The RADIO AMATEUR NEWS

Volume I NOVEMBER-DECEMBER, 1937 Number 8

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DX news should be mailed to W6GHU, Ray Harmon, 4670 Gage Avenue, Bell, Calif.

Any matters pertaining to visits of amateur stations should be mailed to W6NAT, Bill Driml, 1423 East 73rd Street, Los Angeles, Calif.

Ultra High frequency information should be mailed to Ray Stevenson, W6HDV, in care of this magazine

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.We invite all Radio Amateurs and Radio Clubs to contribute articles to this magazine, although we reserve the right to censure articles unfit for publication. .

.This magazine is printed entirely for the benefit of Radio Amateurs and "the more dope, the better," however this magazine is not responsible for statements made by contributors and do not guarantee any statements or circuits published to be correct; we will endeavor to check the authenticy of same.

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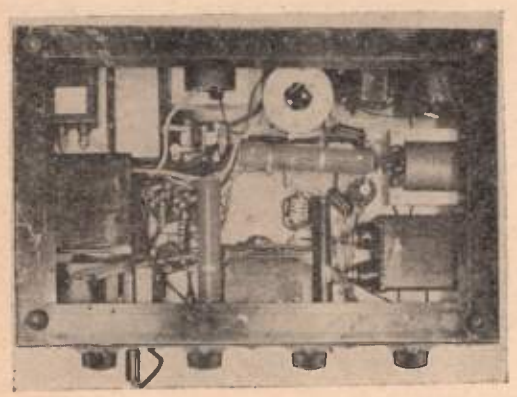
The "HEW" Portable Transmitter

By RAY HARMON, W6GHU

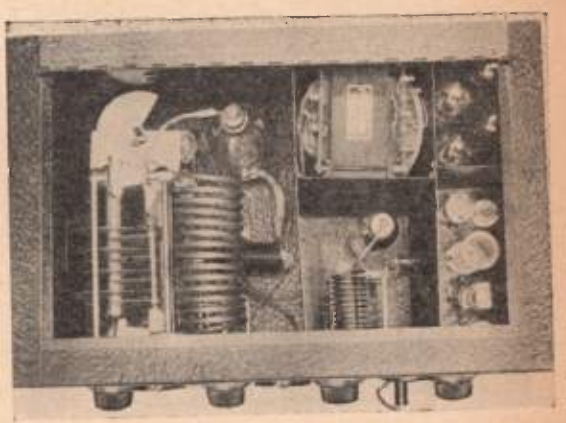
Using three stages only this xmitter is capable of a kilowatt input on 80, 40, or 20 and over 500 watts on "ten." It may be used as a home rig or as a high power portable.

R-R-r-r-r-r- buzzzzzzz sputter—crackle popp r-r-r-rr sputtt-sputt. "My Gawd," yelled Mort Miller, W6HEW, throwing the cans on the table with a loud bang—"What in the name of -ell is the use of having a pair of 150T's in the final and a siggle siggle super if you're going to have to listen to that goddam noise all the time?" "You might move to the beach," says Ray Harmon, W6GHU, "You would get a good QRA and save my ear drums at the same time." "Yeah, but we own the jernt," objected Miller. "Well then, why don't you get married and get a place of your own at the beach or the mountains?" "Sure," objects Miller, "But that's an expensive proposition and the YL doesn't care for Radio, so thats out." "Well," says I again, thinking of my poor TRF, "Why not rent a cabin in the mountains?" "Maybe you've got something Harmon," says Miller, "But I only want to be gone for the week-ends because I have to work for a living you know." "Well," says Harmon making a last feeble suggestion—"Why don't you enlarge on that portable you used to have and take it to the mountains over the week-ends for DX?" "Wait a minute," yelled Miller "We're getting somewhere now." Then Miller went to work and for a while the house shook, boxes came flying out of corners, old parts were dusted off carefully and looked at to judge their probable usefulness and inventory of all the junk was taken. When it was all over and everything quiet in the Miller abode, Mort popped up from behind a pile of boxes holding a forlorn looking RK20 in one hand and a husky tank condenser in the other, then he says, "Boy I've been waiting two years for something to use this RK20 in and now I've got it." "Listen here Miller," says I, feeling proud of the way I had dodged those boxes, "I'm not going to stay here all night and worry about your power leak and troubles, I'm going home—So long."



Note Compactness Underneath Chassis

Coming back a few days later, there was Miller up to his neck in parts and drawings and over a little farther was a waste paper basket



Looking Down Into the Works

full of pencil stubs and destroyed diagrams that had seen service in the planning of the new "W6HEW Portable." "Boy," says Miller, "This is going to be one tough job—I've got the tube lineup figured out and the cabinet size also, the next thing is how to get the thing together without all the parts leaning on one another. The lineup will be a 6L6 Harmonic osc. and the ole RK20 buffer, then I can use one of the 150T's in the big rig as the final for the portable, but the cabinet size is only 23x15x13 inches." "My gosh," says I to myself" A Kw. wtih power supply's and all the R. F. section in a cabinet less than two feet long, a little over a foot deep and just over a foot high—just a shade over two and a half cubic feet of space in that cabinet, the guy's crazy." "You couldn't do that Miller" I tell him, but the only answer I get is a mumbling sound, for Miller is talking over the phone to a cabinet manufacturer. After he is finished he says, "All that is needed now is a good

husky power trans for the final and then I can get to work on the thing." Aniway dear reader that is the way the thing got started. The power transformer for the final is made for 800 watts at 1550 and 3500 volts each side of center tap. It is a specially made job being ten iches high about 7 inches wide and deep. Althought built for 800 watts it runs nicely at a kw.

When the rig is used as a portable the power source for the 110 a. c. comes from a rewound dodge generator which is also made to deliver about 800 watts at 60 cycles and 110 volts. By speeding the motor up the generator can be made to handle over 1200 watts and about 120 volts. This generator by the way is mounted between the grill and the radiator on a '36 Olds coupe and to gear the generator it is only necessary to pull a pin out and couple the generator to a spline with the crank shaft. To disconnect it so that the motor may be cranked it is just as easily done by pulling the pin out and turning the spline the other way and the job is done.

