transmitters use powers not exceeding 20 watts, their performances are remarkable, because most of the stations they work employ powers up to 100 watts.

On the 28-mc. band little new work has been accomplished. During the period of the R.S.G.B. tests, conditions were very bad, and only a few British stations made contacts. We hope to receive reports from our many friends overseas who listened during the test periods.

Commencing May 1st, R.S.G.B. will arrange to distribute all QSL cards sent to them whether for R.S.G.B. members or not. We would emphasize that R.S.G.B. is the only official amateur organization in Great Britain. The present membership exceeds 1400, representing almost all the active transmitters in the country. New members are always welcome and full particulars can be obtained from the Hon. Secretary, 53 Victoria St., London, S.W. 1. A free copy of the Society's monthly publication, the *T. & R. Bulletin*, will be sent to all interested amateurs who write to the above address.

**DANISH REPORT**

*By Helmer Petersen, OZ7S*

Conditions have been fairly good during the last few weeks.

On the 3500-ke. band we have heard no foreign amateurs, but connections with Danish amateurs could be established during the whole day and night.

On the 7000-ke. band conditions have been good, but QRN was horrible at times. For DX work this band won't do, as QRM makes every QSO impossible. Foreign stations heard on this band have been W, AG and FM.

The 14,000-ke. band has been excellent during the month, and best working hours seem to be from 0600 to 1800 G.M.T. During the day most of Europe is heard with good strength, and during the afternoon, some U. S. A. districts. Later in the afternoon Australia, Dutch Indies, Asiatic countries, North and South Africa and Virgin Islands come in. After 1900 G.M.T. most strengths decreased, although VK and ZL were heard several times QSA2-3. QRM is increasing on the band, and worst about 0900 G.M.T. Very often the band seems to be quite dead, but a few CQ's will raise quite a few stations. Many Danish amateurs have got all continents on this band during the last few days.

On the 28-mc. band nothing has been heard, although many receiving stations are working in this territory. Only harmonics from commercial stations were heard, and it seems as if Denmark is very badly placed for the U. S. A. on this band.

**FRENCH NOTES**

*From the R. E. F.*

French amateurs are very much concerned over the QRM situation on the 7000-ke. band, finding it almost impossible to do any DX work there. It has decided to conduct an active campaign against poor notes, raw a.e., etc., and in addition has proposed that the various amateur bands be utilized as follows:

- **160 m.** — Telegraphy and telephony. No restrictions.
- **80 m.** — Principally for continental traffic. Telegraphy and telephony.
- **40 m.** — Telegraphy only.
- **Continental work during the day, but not at night, when being reserved for DX alone.**
- **20 m.** — Telegraphy only. DX band.
- **10 m.** — Telegraphy only. DX band.
- **5 m.** — No restrictions.

The R.E.F. recommends that this proposal be given serious study, as without such plan it will be almost impossible to conduct any DX QSO on 7000 ke. (The editor wishes to point out that this system is almost exactly that now in existence in the United States. — A. L. B.)

28-mc. work has been excellent in France recently. R8CT made the first France-Finland QSO in this band with OH2NM, and F11B, a member of the R.E.F. in Indo-China, heard a Brazilian, PY11B.

**HOLLAND**

No Dutch report is available this month, but at the request of Mr. W. Keeman, the Traffic Manager of the N.V.I.R., we would advise all readers of this department that the address of the card-forwarding bureau for Holland has been changed, and is now as follows:

- Bouwman,
- Voorschoten,
- Holland.

*(Continued on page 78)*
**Correspondence**

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

---

**Justifiable Complaint**

Indianapolis, Ind.

Editor, QST:

I have been holding my steam for a long time, and now it's time to let out a yelp.

When January 1st rolled around, things on 40 meters -- I beg your pardon, 7000-ke. -- seemed reasonably rosy, with most of the stations having notes which could be called "D.C." and the rest having smooth r.a.c., thanks to Ross Hull's articles in QST.

Now, however, things have changed. Apparently the fellows with self-excited sets have found that they can tune up the rig, using 1928 methods, and still raise fellows. Of course they can since their waves cover thirty or forty kiloevolts, and are so easily tuned in. Ten of this kind of men with such stations will more than fill our 7000-ke. band, and needless to say, there are more than ten power-leak notes there, by a whale of a lot.

The result is that those having 1929 equipment are QRM'd on all sides unnecessarily, by selfish individuals whose enthusiasm varies directly as their antenna current. There is not the slightest excuse for an a.c. or poorly rectified note in any of our three popular bands, unless crystal control is used with d.c. on the oscillator. No real note should be much broader than 10 ke. regardless of plate supply, and if well-rectified a.c. is used, with pure d.c. on the oscillator, the note almost invariably becomes pure d.c.

In my own case, if I substitute a self-excited 1928 type oscillator for the crystal oscillator, the note sounds terrible, but when the crystal is returned, the note becomes p.d.e. again.

Next! There are still far too many hams who let their frequency slip above WEM, which is 100 ke. outside our band. Hams have been heard lately who were on about 7800 ke. They can hardly expect to work unmoleseted in another's territory. Something will happen when the Navy and Commericals get mad enough, and the amateurs as a whole will get the blame for something that only a few are guilty of.

--- Curtis C. Springer, W9EMR

---

**A New Angle**

Baldwin, Kans.

Editor, QST:

I am writing this letter in response to the numerous articles appearing in QST razzing the tones. A majority of the authors of these letters are BCL's or c.w. men, who as a rule, don't know their "10 per" about tones.

A tone transmitter as a rule is affected by weather conditions, and is more difficult to adjust than a.c. set, because the right amount of grid bias and having the transmitter adjusted too close to the "peak" are to be contended with.

Receiving sets are not all made to work on tone, so please don't accuse the tone of having rotten modulation when it is all in your receiver. Now c.w. men, why do you delight in bringing yourselves in the 3500 ke. tone band? Why can't you men let the tones have a band or two? You have five of them, so why be such a hog and take all of them, including the one for tones?

The tone man's QSO is not any sillier than the c.w.'s QSO. You can't prove it, can you? If you think that you can, I wish that you would try it.

I own and operate W9GHI on 3500-ke. tone and 3500- ke., 7000- and 14,000-ke. c.w. and have worked all districts. The Ninth District has more tones than, and as good modulation as, any other district.

--- Karlton Marquardt

---

**One for You and One for Me**

Los Angeles, Calif.

Editor, QST:

In reading the last few issues of QST I have noted with interest the various articles as to splitting the 7000-ke. band into two sections. This, I believe when it comes to DX, would be the answer to our troubles. Handling traffic at night on 7000 ke. is almost nigh unto impossible; so as far as DX is concerned 7000 ke. is the thing.

There is, of course, the trouble of keeping everybody where he belongs. Our licenses state that we are licensed to operate on frequencies between 7000 ke. and 7300 ke. and with the band divided it would be a verbal agreement for the W stations to take one half or more of this territory and put the rest of the world on the other. That is where Old Man Trouble sticks his head in. How are we going to make the fellows keep out of that territory which is set aside for non-W and VE stations? All stations have a perfect right to operate on any frequency between 7000 ke. and 7300 ke. and it would be entirely wrong to ostracize anyone for such an offense, if I might call it that.

However, with a little cooperation from the gang and with the A.R.R.L. back of it, the seem-
"Here at last is The Book that we of the Radio profession have needed for a long time. It is the best and most complete handbook ever published" says J. H. Bloomenthal, Chief Radio Operator, U. S. S. B. Steamship "East Side".