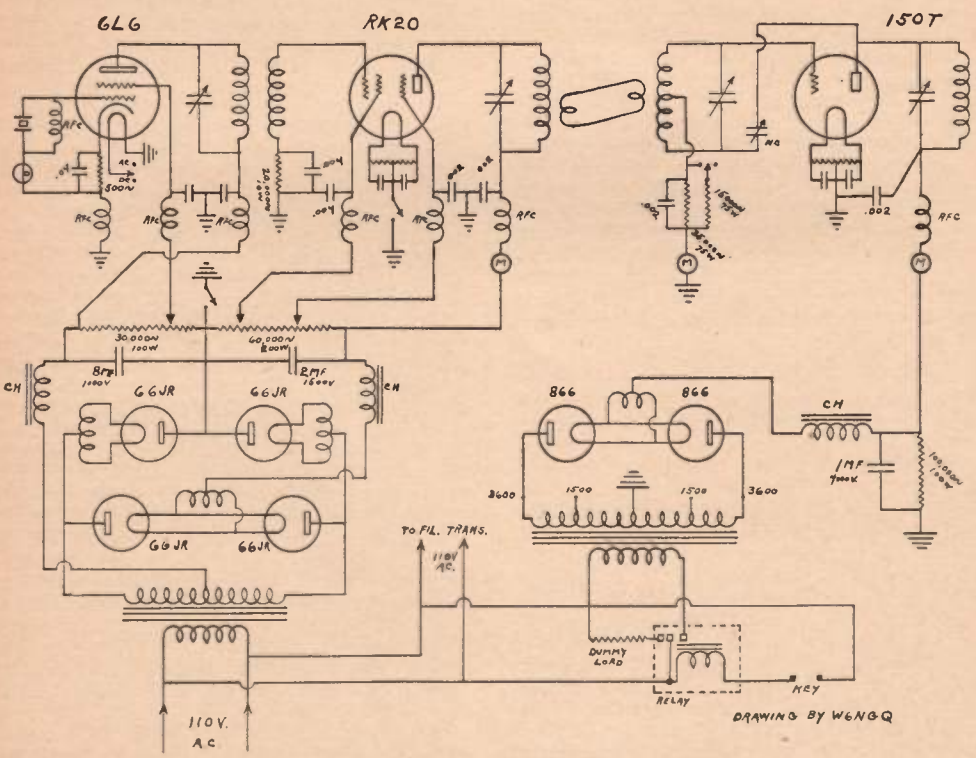
Of course you will immediately say that anything that is built so compactly is bound to have bugs and you are absolutely right! The first one encountered was from the relay. The relay is mounted under the sub-chassis and is a rebuilt job. It is built so that when the key is down the back side of the contact is broken, but when the key is up the other contact connects a 10000 watt dummy load across the generator to keep the regulation stable on the primary, so that when the rig is on there is always a 1 kw load on the genrator besides the rest of the load on the exciting stages. In this way the key only transfers the 1 kw power to either the transmitter final or the dummy load. While the dummy load stabilizes the input power fairly well, it could be better if there was a resistor used whose impedance didn't change with the heat, such as the heater elements do.

For those of you who have blinking lights at home and would rather have a bit higher power bill than the blinking, this same idea would go a long ways toward stabilizing the line voltage. Now we're getting off the point, but the trouble came from a sticking relay which stuck only on the Xmitter side and not on the dummy load side inspite of the fact that the dummy load took a couple of hundred more watts. This was finally traced to R. F. in large amounts being on the A. C. lines and was cured by bypassing the AC and by soldering Canadian dimes on the Xmtr points.

The next trouble was from the power trans vibrating the case and roughening the note up a little—this was stopped by padding the small compartment the trans was in with slivers of wood. And the last bug which is honestly hoped is the last one was in the oscillator circuit, which for some reason or another kept popping out of oscillation and leaving the RK20 with no excitation. After much trouble replacing parts the trouble was cured. (We hope by the simple process of changing the tube which seemed to get just so hot then it would pop out of oscilation—the new tube shows none of this trouble.

As you can see from the diagram many things that aren't quite conventional were done

(Continued on page 33)



Tank Coil Considerations

By Curtis E. Decker, W6MCM
Decker Coil Co.

In looking backward over the course of amateur radio construction one notes that, progressively, one piece of apparatus after another, passes from the stage of home construction to that of the commercially manufactured article. It was once so with condensers and quite recently with transformers and chokes. Today there is much activity in the commercial manufacture of radio frequency coils. This in spite of the fact that coils are perhaps the simpliest of the important components of a transmitter.

Only two or three years ago it was quite the common thing to see in handbooks descriptions of rigs designed to handle, say one hundred watts. For many of these copper tubing coils were specified. The effect of this old estabilised custom still persists in many quarters, as visiting around among amateurs will readily show. Often this is more than merely the inertia of holding on to old gear, for hams not infrequently express strong distrust of mere wire in their final plate tank coils.

Nevertheless the trend is now toward wire coils of the better designed sort, in home built transmitters as well as in those of commercial manufacture. This is a part of the natural tendency in the evolution of radio construction to seek efficiency in proper design rather than to cover up pood design and operation by the use of excessively heavy parts. Undoubtedly the growing popularity of the higher frequency bands has to some degree forced this evolution. While operating on the lower frequencies, if the tank got hot it was possible with some show of success to counter this condition by using more metal in order to get more radiation. Incidently it seemed natural to believe that a big piece of tubing would not melt as readily as a piece of wire. We were victims of a vicious circle. The use of a larger conductor introduced features that caused increased losses in coils, while, at the same time, obscuring those losses through greater absorption and dissipation of heat.

Probably it is of no great interest to go into details regarding the scientific factors involved in good coil design; but a few points that are at least true for all practical purposes may be mentioned. Other things equal it is best to keep the wire in the coil down to the smallest size that will serve the purpose for which the coil is intended. At times this may be determined by the need for more physical strength sufficient to enable the coil to hold its shape. The coil itself should also, as a general rule, be kept down to the smallest practical size. This helps to diminish the size of the external field about the coil. In this way losses are reduced by diminishing the extent to which this field will impinge upon nearby parts of the layout. At the same time there will generally be less clash in the functionnig of the different portions of the transmitter.

It is also not unimportant to maintain a good form factor in the proportions of a coil. There are advantages and disadvantages in either making the coil short or long relative to its diameter. These considerations conflict and, as usual, there must be a compromise. The good old rule of thumb of making the coil from one to one and a half times as long as its diameter still holds good in practice. Within these limits the departure from best performance is unimportant, so there is some leeway in the matter. The spacing between turns is also, and definitely, a matter of importance. Generally there ought to be a spacing between turns equal to at least the diameter of the wire. This may be increased to three or four times the diameter of the wire before the performance of the coil will deteriorate. If, for any reason greater spacing seems desirable it will be found better practice to reduce the overall size of the coil. A good rule of thumb that will cover this point is to design several coils which all have the desired inductive value and which will also maintain a good form factor. Then build that coil which requires the least length of wire. This should not be taken to mean that one or two inches more or less of wire will affect the resistance to r.f. to such a degree that the performance is changed on that account, but it does prove out in practice that the coil with the least length of wire almost automatically will have the best design features, always providing that the previously mentioned precautions have been observed. Much experimental work with coils has proved the practical value of this principle.