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The I.C.W. Racket

Editor, QST:

Having read the correspondence in the May issue of QST and as I'm no great lover of the i.e.w. sig., I think I'll speak my piece.

It may be all O.K. for a fellow (to use i.e.w., spark) are or any other piece of junk to cause QRM if he's in some unknown, or undiscovered continent or even another planet where radio is not, but when it comes to using it here I think he ought to be shot and buried before he gets out far with it. It's nice to turn on your receiver and listen to a guy near you using i.e.w., isn't it? The guy may like the sound of it but I think a lot of the fellows would rather have this guy hear the sound of the bells calling him into the world beyond. The hams who use a.c. are bad enough but it looks to me as if the guy with an i.e.w. note wants to give him a little competition. Well, I'll admit that he's got the fellow with a.c. beaten ten ways for raising a racket all over the band. This bird doesn't seem to care what he's doing to the ether as long as he can work someone. Doesn't he know the bands have been cut down, especially the 7-mc. band? Or does he know that and think that there's plenty of room and it won't matter if he monkey's with it? So fellows, let's get the idea of making QRM off our mind. What do you say?

Hoping to hear less i.e.w. notes,

— Chris, Noxon, WSQP

Variety

Editor, QST:

Something has to be done about this animule Microfarad. What we need is two new names—one for Microfarad and another for Micro-Microfarad: so much different that they cannot be confused even by the girls which work in the "3 and 10." Picofarad is taboo — there might be ladies present which understand Spanish. Furthermore and likewise, it is only one letter different in writing and less than that phonetically.

We have got any number of pioneers in our gang from Hyram down to me whose names deserve to go down in history. QP, MIX, HAT, SK, DON and others galore. But we must call them something pretty soon as you will see later. When I get down to the Zero Ray Emitter I'll tell you all about it. Just at present my latest
KEEPING TABS ON THE FIRE DEMON

A RADIO STATION IN THE WILDERNESS

This picture shows the forest camp at Red Lake, Ontario, Canada, which is one of the nine places in that district where short-wave radio stations have been installed to keep airplanes and forest rangers in the vicinity in touch with headquarters. The radio shack is in the building next to the tower, the latter being used to dry hose after a forest fire. The call letters of the station are VE9RD.

Photo courtesy Radio Broadcast

BEFORE the wilderness Radio Station became a part of the Canadian forest service, millions of acres of forest land were sacrificed to the Fire Demon because of lack or failure of quick methods of communication.

CARDWELL CONDENSERS will be found in many such lonely stations as the one pictured above, depended upon the year through to secure help for the vigilant rangers and to warn against approaching fire.

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1711 Park St. Hartford, Conn.

set tunes by a capacity changing from .19 micro-microfarads to .18 micro-microfarads. Or maybe it’s centimeters.

Well, while tinkering up my T-2 with a larger choke and smaller grid condenser so it would oscillate without dumping a whole flock of power lines into the filament, me and My Shadow (2nd Op) fell into an argument on this devastating subject and I thought I would wind up by saying “Well, call it anything,” “Alright,” sez, “We’ll call it Anything.” About two minutes later I dropped a barb and crawled under the table after it and the dermed fool repeated his statement. I crawled out with the missing article and said very emphatically “Ain’t that just what I said?” He almost laughed his fool head off at something he thought was funny. It was plain to be seen he was ugly.

“A-N-Y-T-H-I-N-G” sez. “Yep, you ain’t forgot how,” sez, and he fell a laughing again. I retched the Woohoo down and soaked him just once. Half an hour later he begin breathing and I blew some “five brothers” in his face and he went to sleep again. Too many brothers.

A strange little creature appeared from nowhere, touching My Shadow on the brow and I was alone in the shack: but before the state gets me I want to straighten this matter out to prevent other murders.

What thinkest thou? Shall we worry away with these clumsy terms forever when the day of Zero Rays and Negative Radiation is just around the corner and micro-microdons will be as common as High C Circuits are today?

Please name these monsters before my execution.

— Clarence Geron

Service Its Own Reward

Pierre, S. D.

Editor, QST:

As the beneficiary of an inestimable service recently rendered by two amateur radio stations, one in California — W6AVJ, operated by Mr. Melvin S. Wood, at Gardena, and the other located in this city and operated by Mr. John Berg, Jr., W9DWN — I would like to publicly express my appreciation, through the columns of your magazine, QST, if that is permissible, of the efforts of these gentlemen in establishing communication between those caring for my younger daughter during a very serious illness and myself, to our mutual relief and satisfaction.

At the suggestion of a friend, with whom my daughter was staying, Mr. Wood endeavored for several days to get into touch with me through a South Dakota station, which was successfully accomplished on the evening of March 26th, when Mr. Berg, almost by accident, picked up the California station and enabled me to exchange several messages regarding my daughter’s condition, much to our delight and satisfaction.

Since that date, through the courtesy and generosity of Mr. Wood and Mr. Berg, I have
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The large K. H. lamp 4 1/2 inches high -- contains 144-inch plate.
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**F E A T U R I N G**

3 new items — Leeds Radio Lab. — others to follow in future issues. This department under the supervision of the Short Wave Specialist Jerome Gross. We design, construct and advise on any material for the "Ham" Broadcasting station or laboratory. Write Jerry Gross for advice on any of your problems.

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Ideal for the beginner or anyone desiring a transmitter extremely simple to adjust and operate. Will operate with a 201-A tube, with 90 volts on the plate, up to a UX-210, with 60 watts input. Has plug in transmitting coils. List price — kit $55. Completely constructed $70.

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had almost daily reports as to the gradual improvement being made in the patient's condition, and for which words are not adequate to express my gratitude and keen appreciation.

I wish, however, to give my testimony to the value of such worth-while service as has been rendered by these radio amateur operators and so unselfishly performed, to whom I shall be under enduring obligations.

If this is a sample of what other amateurs are doing, they certainly are deserving of the highest commendation and worthy of the greatest consideration.

— E. F. Swartz

So We Be

Denver, Colo.

Editor, QST:

To the outsider getting into high-frequency code transmission, it seems to be a difficult proposition; he is confused by this kind of circuit and that kind of circuit, this kind of tube and that kind of tube, and when he talks to amateurs who are old in the game, he cannot find two who will agree on the kind of antenna to use or get any real definite dope. As a rule, he doesn't know that there is such a magazine as QST from which, with a very little study of its pages, he would be able to determine exactly what he wanted, how to go ahead, and (if he has any mechanical ingenuity) construct his station and get it on the air without burning up a lot of equipment.

For the life of me I cannot see how the amateur can operate his station without a good monitor; it not only gives an idea of what the note sounds like on the air but assists materially in proper sending.

Having had some years of experience as an operator for the Associated Press, I believe that the average amateur does not take sufficient pains with his sending; he is what you would call sloppy, chippy, and a sender of combination. I do not mean this criticism for all amateurs, by any means, but I have heard a lot of them doing as I just said. Particular pains should be given to sending call letters slowly and distinctly even though one's ability to receive them should be unlimited. A good steady call gets the contact.

— H. E. Madison

Why Is a Ham?

Sylvester Ave., Jamaica, N. Y.

Editor, QST:

We first became more or less of a devotee of our sleepless art — wireless telegraphy — through an accident.

One day in class we read the romantic and thrilling account of Jack Binn's heroic work and in the course of the story, our teacher (may she rest in peace) asked for the method used in sending or transmitting the then-used distress signal, "CQD." A boy with a voice like the boom of a dynamic speaker volunteered to do the enlightening. Cupping his hands over his mouth he shouted out the letters of the signal at the top
The rapid development of screen grid tubes and the marketing of screen grid receivers by large radio manufacturers demands a set analyzer for testing screen grid sets.

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Here is an instrument which will enable you to take the slack out of what are usually considered the dull summer months. By making service calls with the Jewell 199 you can build good will with your customers, pick up a nice bit of accessory business, and secure leads to a lot of new set sales. Sold by radio jobbers everywhere.

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of his powerful lungs. Needless to say, there was much and prolonged laughter. In fact, some of the boys who knew how the signal was transmitted, literally and actually fell out of their seats. (For the benefit of the curious, that boy was neither part, parcel, warp nor woof of ours.)

This episode was productive of two things. Firstly, that we were the unhappy hosts to a visitor in the person of our austere and forbidding principal and secondly, perhaps more importantly (?), it made us interested in that very fascinating, slumberless, catless and VE-less art of keeping oneself young, lit and balmy. That, our indulgent and slumbering friends, was in the ancient and glorious days of 1914.

With due diligence, we learned the code, built a magnificent receiving set using a homemade crystal detector and a parloromished 75-ohm 'fone receiver. Shades of our lamented and departed tubes! It worked. Then followed a period of patient listening. At last, success was ours. We had been able to make out the call of NAY. After a while our patience exhausted itself, our interest flagged and naturally radio just QSS-ed (QSC-ed) out of our life.

Many years later when we had grown worldly and wise and safely beyond the voting age, our interest in radio was suddenly rekindled by the bristles of an amateur friend of ours. After much effort on our part together with aid and comfort from our friend we managed to secure the coveted ticket.

Then followed a period of much vexation, perturbation and all the rest of the -tious. We had to build a receiver and transmitter. This latter act was finally accomplished. Thus on the very memorable (?) day of August 28, 1928, another source of bedlam on the 7000-kc, band made its blushingly modest appearance.

Since the arrival of the blue parchment, all has not been smooth sailing. We have built and rebuilt our set so many times that we do so now as a matter of habit! We have put most of our spare time and then some, into this hobby. The inroads made by the purchase of parts has put us on the verge of bankruptcy. We have lost out on sleep to an extent that makes the folks apprehensive over our physical condition. To cap it all, we have lost the girl friend. In return for this, we have derived much satisfaction in holding two-way communication with distant points. Amateur radio has been the means of making many a friendship and, we hope, enduring ones. Most important of all (call it selfish, if you will) we have a hobby which is so absorbingly interesting that when after a wearisome day of office work and school we seat ourselves at the key, all our troubles, cares and worriesments dissipate themselves into the thin air and we are living. Yes, we mean it, we are really and truly enjoying our mundane existence.

— Louis H. Roth
Is There No Limit To What an S-M Receiver Will Do?

Australia to New York on Six Tubes

More and more astounding are the records of long-distance reception with Silver-Marshall screen-grid receivers. First the S-M 710 (Sargent-Rayment Seven) made itself famous as the one set which, in California, could be relied on to bring in Japanese broadcasting stations in any kind of favorable conditions—and often when conditions were otherwise. Later, reports began to be published of reception across the Pacific with the S-M 720 Screen-Grid Six—using only three screen-grid r.f. stages instead of four. Then, in March, came the publication of verified reception in New York City, from 2BL at Sydney, with the 710.

And now the Australia-to-New York record has been duplicated with the 720 Screen-Grid Six.

Not every one, perhaps, has the necessary skill to bring in stations from half way around the globe—but the hard-to-please listener, wherever he may be, soon finds that screen-grid tubes, combined with Silver-Marshall engineering, are the ultimate answer to every demand for superlative radio reception.

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Customer who have taken advantage of the unique franchises granted by Silver-Marshall, Inc., to Authorized S-M Service Stations have found that the building of radio sets and amplifiers from S-M standard parts is a highly profitable as well as an interesting business. If you build professionally, and have not investigated the Service Station proposition, ask about it now. And in any case, do not miss the monthly S-M "RADIO-BUILDER"; every issue contains big news. Use the coupon.

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<thead>
<tr>
<th>S-M No.</th>
<th>Name</th>
<th>Scr-Gr. Tubes</th>
<th>Wired Receiver</th>
<th>Component Parts</th>
<th>Total Cost</th>
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<td>710</td>
<td>Sargent-Rayment</td>
<td>4</td>
<td>$113.40*</td>
<td>$78.84*</td>
<td>49.56</td>
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<td>Screen-Grid Six</td>
<td>3</td>
<td>70.20*</td>
<td>47.07</td>
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<td>42.90*</td>
<td>31.71*</td>
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<td>1</td>
<td>30.00*</td>
<td>22.86*</td>
<td>7.14</td>
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<td>&quot;Round-the-World&quot; Adapter</td>
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<td>740</td>
<td>&quot;Coast-to-Coast&quot; Four</td>
<td>4</td>
<td>50.70*</td>
<td>32.97</td>
<td>17.73</td>
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The New Radio Set Tester

THE radio industry is familiar with the Weston Model 537 Radio Set Tester — for A.C. and D.C. receivers. Service men hailed it with great acclaim a year ago, noting its many advantages over the Weston Model 519 — for D.C. only.

And NOW — here is another great advance — the Weston Model 547 — incorporating many additional features to meet the service testing requirements of radio's latest developments.

But with this NEW SET TESTER radio servicing is still further simplified, even taking into account the number of new tubes, sets and circuits.

Space won't permit description here — nor would words alone do this new set tester justice. You must see it for yourself — operate it — try to think up some service problem it can't solve. Try as you will the Model 547 will give you a quick and accurate answer every time. Convenient — complete — light and rugged. Handsome in appearance — and it will yield you handsome profits. It will increase your business and your prestige. YOU CAN BANK ON IT!

This instrument has many outstanding service features. But first of all it is a Weston — assuring you exquisite workmanship and complete service reliability. It is provided with three instruments — all 3 1/4" diameter and furnished with bakelite cases. Carrying case, removable cover, panel and fittings are also made of sturdy bakelite.

WESTON ELECTRICAL INSTRUMENT CORPORATION
602 Frelinghuysen Ave., Newark, N. J.

I. A. R. U. News

(Continued from page 65)

INDIA

The Government's policy here is to cut down all amateurs to 10 watts or less, input. Exceptions are made in special cases. There are no special restrictions as to (a) type of wave (spark is barred, however), (b) quality of wavemeter, or (c) hours of operation. Operation is allowed on assigned wavelengths in the 7000-, 14,000- and 28,000-ke. bands. Phone or code may be used in all bands. Detailed diagrams and specifications of the set are required occasionally. The assigned prefix for India is VII.

VU2AY, input 30 watts d.c., will be on the air regularly from 1530 to 1730 G.M.T. after the end of July in the 14,000- and 7000-ke. bands only. Occasionally on 14,000 from 0130 to 0330 G.M.T. — H. F. Miller, VU2AY.

JAPAN

From Mr. K. Kasahara, J3DD, a member of the Executive Committee of the J.A.R.L. we learn that the frequency assignments of Japanese stations are being changed. Old assignments were for 7900 ke., but all new licenses are now being issued for 7100 ke., and most of the old stations are expected to change very soon. This means that amateurs looking for Japanese DX should expect to find them on 7100 ke. from now on.