In the case of the tank so situated that it is required to handle considerable power it seems natural to mount the coil in the horizontal position. This is as it should be and yet in unnumbered thousands of instances this simple precaution for the attainment of efficient functioning has been neglected in the mounting of small coils in low power stages where losses are usually more significant than in the power stages. If we take, for example, the ordinary form-wound plug-in coil we find this: Inside the coil, and therefore in the most concentrated part of the magnetic field, we have the material in the wall of the winding form. This accounts immediately for relatively large power losses. Then, in one pole of the field there is the bottom of the winding form together with its prongs, the coil socket with its clips and wiring, and perhaps even the material of the chassis or breadboard, which, worst of all, may be metal. To top off all this, imagine this coil to be working as a balanced circuit, as for push-pull operation. It seems remarkable, to understate the matter, that such an arrangement can ever work satisfactorily. The remedy—mount the coil horizontally, and while doing this don't get the side of the coil, either, too close to all of the above mentioned hardware. Even in some coils that presumably have been designed and built with benefit of good engineernig one or more of these common

(Continued on page 20)

Crystal Control on 5-Meters

By the BLILEY ELECTRIC CO.

Of outstanding significance in the development of ultra-high frequency equipment is the transition from self-excited frequency modulated transmitters to the highly stabilized equipment

Figure 1.
Complete 18 Watt 5-Meter Transmitter

afforded by crystal control. This transition has been taking place for some time, but it was only recently that the many advantages of crystal control at these high frequencies has been fully realized.

It is now a well established fact, and has been proven in numerous tests, that greater distances and more reliable communication is possible, with a given amount of power, through the use of very stable radio frequency equipment. This is due largely to two obvious improvements: first, because the concentration of carrier power on a single frequency has the result of increasing the transmitter's effectiveness several times over that of a self-excited modulated oscillator of equal power output and second, because of the fact that the more sensitive superhetrodyne receiver can be employed.

The use of highly stable 5-meter transmitters is not only desireable and worthwhile from the standpoint of increasing the number and reliability of contacts, but also from the standpoint of interference. This latter consideration is particularly important in the larger cities where 5-meter activity is comparable to that found in the lower frequency bands.

DEVELOPMENT

Heretofore, the application of crystal control to 5-meter transmitters has been limited by the fact that the necessary frequency multiplying schemes seriously complicated the design and construction. The development of the now well-known HF2 20-meter crystal unit was an important step in the right direction but transmitter simplicity was still wanting. With this in mind, a program of investigation and research was instituted in an attempt to develop a practical 10-meter quartz crystal.

The characteristics of existing types of crystals were unsatisfactory for these high frequencies and the development of a new cut was necessary. After extended research, a new angle was found in which the crystal was thicker, for a given frequency, than other cuts and at the same time possessed the necessary high activity. It will safely carry an RF current of up to 200 mils without danger of fracture and has a drift of 43 cycles/Mc/°C.

This new crystal, complete with holder, is the Bliley HF2 10-meter crystal unit. It is indeed a revolutionary development for it is now possible to have 5-meter crystal control which is really simple—so simple that it can be easily applied to portable and mobile equipment.

TUBES

In applying crystal control to high frequency transmitters, the problem resolved itself not only into the development of the crystal, but also, to the selection of tubes which had the proper characteristics for efficient crystal performance With some tubes, especially the higher mu and pentode types, the crystal was effectively shorted by the high input capacity. Others, having a low feed-back capacity and a large electrode spacing, were equally unsatisfactory. Pentodes, in general, are not to be recommended and best results were obtained with the new high frequency triodes such as the 955, 6J5G, 6E6 and RK34.

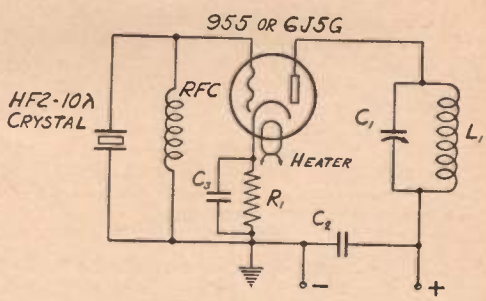


Figure 2. 10-Meter Triode Oscillator

L1—8 Turns No. 12 wire single spaced ¾" dia.
C1—75 mmf. variable condenser.
C2—.005 mf. mica condenser.
C3—.005 mf. mica condenser.
R1—200 ohm carbon resistor.
RFC—2.5 mh. R. F. choke, National or Hammarlund.
Plate Voltage—180V. for the 955, 220V. for the 6J5G.

The 955 and 6J5G are excellent oscillators, giving 1¾ and 2½ watts output, respectively, on 10-meters. The 6J5G has slightly higher inter-electrode capacities but is preferable to the 955 because of the higher output and lower cost. Either of these tubes will give sufficient output at 10-meters in a simple triode oscillator circuit, to drive an 802, RK23, 807, RK39, or 6L6 tube as a doubler.

The 6E6 and RK34 tubes are particularly interesting since their dual-triode construction makes possible good 5-meter output with a single tube. The 6E6 gives an output of 3 watts on 5-meters from the doubler section, while the RK34 will give an output of 3 ½ watts.

CIRCUIT CONSIDERATIONS

At these high frequencies, careful consideration must be paid to the design and construction of the transmitter. Low-loss construction must be used throughout, with the parts so arranged as to facilitate short direct leads, and, at the same time, to permit the individual circuits to be shielded and isolated as much as possible. If sub-base or chassis construction is used, all grounds should be tied to a common bus and the bus strapped to one point on the chassis to

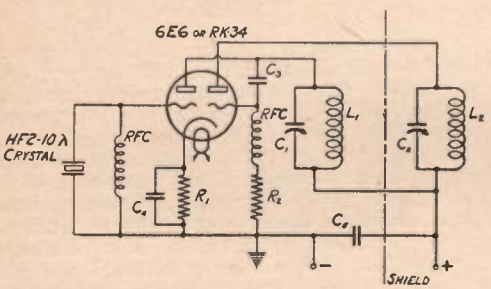


Figure 3. Dual-Triode Oscillator-Doubler For 5-Meters

L1—6 turns No. 12 wire single spaced ¾" dia.
C1—75 mmf. variable condenser.
L2—4 turns No. 12 wire double spaced ¾"
C2—35 mmf. variable condenser.
C3—.0001 mmf. mica condenser.
C4, C5—.005 mf. mica condenser.
RFC—2.5 mh. R. F. choke, National or Hammarlund.
R1—400 ohms.
R2—30,000 ohms.
Plate Voltage—6E6—300, RK34—325.

eliminate the possibility of closed loops and circulating currents in the ground system. Parallel feed should not be used due to the absence of a real good choke at these frequencies. This means that the tuning condenser will be at high voltage and must be insulated from ground. An alternative method, which is often used at the lower frequencies, is to ground one side of the condenser and insert a by-pass condenser in the tank circuit. This arrangement should not be used since the impedance and losses of a mica condenser is considerable at these frequencies and if it is required to carry the circulating tank current, there will be serious loss in power output.

For maximum power output, a high-C tank circuit should be used in the crystal oscillator. This is necessary since the recommended tubes have a low plate impedance, and is advantageous in that the stability will be greatly increased as compared to the use of a low-C tank.