DUTCH EAST INDIES

Last month we chronicled the formation of the N.I.V.I.R.A. as the amateur society for the Dutch East Indies. Almost 100 members are now enrolled, and officers have been elected as follows:

President J. van Holst Pellekaan PK3AN
Vice President A. J. A. Schoevers PK2AJ
Secretary Egb. A. Krygsman PK4AQ
Director Hasselbach PK2AL
Director G. K. H. De Bent PKGBA
Technical Director F. H. E. Oldenboom PK4AR
Technical Director A. J. H. L. Rosenquist PK1JR
Communications Manager Egb. A. Krygsman PK4AQ
Asst. to the C.M. A. J. H. L. Rosenquist PK1JR

As stated previously, all correspondence, and QSL cards for PK stations, should be addressed to Egb. A. Krygsman, Landas Estates, Palembang, Sumatra, D. E. 1.

Our best wishes go to the new organization.

U. S. R.

By W. Vaneff, AU12RA

By the 1st of January, 1929, we had some 500 amateur transmitters, and 1500 registered short-wave receivers, compared to 63 transmitters and 400 receivers a year previous.

Last October the old call system (02RA, 10RA, etc.) was dropped, and the American system adopted, so that the calls now consist of

WESTON INSTRUMENTS
PIONEERS SINCE 1888

Say You Saw It in QST — It Identifies You and Helps QST
Special Offer—
During July and August only

A year’s subscription to QST
(either new or renewed)
and a copy of the fifth edition of the

Radio Amateur’s Handbook
By Handy and Hull
(in its 51st thousand)

$3.00
(foreign countries $3.50)

FOR THOSE WHO DON’T KNOW IT:
The Handbook is a practical manual of amateur radio in all its phases, published by the American Radio Relay League, the amateur’s own organization. It starts at the beginning and tells the whole story: What amateur radio is, How to be a radio amateur, How to obtain your licenses, How to build the simple apparatus of a simple station, How to build the best known apparatus for the most modern station, How to operate the station. Enough information to keep you busy and interested for five years.

FOR THOSE WHO DO KNOW IT:
For years the Handbook has been the practical working guide of successful amateurs the world over. Now it has been completely revised in terms of 1929, by Mr. Handy, the League’s Communication Manager, as to all the aspects of operating procedure, and by Mr. Hull, the director of the League’s current Technical Development Program, as to all its features of apparatus and technical matters. Everything in it is on a 1929 basis, replacing the 1928 methods which used to be good enough but aren’t any more.

MUCH THAT IS NEW — ALL THAT IS GOOD
SPECIAL OFFER A copy of the $1.00 edition of the HANDBOOK; a year’s subscription to QST and a year’s membership in the American Radio Relay League.

ALL FOR THREE DOLLARS! (Foreign countries $3.50)

Note: If you want your copy of the Handbook in stiff buckram binding add $1.00 to your remittance.

Even if you are already a member of the League and a subscriber to QST, you may avail yourself of this offer. Simply mention that fact and instead of entering it as a new subscription we will extend your present subscription for another year, and send a copy of the Handbook at once.

AMERICAN RADIO RELAY LEAGUE
1711 Park Street
Hartford, Connecticut
U.S.A.

DEAR SIRS:
I want to take advantage of your Special Offer and enclose remittance.
I am
am not a member of the League.

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

Say You Saw It in QST — It Identifies You and Helps QST
How to select, operate and care for radio receiving sets —

Practical Radio
Including the Testing of Radio Receiving Sets

New Third Edition
By JAMES A. MOYER, Director of University Extension, Mass., Dept. of Education, and JOHN F. WOSTREL, Instructor in Radio Department of University Extension, Mass., Dept. of Education

376 pages. $3.50 net, 223 illustrations

— what radio is — how a radio set works — how to select, operate and care for radio receiving sets — how to construct your own receiving set — how to select a good speaker — how to select, tree and use vacuum tubes properly — how to locate common troubles — how to remedy them.

See this book FREE

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370 Seventh Avenue
New York, N. Y.

You may send me Moyer and Wostrel's PRACTICAL RADIO, third edition, $2.50 net, postpaid. I will either return the book, postage prepaid, in 10 days, or remit for it at that time.

Name

St. and No.

City

State

Name of Employer

Official Position

(Books on approval in U.S., and Canada only) QST 7-29

3000 V. Recto Bulbs


Complete Parts for Silver-Marshall

No. 730 "ROUND-THE-WORLD" 4 A COMPLETE short wave receiver (174 to 204 meters) A and two-stage audio amplifier. All wave lengths are covered with no dead spots. Amateur bands fall well to center of tuning dial. Net $30.00. Completely constructed $22.00, C.A.D. or cash with order. Postage or express extra.

Send for New 1929 Ham Book — FREE

WE HAVE AERO MONITORS IN STOCK

CHI-RAD

CHICAGO RADIO APPARATUS CO.
415 S. DEARBORN STREET

CHICAGO

s a number, denoting the district, followed by two letters. The transmitters of clubs and scientific institutions have a number, followed by three letters, the first of which is K.

Most of the Soviet stations are working on r.a.e., or d.c., and there are very few using raw s.e. The average power is between 10 watts and 20 watts, although a few are allowed to use up to one-half kilowatt. Crystal control is rarely employed.

As a result of a conference of the amateur clubs held in Moscow, it has been decided to employ the prefix EU for amateur stations in European Russia, and AT for Asiatic Russia. Our Government did not take part in the Washington Conference, and has left it to the amateurs themselves to decide the questions about calls and waves.

Many expeditions were made during the last year or so, and amateurs have taken part in most of them. The most successful was the Russian-German expedition to the Pamir tableland. At the present time there is an expedition in the Bering Strait region which is using four short-wave transmitters. The calls are RB71, RB72, RB73 and RB74, and schedules are kept with Russian amateurs.

The Government here is very favorably disposed toward amateurs; licenses are issued freely, and without charge, and the postal department forwards QSL cards among Russian amateurs free of charge. Prizes are donated for tests, too.

With such cooperation, and with an active interest in shortwave work being taken by many amateurs, it is hoped that the good results so far secured will be continued in the future.

Official Frequency System

(Continued from page 16)

than the accuracy to which the average good amateur frequency meter can be calibrated and kept constant. During each transmission by WIXV its exact frequency will be announced to within 1/100 of 1% for the benefit of those able to use such accuracy, but for all regular amateur purposes the transmissions of both stations may be assumed to be equal to the figures herein given. While no responsibility, financial or otherwise, is assumed for the accuracy of these transmissions, every effort will be made to have it exceed the figure given.

STANDARD FREQUENCY SCHEDULES

For July and August

<table>
<thead>
<tr>
<th>Date</th>
<th>Schedule</th>
<th>Station</th>
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</thead>
<tbody>
<tr>
<td>July</td>
<td></td>
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<tr>
<td>5, Friday</td>
<td>A</td>
<td>WIXV</td>
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<tr>
<td>7, Sunday</td>
<td>CD</td>
<td>W9XL</td>
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<tr>
<td>12, Friday</td>
<td>AB</td>
<td>W9XL</td>
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<tr>
<td>19, Friday</td>
<td>B</td>
<td>WIXV</td>
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<tr>
<td>21, Saturday</td>
<td>C</td>
<td>WIXV</td>
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<tr>
<td>26, Friday</td>
<td>AB</td>
<td>W9XL</td>
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<tr>
<td>Aug.</td>
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<tr>
<td>2, Monday</td>
<td>A</td>
<td>WIXV</td>
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<tr>
<td>4, Sunday</td>
<td>CD</td>
<td>W9XL</td>
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<td>WIXV</td>
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<tr>
<td>18, Sunday</td>
<td>C</td>
<td>WIXV</td>
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<tr>
<td>23, Friday</td>
<td>AB</td>
<td>W9XL</td>
</tr>
</tbody>
</table>

Say You Saw It in QST — It Identifies You and Helps QST
The Two-Range Receiver (15-300, and 290-570 meters) with Its Own Coil Storage

The 6 coils of the SW-4 THRILL BOX are kept in the cabinet, all in a row, each in its special storage socket. Thus they are protected from damage and dust, and are always on hand and ready to use. Every other detail is just as carefully thought out. The SW-4 is not a copy — it bristles with new and ingenious details for your convenience and pleasure.

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4-Tube THRILL BOX SW-4
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BECOME A RADIO OPERATOR
See the World, Earn a Good Income, Duties Light and Fascinating
LEARN IN THE SECOND PORT U.S.A.
Radio Inspector located here. New Orleans supplies operators for the various Gulf ports. Most logical location in the U.S.A. to come to for training.
Nearly 100% of radio operators graduating on the Gulf during the past six years trained by Mr. Clemmons, Supervisor of Instruction.
All graduates placed. Runs to all parts of the world.
Member of the A.R.R.L. — Call "WAGR."
Day and Night Classes — Enroll any time.
Write for circular
GULF RADIO SCHOOL
844 Howard Ave. New Orleans, La.

TRANSFORMERS
Guaranteed — Mounted — Complete
2 K. W. 2000 — 2500 each side ........................................ $40.00
700 watt 1000 — 1500 each side ..................................... 14.50
700 watt 2000 — 3500 each side .................................. 21.00
Auto-Transformers, wholesale $2.00 each.

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“WHAT B-ELIMINATOR SHALL I BUILD?" Send 10c to Dept. Q-T for this helpful construction book
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ELECTRAD

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OUT big Wholesale Radio Catalog No. 19 (2ND EDITION) is a valuable encyclopedia of a liberal Radio education. Mailed immediately on request — absolutely
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Radio Specialty Co. 1005 Park Place
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S1
ACME WIRE PRODUCTS

Coils — Magnet Wire Wound
Magnet Wire — All Insulations
Varnished Insulations
Parvoit Filter and By Pass Condensers

All products made to Recognized Commercial Standards including those of:
Radio Manufacturers Assn.
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For 25 years manufacturers and suppliers to the largest and most discriminating users.

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DODGE RADIO SHORTCUT

Kills Hesitation — Produces Results Quickly Qualifies for Code Exam.

Puts Opportunity within Easy Reach

REPORTS FROM 500 USERS PROVE THIS

Tells whole story and who's who—with each order.

CONSIDER these extracts from reports on file:

W9CGI — Studied one evening—copied 15 per.
W9DIZ — Mastered code easily, now do 18 per.
W9IT — From scratch qualified in 2 weeks.
W9LY — Speeded up from 8 to 17 very soon.
W9CKY — Quickly increased code reading speed.
W9LW — Up from 15 to 25 per in 4 hours.
W9MC — Speed was 6. Now 25 and Commercial.
W9NCT — Hours with DRS—no more trouble.
W9PO — Easy to learn. Now copy 15 per.
W9SK — Up from 13 to 22 in few weeks.
W9ND — Thought never would be able read code.
W9ZG — DRS all OK and well worth the price.
W9AB — Licensed after little effort.
W9DMK — Raised speed 8 to 15 in 2 weeks.
W9RZ — Speed was 10 O'S — now 25 sent once.

DODGE HIGH SPEED METHOD

(Intensive Speed Practice)
Most Efficient Booster Known for 25 per ops.

FREE — Hams who order Radio Shortcut in July, promise Test and quick Report on our High Speed will get copy that method FREE.

DODGE MORSE SHORTCUT

Master both codes our way and use without mixim.
W2BXY — W5ANW — W9GUK now use both cards.

Radio shortcut $3.50. High Speed or Morse $2.50. Orders now. None C.O.D. Foreign add Fifty Cents.

C. K. DODGE
Box 100
Mamaroneck, New York

OFFICIAL FREQUENCY STATIONS

(Required accuracy 3.10 of 1%)

Reports on Standard Frequency Transmissions are solicited from all who take advantage of this service. Regardless of how far from or near to the transmitting stations you may be, your report is of interest to us. Standard blanks which will facilitate your compilation and our handling of the reports are available on request. All reports should be directed to: Experimenters' Section, American Radio Relay League, 1711 Park Street, Hartford, Conn.

After your report has been received and acknowledged, it will be forwarded to the Standard Frequency Station upon whose signals it comments.

— H. P. W.

The Lunch Kit Portable Receiver and Monitor

(Continued from page 28)

posts. A portion is cut out at one end to pass the two '199 tubes, the sockets for which are mounted directly beneath on a strip of bakelite fastened to the two pieces of brass which support the panel.

Two other pieces of bakelite are bridged across these brass strips. One of these pieces carries the audio transformer and the other mounts the "A"- and "B"-battery binding posts.

There is an additional compartment in which the "A" and "B" batteries fit in the case provided for the set and the hinged cover can be locked closed to prevent the equipment from being spilled accidentally.

There is no particular reason why anyone cannot duplicate either of these sets or build similar units for but a few dollars. There are many pieces of equipment on the market that are small and light enough to fit readily into such a design. It will be found that this sort of a portable will prove of considerable worth not only on the road but at the home station as well.

Strays

The niftiest jigger for making the connection to the control grid (the one on top of the tube) of the 222 and 224 yet seen is the National Company's "Grid-Grip." It is nicely tinted, equipped with a soldering lug and certainly does grip.
QSL Cards Free
to Stations using Vitrohm Radio Resistors

Ward Leonard wants all amateur stations using Vitrohm Radio Resistors to have a supply of printed QSL cards — with our compliments.

Twenty-five of the new QSL cards, printed on both sides, ready to use, will be sent free upon request to any station using Vitrohm Resistors. More of the cards if you want them. Send in your request now. There is no charge or obligation of any kind.

New Bulletin 507 Covering Vitrohm Resistors for Radio
A complete line of Vitrohm Resistors for radio receivers and transmitters is included in this new bulletin. Every up-to-date station will want a copy. It will be sent anywhere upon request free of charge.

Ward Leonard Electric Company
31 South Street
Mount Vernon, N. Y.

X-L VariO-Denser
Increases Efficiency and Power of Receiver

X-L Products give accurate values and dependable service. Endorsed by radio engineers, designers and set builders and standard in all heat known circuits.

Model "G" with grid clips made in three variable capacity ranges. Price each $1.50.

Model "N" has variable capacity, adjustable from 1.5 to 20 micro-micro farads. Price each $1.00.

Bakelite insulated X-L Push Post, the most perfect binding post made. Plain or all standard markings. Price each 15 cents.

Manufacturers of the X-L Link, the 100% Voltage Control and many-purpose Light Socket Adapter. Write for descriptive literature and free book of circuit diagrams.

X-L Push Post
X-L Radio Laboratories
Dept. D
1224 Belmont Ave.
Chicago, Ill.

Do you know that the 1929 Handy and Hull Handbook is available in bound form — $2.00 per copy, postage paid?

When ordering a copy of this new edition, look at your present copy and determine if you want the 1929 copy in more permanent form.

RADIO IN BRASIL
When in Brasil, apply to M. Barros & CIA for anything you need in connection with radio.