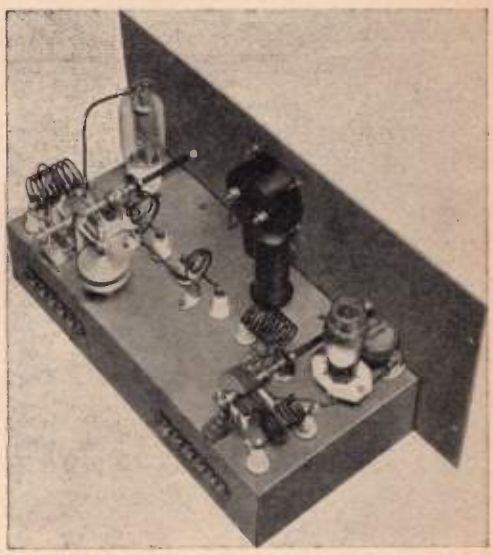


Figure 4. 60-Watt 5-Meter Transmitter

PRACTICAL CIRCUITS

Standard crystal oscillator circuits for use with HF2 10- meter crystal units are shown in Figures 2 and 3. The circuits are conventional but all values indicated should be adhered to as closely as possible as these have been found to give best output and highest stability. The construction and layout of two simple 5-meter crystal controlled transmitters is pictured in Figures 1 and 4. The transmitter shown in Figure 1 has an output of 18 watts and because of its compactness is ideal for a mobile or portable rig. An RK34 oscillator doubler is used to drive a second RK34 as a push-pull amplifier. The modulator is a 6L6 driven by a 6C5.

Figure 4 shows the RF section of a 60 watt transmitter using a 6J5G as the crystal oscillator. The oscillator drives a 6L6 as a doubler to 5-meters and this in turn drives the 35T in the final. The 6L6 tube is easily overdriven and for this reason, considerable care should be exercised in adjusting the coupling between it and the oscillator tank.

The constructional details and circuit diagram of a complete single tube 5-meter crystal control transmitter are shown in Figures 5 and 6. It consists of a single 6E6 as a crystal oscillator and doubler modulated by a 6F6. This transmitter is simplicity itself, both in performance as well as in construction, and, due to the fact that crystal control is used, results equiva-

Figure 5. Simple One-Tube (R.F.) 5-Meter Transmitter

lent to a 10 to 12 watt self-excited rig are obtained. The performance of this transmitter is a good example of what can really be done with crystal control on 5-meters.

Not only does the 10-meter crystal make possible portable 5-meter crystal controlled transmitters, but it also greatly simplifies the construction of high power transmitters. When these facts are considered, together with the concentration of power on a single frequency, the desirability of crystal control is obvious—and the practical answer is the use of the HF2 10-meter crystal unit.

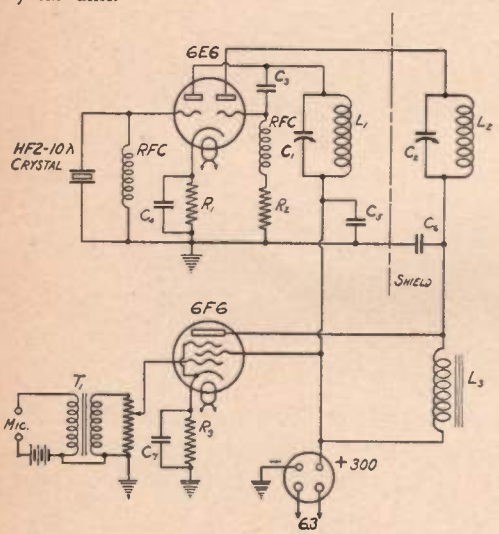


Figure 6. Diagram of Simple but Highly Effective 5-Meter Transmitter

L1, C1, L2, C2, Same as in Figure 3.
C4, C5, C6—.005 mf. mica condenser.
C3—.00025 mf. mica condenser.
C7—10mf.—25 volt electrolytic condenser.
R1—400 ohms.
R2—250,000 ohms
RFC—2.5 mh. R. F. choke, National or Hammarlund.
R3—250 ohms.
T1—Modulation choke.
L3—Microphone Transformer.

THE FINAL

By His Knibbs, W6IVG

I'm just a glass bottle, with metal inside,
Asetting in a socket all swollen up with pride
or I'm the guy that can put it out
With hot RF, sure I can shout.

I also can take it, for to me the hams sure shoot
Loads and loads of electricity and some abuse to boot;
It sometimes makes my face red, but I do not try to duck,
For so far, my ham owner has been endowed with perfect luck.

I keep shoving it up the chimney; where it goes I do not know,
As long as it keeps moving there's no danger to me tho
or what goes up, sure must come down, that fact is well renown
To land in some forgotten place, or some far off, little town.

I usually set atop the rack, like a king upon his throne,
I sometimes have a partner but more often work alone.
The output of the ham's endeavors all depend on me,
And the buffer and exciter stages are filled with raw envy.

But the day will come, I know it well, when I will get a jolt,
Of lots of juice upon my plate, but of excitation not a volt;
And then I'll fold up and leave this land of Amateurs and Hams
And go to the place of forgotten tubes and filaments and bands.

▼

BELL CLUB BANQUET

On Saturday, December 4th, The Southeast Radio Experimental Association, better known as The Bell Radio Club, will hold their regular Winter Hamfest at Cole's Cafeteria, 6514 Pacific Blvd., Huntington Park, Calif. The supper will be served at 7:00 p. m. sharp.

President Charles Feay, W6EJZ promises some very fine entertainment plus a few speeches by well known citizens. Unlike the usual hamfests, this will be a strictly social get-together and feed, absolutely no discussion of radio.

All amateurs are invited to attend, tickets must be purchased in advance, the closing date being Friday, December 3rd.

▼

If you have trouble keeping the point of your soldering iron bright and clean, melt some resin into a shallow tin dish and let the tip of your iron rest in the resin while it is hot and you are getting the next connection ready to solder. The resin prevents any troublesome oxides from forming on the tip.

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Intermediate Frequency Transformer Design

BY PAUL O'CONNOR
Chief Engineer, J. W. Miller Co.

Since intermediate frequency transformers consist of inductively coupled resonant circuits, it may be desirable to review briefly some rules governing these circuits.

When mutual inductance exists between two separate circuits which are tuned to a common resonant frequency energy may be transferred from one circuit to the other through transformer action. This action is rather complex at radio frequencies but may be predicted with reasonable accuracy by observing a few fundamental rules.

Rule 1.

The coupled secondary has the effect of adding series impedance to the primary have a value—

$$\frac{(WM)^2}{Zs}$$

M—Mutual inductance
W—2 . pi . f
Z_s—series impedance of secondary

Rule 2.

The primary current induces a voltage in the secondary lagging 90° and having a magnitude—

WMIp

Rule 3.

The secondary current is that current which would flow if the induced voltage were in series and the primary were absent.