M. Barros & CIA
70 sob. Rua S. Jose 70 sob.
Postal Box 89
Rio de Janeiro
Telegraph address, Radioparte, Rio de Janeiro
Branch: Avenida S. Joao 4, S. Paulo, Brasil

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RADIO OPERATING
Next terms start July 15th and Sept. 1st
For further information and circular, address
The Registrar
FEDERAL RADIO AND RAILWAY INSTITUTE
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SET Builders FREE

Barawik, the first and oldest radio specialty house, offers you unusual service this year. Trigger boards, quicker alignments, lower prices. Deal with an established, reliable firm. The finest radio, latest service, lowest prices. Barawik service makes you more money. Send now for the new catalog showing latest wholesale prices on sets, parts, short wave, etc.

BARAWIK CO. CHICAGO, U. S. A.
Radio Frequency Couplings

The matter of wasting energy to get a suitable separation of signals may be dealt with quantitatively as follows. Starting with Equations (1) and (2) it may be shown that the width of the tuning band is proportional to

\[ \sqrt{\frac{L}{R}} \]

For example, if a suitable design for ordinary tubes has been found the same numerical value of the foregoing quantity should give the same separation of signals with a tube of different characteristics. Showing concrete values, \( \sqrt{L/R} \) for the 201-A will run about \( 0.28 \times 10^{-6} \) for the d.c. screen-grid tube say about \( 0.0025 \times 10^{-6} \). As the latter figure is about one fourth the former,

\[ \frac{1}{\sqrt{L/R}} \]

can equal four times as much as it does in the case of ordinary tubes, assuming the coupling coefficient is the same. This indicates that \( L \) can be in-

---

Correction on W8ARO Station Description

Specifications for the coils given under Fig. 1, page 12, May, 1929, QST should be as follows:

1. 8 turns 3/16" copper tubing, 3/16" inside diameter for 3500 kc. 11 turns R.E.L. coil 1/4" inside diameter for 7000 kc. 7 turns 3/16" copper tubing, 2 1/2" inside diameter for 14,000 kc.

2. 9 turns 5/8" copper tubing, 3 1/2" inside diameter for 3500 kc. 7 turns 5/8" tubing, 3 1/2" inside diameter for 7000 kc. 7 turns 5/8" tubing, 2 1/2" inside diameter for 14,000 kc.
Synchronous Motors for Television

In addition to building reliable and satisfactory motor generators, "Esco" has had many years of experience in building electric motors for a great variety of applications.

Synchronous motors, small, compact, reliable self starting are now offered for Television equipment. They require no direct current for excitation, are quiet running and fully guaranteed.

Other types of motors suitable for Television may also be supplied.

Write us about your requirements.

ELECTRIC SPECIALTY CO.
25 South St. Stamford, Conn.

Wire Your Home for Radio

For every radio need, in Brushed brass or Bakelite. Fit standard electrical switch or outlet box. Single plates and in gangs in many combinations.

No. 135 — For Loud Speaker .......................... $1.00
No. 136 — For Aerial and Ground .......................... 1.00
No. 137 — For Battery Connections ....................... 2.50
No. 138 — For A. C. Connections ........................ 1.00

(Bakelite, 25 additional per plate)

YAXLEY MFG. CO.
Dept. 5 — 9 So. Clinton St., Chicago, Ill.

NO NEED TO WORRY

Over current or voltage peaks. Unlimited power for your transmitter. Power to spare for Hi-C tanks, loose coupling, perfect signals. Who'll ever need 5000 mill 5000 volts anyway? But it's there, ready for you, if your transmitter is powered with a Mercury Arc. Flawless long life. Full wave in a single tube. Filters to XTAL DC. Completely automatic, no waiting to start. Ask the gang. Special in Edison 8s, won't last long.

RECTIFIER ENGINEERING SERVICE
4337 Rockwood Rd. Radio W5ML Cleveland, Ohio

FREE RADIO GUIDE

SEND FOR IT!
Shows the latest wrinkles, newest developments in radio at startlingly low prices. Get the set you want here and save up to 60%. The best in parts, kits, complete factory-built sets and supplies. Orders filled same day received. Write for free 32-page copy now.
BARAWIK CO. 117 Canal St., CHICAGO, U.S.A.

Radio Operators

Raise Your Speed 50 to 100% in Short Time

Write at once for information about The Candler System Course in High-Speed Telegraphing and Soft-Mastery — the only "short-cut" to greater speed, accuracy and endurance that means BIGGER PAY. DOUBLE your speed or slow operators. Makes fast operators FASTER. Takes the kinks out of slow ones. Relieves "sluggish" arm. Restores the grip. Prevents fatigue, cramps, paranoia and kindred ills. Over 40,000 operators have been developed by this system.

McIlroy, world’s champion radio operator endorses no other system. Begin now! In a few weeks you’ll have more speed than you ever thought possible. Our money-back guarantee protects you. Write now!

THE CANDLER SYSTEM CO., Dept. RL.
6341 S. Kedzie Ave., CHICAGO, ILL.
A SPECIAL DEPT.
FOR RUSH JOBS

WHEN a manufacturer
wants a resistor built to
specifications—he usually
wants it in a hurry.

That's why we've installed a special
department for just such rush jobs. Two hours after we get
your specifications, samples are
on their way to you. We even
ship by air mail if you desire.

And we don't stop the rush with
delivery of samples. If samples
are satisfactory (and practically
all of them are) we can ship
quantities in the same quick time.

Write to
HARDWICK, HINDLE, Inc.

Sales Dept.
122 Greenwich Street
New York City

Factory
255 Emment Street
Newark, New Jersey

RESISTORS

Little-Known Tubes
(Continued from page 21)

values are contingent upon the operation of the
modulator as indicated in Fig. 12 which gives the
proper grid bias and maximum peak grid voltage
usable.

When either 811 or 842 tubes are operated in
parallel, a resistance of approximately 100
ohms should be placed as near to the grid of each
tube as is practical. This will prevent the genera-
tion of parasitic high frequency oscillations
between the tubes. If 841's are used as oscillators
(842's should not be so employed) the resistors
may be supplanted by suitable chokes which
will have less effect upon the efficiency of the
circuit. In all cases, the plate voltage should be
reduced when a new circuit is being set in operation.

Financial Statement

By order of the Board of Directors the fol-
lowing statement of the income and dis-
bursements of the American Radio Relay
League for the first quarter of 1929 is published
for the information of the membership.

K. B. WARNER, Secretary.

STATEMENT OF REVENUE AND EXPENSES
FOR THE THREE MONTHS ENDED
MARCH 31, 1929

REVENUE
Advertising sales, QST. $16,038.08
Newdealer sales 13,831.88
Advertising sales, handbooks 2,382.23
Handbook sales 5,799.89
Dues and subscriptions 11,637.71
Back numbers, etc. 848.46
Emblems 95.65
Interest earned 682.51
Cash discounts earned 354.92
Bad debts recovered 125.22 $52,676.62

Deduct:
Returns and allowances 5,627.95
Less portion charged to re-
served for no-standard trans. 191.75 5,436.20

Discounts 2%, for cash 247.63
Exchange and collection charges 10.86 5,794.69

Net revenue $46,881.83

EXPENSES
Publication expenses, QST $14,263.53
Publication expenses, Handbook 3,679.11
Salaries and commissions 14,469.85
Forwarding expenses 775.07
Telephone, telegraph and postage 1,066.78
Office supplies and general ex-

2,063.35
Rent, light and heat 583.05
Traveling expenses 1,664.29
Depreciation of furniture and
equipment 538.33
Communications Department field
expenses 40.57
Headquarters Station expenses 43.15
Bad debts written off 300.00

Total expenses 39,090.07

Net gain from operations $7,792.76

Say You Saw It in QST — It Identifies You and Helps QST

Build Your 1929 Receiver
with Approved Parts

A Complete Selection of Audio and
Power Parts and Units

No. 994 — Power Amplifier Transformer. $12.00
No. 2189 — Push Pull Output Transformer. $12.00
No. 2142 — Push Pull Input Transformer. $4.50
No. 2107 — Straight Output Transformer. $12.00
No. 2158 — Audio Transformer. $4.50

Two Secondary Windings (for either No. 2189 or 3107):
one for Magnetic type and the other for Dynamic
Type Speaker.