Using these rules we may find the primary current—

$$Ip = \frac{E}{Zp + \frac{(WM)^2}{Zs}}$$

Lp—primary current
M—mutual inductance
E—applied voltage
Zs—series impedance of secondary alone
Zp—series impedance of primary alone
W—2 pi f

Mutual inductance equals—
L_1 plus L_2 plus or minus 2M

By measuring the series inductance of L_1 and L_2 in both additive and subtractive polarity the mutual inductance may be said to be the difference inductance divided by 4.

While two coupled circuits at radio frequencies constitute a transformer, it is not possible to compute the voltage and current induced by turn ratio, magnetizing current, etc., as in power transformers since the leakage reactance at radio frequencies may be as high as 99% while at power frequencies only 2%. For this reason coupled circuits at radio frequencies are calculated in terms of the mutual inductance existing between them.

The energy transferred between the coupled circuits is, for any given frequency and voltage, dependent upon the mutual inductance and the coupled impedance. In resonant circuits the coupled impedance is inductive at frequencies lower than resonance and capacitive at frequencies higher than resonance, while at the resonant frequency it becomes a pure resistance, just as in the case of the simple parrallel resonant circuit. A resonance curve taken on the secondary alone will have the same general form as a curve taken with the two circuits coupled except that it will be sharper since the primary resistance increases the equivalent resistance of the secondary.

With a small degree of mutual coupling the primary resonance curve is almost the same as if no secondary were coupled; the secondary is small and the secondary resonance curve is steep, more so than either the resonance curve of the primary or the secondary alone. This is due to the fact that the primary current follows the resonance curve of the primary and induces a voltage in the secondary that increases as the primary current increases and decreases in the same manner. The effect of this is to sharpen the secondary resonance curve. As the coupling is increased the impedance coupled into the primary tends to reduce the primary current at resonance and to increase it at higher or lower frequencies. At frequencies below resonance the primary series reactance is capacitive and the coupled impedance is inductive. At frequencies above resonance the primary series reactance is inductive and the coupled impedance is capacitive. This tends to increase the primary current at frequencies other than resonance by cancelling part of the primary reactance.

When the resistance coupled into the primary is equal to the primary resistance we have the condition known as critical coupling. At critical coupling the energy transfer is maximum and the primary current shows a double hump, being greater at frequencies above or below resonance. At all other values of M, greater or lesser, the secondary current will be lower. When the mutual inductance is such that the following equation is satisfied we have critical coupling.

$$\frac{(WM)^2}{Rs} = Rp \quad \text{or} \quad WM = \sqrt{Rp\ Rs}$$

At critical coupling the resonance curves of primary and secondary will be as shown in Fig. 1.

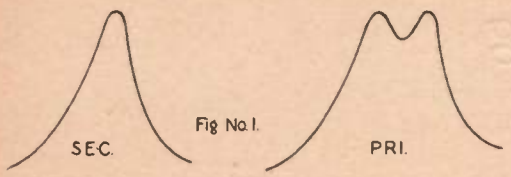


Fig No. 1.

The k required for critical coupling may be expressed in terms of Q—

$$\text{critical } k = \frac{1}{\sqrt{Qp\ Qs}}$$

$$Q = \frac{W\ L}{R}$$

With high Q circuits the value of k for critical coupling will be quite small. A Q of 200 would give a k value of ½ of 1%. Since the Q of the condensers used in intermediate frequency transformers is so much greater than the Q of the coils, we may with good accuracy consider only the Q of the coils as having a bearing on the gain and selectivity of the transformer.

The effect of placing the transformer in a non-magnetic shield is to lower the inductance and to increase the resistance in the same manner that the coupled secondary effects the primary circuit, as the shield possesses inductance, resistance and capacity. The amount of change produced by the shield is dependent upon the mutual coupling.

The behavior of resonance curves becomes quite erratic when the primary and secondary are tuned to different frequencies.

In actual intermediate frequency transformer construction we have capacity as well as inductive coupling due to the capacity of leads, physical position of the tuning condensers, etc. The effect of the capacity coupling is to either increase the resultant coupling or to decrease it depending upon the polarity of the windings. With both coils wound in the same direction and the starts or finishes of the coils connected to plate and grid the electrostatic coupling opposes the magnetic coupling. With the capacity coupling additive to the magnetic coupling the coils must be spaced farther apart to maintain a low value of M. However slight variations in physical spacing between coils does not produce as great a change in M as would be the case if inductive coupling alone were present. In production manufacture this condition is sometimes desirable under conditions where slight variations in physical spacing of the coils may occur.

In capacitive coupling the characteristics are the same as with inductive coupling and it is necessary to substitute—

$$\frac{1}{(W C_m)^2} \quad \text{for } (WM)^2$$

Where C_m is the coupling capacity.

Combinations of inductive and capacitive coupling may be used to produce a degree of coupling that varies with frequency. Applications of such combinations have been described by Loftin and White in the I. R. E. Proc. for October, 1926.

When resonant circuits are so coupled that a uniform response is obtained through a band of frequencies near resonance and all other frequencies are sharply attenuated we have band pass filter. The width of the pass band is nearly proportional to the degree of coupling and the response within the pass band is nearly inversely proportional to the band width. To determine the degree of couplings, k, for a given pass band, we have—

$$\frac{Fr}{F_1 - F_2} = \frac{\sqrt{1 + k} - \sqrt{1 - k}}{\sqrt{1 - k^2}}$$

Since k is generally small we may say that—

$$k = \frac{F_1 - F_2}{Fr}$$

$F_1 - F_2$ = pass band

Fr = reasonant frequency

The error in the latter equation will be about k percent. That is, a k of .01 would result in an error of 1%. For uniform response within the pass band it is necessary that—

$$\sqrt{Qp\ Qs} = \frac{1.5}{k}$$

When the pass band is increased for a given resonant frequency, the Q must be lowered if uniform response is to be obtained.

For uniform band-pass response, the ratio of primary voltage to secondary voltage will be—

$$\frac{Es}{Ep} = \frac{\sqrt{Qs\ Qp}}{2}$$

In any band-pass circuit it is necessary that the primary and secondary circuits be tuned to the same frequency; otherwise the band-pass characteristic will be lost.

With a constant pass band the Q of the circuit would have to be proportional to the frequency, and it is therefore not practical to design a band-pass filter which has a constant band width with various resonant frequencies.

In the actual manufacture of intermediate frequency transformers a great many compromises must be made in order to meet the limitations placed on physical size, and cost, and, of course, standardization of some form must be made.

In 1930 when superheterodynes came into general use, the standard intermediate frequency was 175 kilocycles and two stage amplifiers were used. Most of the intermediate frequency amplifiers used in this period were extremely sharp—enough so to cause serious attenuation of the audio frequencies transmitted. In order to obtain a sufficiently high image frequency ratio with 175 KC I.F. amplifiers, it was necessary

to use one or two tuned signal frequency circuits ahead of the first detector. The demand for lower priced radio receivers made it expedient to eliminate as many parts and tuned circuits as possible. This brought about the use of a higher intermediate frequency and the elimination of one or both of the tuned circuits ahead of the first detector. The more commonly used intermediate frequency amplifiers were from 450 to 500 KC, which gave a fair degree of image rejection with only a single circuit tuned to the signal frequency. The advent of all-wave receivers made this intermediate frequency range still more desirable. Since design has been more or less concentrated on intermediate frequency transformers in the 450-500 KC range, technique has developed to such a degree that a single stage at 465 KC may have almost the same degree of gain as two stages of the older types at 175 KC. Frequency response curves have been improved in that steeper sides with a more flat top provide good selectivitiy without excessive attenuation of the high audio frequencies.

The development of the powdered iron core of minute particles held together by some insulating binder has made it possible to greatly increase the Q of I.F. transformers while actually decreasing physical size. Cores most commonly used are round slugs $\frac{3}{8}$" in diameter and $\frac{1}{2}$" long. These cores will raise the inductance of a given coil approximately 20%. Their use also tends to decrease the leakage reactance. The Q of the 465 KC transformer in a $1\frac{1}{2}$" square shield may be raised from 75 to approximately 125 by using an iron core. The Q may be as high as 200 at 465 KC by using the larger shield and No. 10/41 Litz wire in the coils. Duo-lateral type windings are now used almost exclusively. In general it is desirable to wind the coils as narrow as possible without having too large an outside diameter. Multiple pie narrow windings have a better Q than rectangular windings, since the distributed capacity is reduced to a considerable degree. Most coils are wound on a $\frac{1}{2}$" diameter dowel or form.

The majority of intermediate frequency transformers are tuned with condensers of approximately 100 uuf. capacity. The most commonly used is the mica dielectric compression type trimmer. Recently there have appeared midget air dielectric condensers for tuning intermediate frequency transformers. A great deal of controversy exists regarding the relative merits of these two types of condensers for use in I.F. transformers. Three distinct disadvantages of the air dielectric type are: Cost, bulky physical size, and the fact that dust will collect between the plates and in time form a low leakage path between the terminals. The strongest claim for them is that they are not appreciably affected under conditions of wide temperature variations. A well designed mica dielectric compression type trimmer is quite compact and may be constructed so as to have a very long leakage path between terminals. By proper shaping of the plates and operating the condenser within a rather narrow capacity range, the compression type condenser may have only a very slight capacity variation with temperature changes from 40 degrees to 120 degrees Fahr.

Interest in high fidelity reception has presented some problems to the designer in that a receiver must have ample selectivity for out-of-town and distant reception as well as a broad frequency response curve for high fidelity broadcast. A bandwidth of about 17 KC in the broad position seems to be required at this time. A number of more or less ingenious methods of variable selectivity have been revised. A common fault of practically all of them is that as the band width is varied the tuned circuits do not remain in resonance due to changes in mutual inductance, capacity, etc. In this respect the systems which vary the physical position of the windings by mechanical means seems to be the worst. Some of the electrically variable types are quite good, of which the circuit in Fig. 2 (a) is perhaps the best:

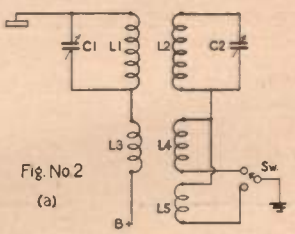


Fig. No 2
(a)

In this circuit L_1 and L_2 are the main tuned circuits and wtih the swtch in the L_5 position the co-efficient of coupling is such as will give the desired selectivity. With the switch in the L_1 position the coils L_4 and L_3 are so designed that the result is to over couple the transformer. The dip which occurs in this transformer is filled by the peak of the following transformer, which is not changed. Proper choice of the values of L_3 L_4, and L_5 will result in a transformer which is in resonance in either the sharp or broad positions. A disadvantage is the increased cost of construction due to the fact that five windings are required on the transformer.

Another method commonly used is shown in Fig. 2 (b).

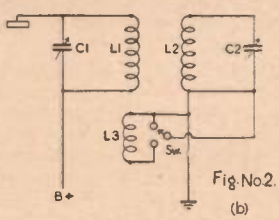


Fig. No 2.
(b)

This method inserts an inductance L_3 in series with the secondary tuning condenser in the broad position. The coil L_3 is closely coupled to the primary and serves to provide over coupInig. However, the transformer does not remain in resonance in both positions.

Another circuit, developed by the Miller Company, offers a number of advantages. It is

simple and inexpensive and may be constructed to give almost any desired response curve, since both inductive and capacitive coupling are utilized in the broad position. See Fig. 2 (c).

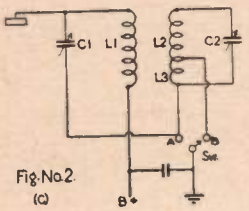


Fig. No. 2 (c)

In the sharp position (switch at A) the unit is a normal transformer and the coupling is such as will give the desired selectivity. In the broad position (switch at B) the current through the condenser C1 and C2 flows through L_3. Proper choice of C and L_3 will produce almost any desired response curve.

Fig. 3 is a simplified drawing of Fig. 2 (c).

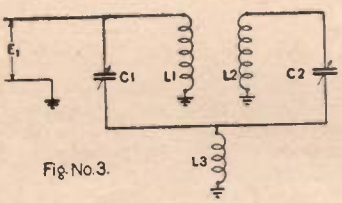


Fig. No. 3.

▼

OLD TIMER PROGRAM

The California History and Landmarks Club will hold a radio day February 10th with a program devoted to early days of broadcasting in Los Angeles.

The speakers will include Carl Haverlin, Sales manager of KFI-KECA, who has been connected with the Erle C. Anthony radio organization for the past twelve years, and Dr. Ralph L. Power, radio counsellor, onetime professor of economics at the University of Southern California, who started in radio in 1922 and was one of the first remote control announcers on KFI from the Examiner after the newspaper discontinued its own station, KWH.

The Club, as part of its program to perpetuate and honor histrical events, also plans at a later date to unveil a bronze plaque commemorating the spot where the first voice broadcast from Los Angeles originated. It is expected that the Los Angeles Broadcasters' Association and the Radio Oldtimers' Club will asssit in locating the exact spot and in assisting at the ceremonies.

Low Power DX?

Jimmie Neubauer, W6LVX, thinks W2BUZ is an artist with low power. Recently he went back to a W2 on 40 meters who was QSA 5 R9, but when the W2 failed to return and he thought he had given up and went on working someone else. Shortley, by mail, he received the following dope on a QSL card.

Ur sigs hrd at W2BUZ, RST 5-8-9x wid a fb note es vy little fade. Receiver used a homemade untuned rf, det, es 1 a.f. U ans our CQ but we were so startled at hearing a W6 cmbak to us tt we forgot to throw xmtr switch till u sined es when tubes finally did heat es we clld u it was too late as u were then wrking a W1 Xmtr hr is only a pr 48's wid 110v on plates so u can understand why so anxious to hr ur rpt on our sigs, stgth, note, QRM, etc. Ant 40 m doublet pr feeders, Ur first W6 es furtherest we knw we've been hrd so pse oblige o. m. es snd us a rpt so we'll hv proof. Best 73's to u o. m. frm W2BUZ.