D-946 — Standard Condenser Unit. $22.50

This Condenser Unit is also designed especially for use
with No. 994 Transformer for Power Amplification.

No. 5554 — Double Choke, use in Filter Circuit, $11.00

These Dongan Parts are available now. Equip your
receiver with this new amplifier — and enjoy still
another of Radio's greatest advancements.

For Push Pull Radio and Phonograph Amplifier:
No. 2124 — Transformer. $6.00

Dongan Electric Manufacturing Co.
2999-3001 Franklin St., Detroit, Mich.
"TRANSFORMERS OF MERIT for FIFTEEN YEARS"
Scientifically Prepared for Maximum Power and Unconditionally Guaranteed

1 sq. inch sections of quartz crystals of your approximate specified frequency supplied at the following rates:

75-100 meters 100-200 meters 200-400 meters
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One inch rods 400-600 meters
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Sections of any practicable dimensions made to order

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"Twelve years' crystallographic experience"
The Ultimate Transmitter

It will get you through like hand sending. Under cover that looks in place only need be removed to adjust speed or clean points. Beautiful black frosted enamel finish 2 1/2 x 3 1/4 x 2 1/2 high, weighs three pounds.

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Relay and remote control model 36E contacts welded in place.

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Four instruments in one, double or single key, right or left hand.
Four vacuum feet. When you order state for left or right hand use.

Send for our descriptive circular.

Remit by money order or registered mail.
Do not strain your nerves with an old worn out bug.

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QRH Rats, Mice and Bacteria?

(Continued from page 41)

found. However, a consistent heating effect increasing at a fairly regular rate from 1.5 meters to 15 meters with a peak around 5 meters for a normal salt solution has been noted. It is also interesting to note that a suspension of gram negative bacillus shows little heating effect around five meters but a great heating effect at 50 meters. The reverse appears to be true with the salt solution: Namely, a maximum heating effect around 5 meters and a very slight heating effect around 50 meters.

Perhaps a word of warning might be in order insomuch as the electrical part of this experiment can be duplicated by almost anyone who has the equipment. The bacteriological work should be attempted only in a laboratory experienced in such work. Be careful in handling ultra-high frequencies for the resulting effects are not yet fully understood — there is some heating effect noticeable in human beings in the neighborhood of 5 meters which may have delayed action but it is thought not. There is, as yet, no conclusive evidence either way.

Midwest Division Convention

(Continued from page 51)

petition, but D. C. Rawls, an old time Des Moines amateur just returned from China where he has been for a number of years, filled in the gap most interestingly on radio in that country.

While lectures were taking place, George S. Turner, an old-time amateur but now Radio Inspector for the Ninth District, conducted examinations and from his report quite a number of amateurs were made happy by passing the test. Louis Huber, formerly of this Section and now assistant to Communications Manager at Headquarters, was perfectly at home and gave the gang a good talk on the activities of the Communications Department. Prof. C. M. Jansky, Jr., of the University of Minnesota, as well as Consulting Radio Engineer, spoke on “Opportunities in the Field of Radio Communications and its Various Ramifications,” which proved one of the good addresses given. A new Y. L. in the Division is Miss Lois Crawford, W9DLW of Boone, who attended her first convention. If you hear her, fellow, give a helping hand — she is a little deficient.

Lt.-Commander R. H. G. Mathews, U.S.N.R., our old Matty of 9ZN fame, showed up with a medical examiner and before the convention was over he had enrolled 26 in the Naval Reserve, with the assistance of Boyd Laisure. Fred Schnell, now with Aero Products, presented one of the best addresses and with his lantern slides left nothing to imagination on the new wavemeter which is being brought out by his firm. Carl Menzer, Director W5UI, Iowa City, talked on Fundamentals and present uses of Television and Phil Konkle, W9YI, explained crystal control
QST OSCILLATING CRYSTALS
Constant Temperature Control Equipment

We are now in a position to supply you with Thermocally Controlled Heater units for accommodating two crystals (one used as a spare) with provision for instantaneous change-over, said unit maintaining a guaranteed constant temperature to a tenth of one degree Centigrade. This unit is easily adjusted and is entirely automatic, operating from the 100-Volt supply mains. Delivery 10 days after receipt of order. Price $400.00. More details upon request.

We also grind crystals for use in the Broadcast Band accurate to plus or minus 500 cycles of your assigned frequency for $25.00 fully mounted.

Prices for grinding crystals in the Amateur bands are as follows:
- 1700 to 2000 Ke band: $30.00, unmounted
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A chain of parts, if you please . . . transformers, tubes, condensers, resistances and the like as links of the chain. Unless each link performs to perfection the whole receiver is condemned and your name with it.

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oscillators; and Bill Heinz, had WHO'S control car which proved interesting to those connected with broadcasting stations. I am a little ahead of the story, because the banquet was held on Friday evening instead of being the usual closing affair on Saturday. It was a great event and was held in Memorial Union Hall. Dinner was prepared and served by the co-eds of the Domestic Science Class and would put to shame some of the chefs in leading hotels. The most disappointed “ham” was “Swyx” Solotar, W2GYX, who came all the way from the wilds of New York City and missed, as he said, the best part of the convention, the dinner. He arrived on Saturday! Well, to get back to the banquet, Director Quinby, who was very much in evidence during the convention, was the shining star of the dinner. He acted as toastmaster and took delight in “roasting” Schnell, Mathews, Huber, Jansky, Hebert and several other speakers; but it all made for a pleasant evening ending with the distribution of prizes, for which our thanks go to all those manufacturers who contributed so generously.

The closing of all events by Saturday afternoon gave the fellows a chance to gather around the hotel lobby in the evening while awaiting their trains and cemented friendships which we hope will last until they can be renewed at next year's convention.

—A. A. II.

Those Past Issues of QST
(Continued from page 38)

the back edge within the covers just made. The index sheets can be fastened to the free face of the “V” by means of three double pointed brass paper fasteners.

With the stack of QSTs bound and labelled in the above manner, it will no longer be necessary to set aside a half day to look up what so and so said about this or that. Those bindings are guaranteed to withstand the attacks of storms, quakes, winds, junior ops or what have you. There is one important warning: Don’t try to lick the gummed tape unless you have an exceptionally strong stomach!
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It Will Interest You!

See Page 79

This Issue of QST

Offering a copy of the latest edition of the "Handbook" and a year's subscription to QST at a SPECIAL PRICE

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Peter L. Jensen has applied entirely new and original principles in the design of this new dynamic. The cone is 10 inches in diameter. The moving coil represents an innovation in design. The sensitivity is greater than that ever attained in any previous dynamic speaker, and the ability to reproduce enormous volume is exceeded only by the Jensen Auditorium Dynamic.