Harold G. Newman,
% R. Cabanellas, W2BNJ,
505 West 111th Street, New ork City

Jimmie says that he was really surprised to get the above card, because as we have said before, the signals of W2BUZ were QSA 5, R9 and comparable to the average 40 meter sigs. However radio can do strange things.

▼

When you find it necessary to climb that 80 foot mast of yours be sure to wear a light fall coat.

▼

Pierson-DeLane, Inc., Los Angeles, recently established to take over the manufacture and distribution of the PR-15 Communications Receivers formerly handled by the Patterson Radio Co., has gone into complete production and announces that, starting December 15th, they will be able to ship sets the same day the order is received.

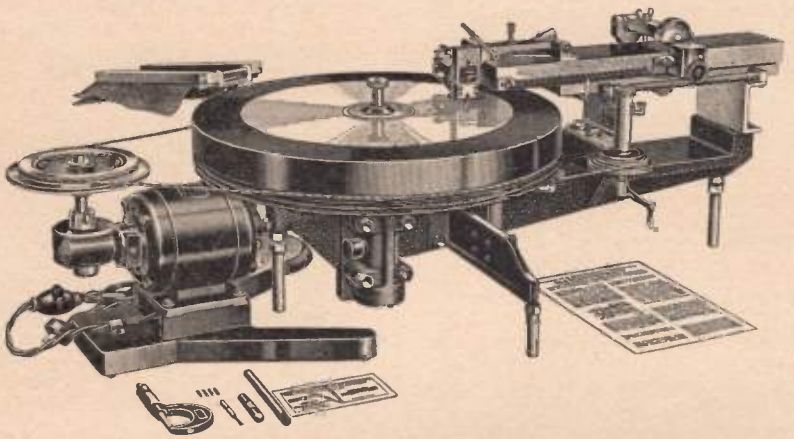
There will be no radical change in either cabinets or the technical design. National sales will be in charge of Charles Weinberg(who recently resigned from the sales managers post with Patterson to accept a similar position with the new organization.

The PR Communications Receivers have been the fastest selling items in their class the past ten years and thousands of amateurs the world over have been ardent boosters for the instrument.

"Custom-built" for the purpose, the receiver have been in demand by various types of radi enthusiasts, but the principal sale has bee among amateurs.

Advance Disc Recording

BY THE UNIVERSAL MICROPHONE CO.
Recording Division



INTRODUCTION

In a subject as great and of so much importance as the recording industry, the most notable and interesting phenomena is its comparatively slow but positive development. There are in fact three, or perhaps four, notable dates and names to be conjured with recording, and their span of years runs over eighty. In truth, other day phenomena, such as radio, telephone, etc., shows slow development too. It is interesting to note, however, that although we cannot actually tie all three industries together, in the final analysis each is highly correlated to the other, and each highly indebted to the other.

It was only a few years ago (1857) that a Frenchman made the first sound recordings known in history. Unfortunately this man, Leon Scott, had not thought of ways to reproduce his wavy lines recorded on a cylinder, in smoked paper. That he knew of the existence of sound waves is unnecessary to say. Fully twenty years later (1877) our own Edison did record and reproduce sound from a cylinder covered with foil, and wthin a few years he was doing the same trick on a wax cylinder. From there the development of our present day recordings was highlighted by the introduction of the flat disc and the process of making many copies therefrom. The next great event was the introduction of the electrical method of recording which took place during 1926 and 1927.

From this point we can truly say the industry advanced by leaps bounds, and with the aid of electrical amplifiers, mcrophones and cutting heads it is now possible to reproduce music and sound to such a high degree that it becomes almost impossible to distinguish the recorded sound from the original. During this development it becomes necessary to include at least two more great names to our small list, and although their developments were not for the recording industry, indirectly it made possible the last great electrical development. These are Dr. Lee DeForest, inventor of the Triode Vacuum tube, and Alexander Graham Bell, inventor of the telephone.

Thus concludes the rather brief history of the recording industry. But its development is far from finished. That eminent conductor Leopold Stokowski, in a recent radio address said, "It will not be long before recorded and transmitted music will even surpass in quality what the human ear actually hears at a concert."

BLANK DISC RECORDING

Under this heading we come upon three types of blank discs in use the first and oldest is the Wax blank which is very interesting and we refer you to a "Treatise on Practical Wax Recording" published by Universal Microphone Co., Ltd. for a complete discussion thereof. The second is the blank aluminum disc. Much fine work has been produced on aluminum and beautiful results are regularly obtained, invariably in keeping however, with the class of equipment used. It is regretted that in too many cases blank aluminum is used with inferior associate equipment, such as amplifier, microphone and cutting head, and it is for this reason that satisfactory results have not always been attained. In recording on this material a sapphire stylus is used, with a small diameter highly polished point.

Of the reams of copy that have already been published on the subject of instantaneous recording, the writer has found little "bona fide" or inside information explained in such a manner as to put across its point without confusion. It is with this in mind that this new edition of "Advanced Disc Recording" was conceived and written to benefit both advanced recordists and amateurs alike.

RECORDING

On this subject we shall discuss the lateral type of recording and leave vertical recording (hill and dale) for future work, mainly because lateral recording is the method in use in the great majority of studios today and because it is by far the simplest and most practical type of recording, plus the fact that good lateral recording is today developed to a very high standard.

Probably the most important reason for using aluminum disc is that aluminum, if played with cactus needles will last indefinitely.

The third and finest type of instantaneous recording is that done on cellulose nitrate or acetate blanks, which is taken up at length in the following article.

PREGROOVED RECORDING

Recording on pregrooved materials is only suited to the amateur recordist because it begins to give him an understanding of what it takes to make a record, and secondly because the initial outlay required to start this type of recording is low.

Frequency response and modulation are both limited however, due to the excessive damping of the groove side walls and pressure of from 18 to 22 ounces necessary on the stylus. This limitation of frequency response and the loud groove hiss has passed pregrooved records into a period of four or five years ago, and they are not considered at this late date.

BLANK ALUMINUM RECORDING

Recording on blank aluminum is usually the graduating step the amateur recordist take in getting out of the pregrooved class. Blank aluminum recording when made on the type of equipment used to record on wax and acetates gives a result that will surprise most experienced recordists. The lack of appreciation and understanding of blank aluminum recording is due mainly to the lack of high quality equipment generally used to obtain the result. There are three very fine types of blank aluminum recorders, the heavier and larger one giving of course the finer result due to indirect synchronous motor coupling 110 pound turntable and many other refinements. Aluminum recorders require much less motor power than acetate (or cellulose nitrate) recorders, thus small governor controlled turntable motors can successfully be used. Governor controlled motors however, should never be used for recording on acetate or cellulose nitrate materials, due to the fact that from four to five times more power is required. This, together with the fact that the load differential between an inside groove and an outside groove is enormously increased when actually removing a thread of acetate material, as against simply creasing a shallow groove in the processed aluminum, absolutely prohibits the use of anything but a well powered synchronous motor on the cellulose nitrates and acetates.