The Concert Dynamic definitely sets a new standard of excellence. For along with the musical reproduction of high notes as low as 30 cycles, the higher frequencies are reproduced with extraordinary brilliance. In fact the entire musical scale is reproduced with a brilliance and firmness of quality never acquired before.

There is no need of a "side by side" comparison to appreciate the superiority of this new speaker. Wherever it is heard its performance is both startling and impressive.

Write for complete information and ask for a frequency response curve of this new speaker if you are interested. Ask also about the new Jensen Imperial, a beautiful cabinet equipped with either the Concert or Auditorium Unit.

NEW LOW PRICES

JENSEN CONCERT DYNAMIC
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FOR SALE—15 dial Ufolios like new. No reasonable offer refused. W9DHI.

WANTED—long wave commercial or navy receiver tuning to 1000 meters, W9DHI.


WANTED—three UP136 transformers. W9MH, Joplin, Mo.

FOR SALE—Four 48-volt units Willard storage B batteries. One 6-volt Willard storage battery. One Grebe cone speaker. Best offer takes them. Kenneth Allen, West Frankfort, Ill.

CBG full-purpose speaker kit. Records for play or listen in two styles at two prices. Harry & Young, 120 Ann St., Hartford, Conn.

KNAPA eliminator, New, 310, D. L. Currens, Owensboro, Ky.

FOR SALE—two new 50-watt tubes, transformers, etc., very reasonable. Martin Frazier, 2140 Green St., Philadelphia, Pa.

WESTON special No. 301, 1000 ohms per volt, 0-1000 volts, with external resistor, $12; same without resistor, $11; Jewell E. 44, 1000 ohms per volt, 0-1000 volts, with external resistor, $11; same but 0-000 volts, $12; 250-watt untransformed receiver transformer, $8.35; 100-volt and 1000-volt rectifiers, $16.50; 150 MA choke, $3.75; 100 MA choke, $2.50; 1000 volt transformer, $1.50; 50-watt filament transformer, $1.25; 500 volt transformer, $3.50; 100-volt Edison Navy-Tyre transformer, $3.45; AB 380 volt transformer, $1.50; 1000 volt transformer, $5.50; 50-watt Westinghouse slug 250 MA motor, $3.50; Westinghouse 0-150 volt transformer, $10.50. Write for list. M. Leitch, Park Drive, West Orange, N. J.

HAMS—We manufacture high voltage fixed condensers, coils, tubes, waveguides, metal cores and elves and are equipped to build these units to your specifications. We can quote prices which are lower than you have been paying. Also furnish you with any part you desire. Send in your order by return. We will supply your requirements at 85% discount. Write us and let us know your wants. Electro Laboratories, 251 East 127th St., New York City.


FOR SALE—10 mid. 1000-volt filter condensers, price per one, $2.85; 1000 ohm per volt, 1000 volt, $2.40. Made to order in any required quantity. Write for list. E. A. Smith, 150 E. 26th St., Chicago, Ill.

WE SELL 3-tube a.e. Crosby Showbox with Dynatron and tubes. First class condition, used about a month. Real bargain at $90. WQNY, 106th, Waynesboro, Va.

WANTED—4V or 12V to approximately 450V dummeter. Must be in good and complete condition. Scott 1100, 1500 ohm, $200, W.W. RENEL, 5932-76th Ave., Chicago, Ill.

REELS, with strong tungsten steel contacts that will break lots of volts. A bargain $2 each. Slightly used ones, $1.50 each. Also furnished with 500 volt transformer, $20.00. Send for price list. Charles H. Shurtz, 2124 W. Peterson Ave., Chicago, Ill.

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WESTERN Electric tubes, transformers microphones, condensers; General Radio condensers. Western select only, best quality equipment. Am moving out an apartment, where there is room for tubes, so everything must go. Send list to, L. M. Elliott, 7th and Montauk, Bayside, L. I., New York.

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SILL transmitter complete with power supply and tubes ready to plug in line. Perfect d. c. note. Photo on request. Fitty dollars. L. 55 Wayland St., Hartford, Conn.

IN stock — imported English crystals; freq. to .1%. Ordinary type, $19.50; power type, $49 in 100 or 85 meter bands. Dust proof holder, $2.50; mercury vapor Hecobults, $10. Prepared with sale delivery guaranteed. New 10 mid., 1000 volt filters complete, $1.50. Nothing else you need at dealers discounts. Write Henry's Radio Shop, Butler, Mo.


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SURPLUS apparatus — Akron antenna switch; 11; Boston marble base key, $1.25; GE5000 ohm, 50-watt gridleaks, $1.25; 50 Henry 100 mid coil choke, $2.50; WE364W desk microphone, $8.00; Plodar 650 volt, late transmitter. $1.50; WA2H0, Derridr, 21 Carlston St., East Orange, N. J.

SPECIAL summer prices on crystals; 5000 Ke crystal $14.00; 1700 Ke crystal $9.00. Blanks $4.00. W9DRD, Herbert Hollister, Edwardsville, Kansas.


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The first high-power amplifier to use the UX-860 power supply tubes in this arrangement, it requires no neutralizing. Hook this unit on your present oscillator, converting it into a 1929 job, with ample power for ham use. Power supply delivers 2000 volts at 250 M.A. Employed two of the RCA's newest rectifiers, UX-866. Due to the construction of the UX-866, unusually high voltage may be applied safely to them.

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Send for Aero Green Book and 1929 Supplement showing newest Short Wave Products. Price $2.50

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Designed for the new 5, 10, 20, 40, and 80 meter bands. Use with any type of aerial. Available in plug-in bases with adjustable wind and wound primary.

Complete Condenser, Kit L, W. T. D. 3 coils. $12.50

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Aero High-Power Xmitter and 150-Watt Amplifier

For operation on 10-20-40-80-100M. Bands

The first high-power amplifier to use the UX-860 screen grid tubes, employed when using with Aero Kit No. 33, or as a 150-watt amplifier in any master oscillator combination. For those desiring a master oscillator system, this unit works with a high degree of efficiency as an amplifier. With two screens a UX-860 power tube in this arrangement, it requires no neutralizing. Hook this unit on your present oscillator, converting it into a 1929 job, with ample power for ham use.

Power supply delivers 2000 volts at 250 M.A. Employed two of the RCA's newest rectifiers, UX-866. Due to the construction of the UX-866, unusually high voltage may be applied safely to them.

Model No. 82 — including the power supply, but not including tubes. List Price $250.00

UX-860 — single power supply and tubes. List Price $114.00

Aero Short-Wave Receiving Coils

Small in diameter, providing a much smaller external field, a better shape factor and improved efficiency. The Kit contains three coils (16.5 to 89.5 meters).

Kit LWT-1 $12.50

LWT-15 (15 to 155 meters). Price $12.50

Aero Shield Grid Coils

LWT-15 Kit of three coils (16.5 to 89.5 meters). $11.50

LWT-10 Kit of three coils, $10.50

Single Coils, Secondary and Stickers

Int-101 — 16.5 to 32 meters. $4.00 net

Int-102 — 16.5 to 13.7 meters. $4.00 net

Int-103 — 16.5 to 89.5 meters. $4.00 net

Int-106 — 13.5 to 155 meters. $4.00 net

Int-108 — 13.5 to 155 meters. $4.00 net

Phone Dial, $3.00

100-W watt, Base without dial $3.00

100-W watt, Base with dial, $3.50

Aero-Transmitting Coil Kit

840-K — 10 to 57 meter kit $12.00

880-K — 36 to 90 meter kit $12.00

1000-K — 100 to 150 meter kit $12.00

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