Note that the same cutting head is used on all machines, showing that the cutting head alone is not the complete answer to getting th best results, but that mechanical filtering an stability plays a far more important part tha it is possible for the beginner to realize.

Assuming that the operator has tired c pregrooved recording and wishes now to recor on blank aluminum, he can without much furthe outlay of cash, purchase an efficient recorde complete with two speed motor, lead screw Professional type of push-pull cutting head, an volume control, etc. and thereby obtain highl improved results, by eliminating the high groov distortion present in regrooved recordings. Fror this point further improvement may graduall be made, by acquiring in the following approxi mate order, a recording amplifier, high and lov pass filters, and eventually the heavy lathe typ Professional recorder.

Getting back to the process of recordin on blank aluminum, we first check our lea screw assembly (see Fig. No. 1) for binds, a the motor is rotating, by grasping the lead screw between the thumb and forefinger, and gentl trying to revolve same in either direction. Th correct result is to have play in the lead screw A lack of play or freedom indicates a binc causing an uneven load on the motor durin each revolution of the lead screw which is ap to result in waver or "wows" in the recordinc This may be corrected by setting the outboar bearing at the proper height. Another importan check to make is to hold the lead screw an try to gently move it from left to right. Her again there should be play, the lack of which wil produce the same bad results as in the first case

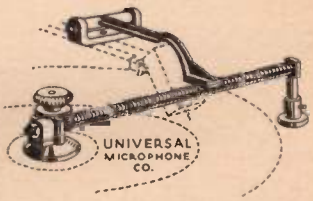


Figure No. 1

A sapphire stylus is next inserted in the cut ting head, making sure that the set screw i holding it tightly. Assuming this has bee checked, we now determine the angle of th needle which should be in the vicinity of 2 degrees. (See Fig. No. 2). At this point th operator is ready for his first test recording, an will undoubtedly be surprised at the differenc in quality between the pregrooved and ungroove methods of recording.

Aluminum recordings have very definite ad vantages over every other type of recording i that the records once made are absolutely per manent if used with a pickup designed for lov record wear. Such a pickup is available an it should be noted that it has a sixteen incl arm, (recommended for any size record) pivote in ball bearings at the back pivot point thereb allowing perfect freedom and an absolute mini mum of sidewall wear. The armature in thi pickup is extremely free in its mountings, whicl

also minimizes record groove wear. The last and important point in the use of aluminum records, is that they should be played only with a cactus, bamboo or other non-metallic needle, and never with a steel needle.

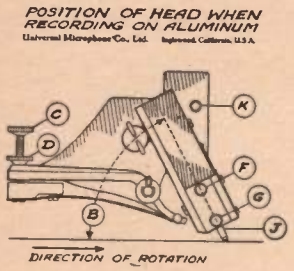


Figure No. 2

Probably the best needle is the Burma Thorn, or red cactus, which although fairly expensive, can be resharpened many times, thereby bringing the cost down to what an ordinary steel phonograph needle would cost. Due to the hardness of the Burma Thorn it reproduces much higher frequencies than any other type of fibre needle. See Fig. No. 3, showing how in playing aluminum records the needle should ride the bottom of the groove and also how it is possible for the needle to ride between grooves being held there by the ridge on each side of the actual groove. Also, how a worn fibre needle may run over the sides of the actual groove.

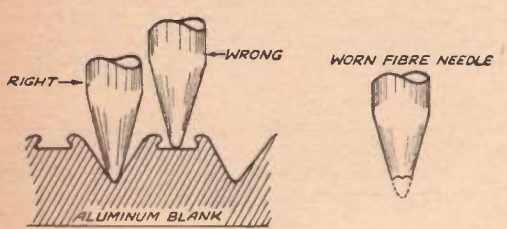


Figure No. 3

ACETATE RECORDING

The word acetate, in recording is a misnomer, but is in common use for the semi-plastic, (usually black) material used for this high quality type of work in the instantaneous field. It is cut in a manner similar to wax and it has been the prediction of many experienced recordists that "Acetate would one day replace wax as a recording medium." This prediction is not far fetched, and one only has to look back two years to see the great improvement made in cellulose-nitrate discs which, incidentally, comes closer to describing the material used than the word acetate.

As previously stated, record materials, cutting heads, etc., alone cannot produce good recordings. Acetate is the finest type of recording made, but it can only be as fine as the associated equipment will permit it to be, i.e., a light turntable, average amplifier, and non-syncronous, or syncronous, motor of insufficient torque will certainly not produce a fine recording, even if a cutting head worth a thousand dollars is used with this incorrectly designed equipment. The same of course, applies to aluminum or any other type of recording, just as it applies to life in that old saying "we only get out of life what we put into it."

In dealing with this intricate subject we shall try to treat separately each component part that goes toward the making of fine recordings. Where overlapping subjects occur the reader will know that it is well nigh impossible to prevent this as each subject treated here must in the end be all interwoven to produce one complete working unit and understanding of the whole.

RECORDING AMPLIFIERS

On this subject it is impossible to say too much and we must apologize to the reader for the lack of space to say all that is necessary. We do however, cover the subject generally with notes and warnings as to what to watch out for. The main requirements of a fine recording amplifier are: It must be class "A" prime in all stages and only the best of parts can be tolerated. The recording amplifier should be capable of at least 5 watts undistorted output, which means the amplifier must have at least 12 watts maximum. Also, in making air checks, a tuned radio frequency pick-up source for the amplifier is much preferable to a superheterodyne circuit—the former giving by far the clearest signal and widest range signal.

Since the low frequency response characteristic of all lateral disc records is limited by the distance between adjacent recording grooves, it is essential in recording to use an amplifier with a rising characteristic, while the playback amplifier should have a falling characteristic, giving an overall result that is quite flat. This procedure is necessary for two reasons: First, the distance between grooves on a record limits the amount of bass than can be recorded and if we do not attenuate the frequencies below 250 cycles, our overall volume level will suffer. Second, all record background (needle scratch) frequencies lie mostly above 2500 cycles; thus, if we accentuate the high frequencies in recording and attenuate them in playback, we get in addition to maximum volume and flat frequency results, a background noise level that is extremely low compared to the volume level. Thus when using a single amplifier or channel of flat frequency characteristics for both recording and reproduction, it is necessary to use a high-pass filter in recording and a low-pass filter in reproducing.

We wish to caution the reader against the use of a Public Address or other type of amplifier for recording. By all means use a recording amplifier, the following being the absolute requirements.

1—Must be class A circuit.
2—Must have at least 12 watts total output.
3—Must be absolutely without hum or ripple, as the least trace of hum will be communicated to the record groove, causing shattered highs.
4—Should have built in high and low pass filters.

Don't try to influence the characteristics of your recorded music by adjustment of cutting head, use your filters instead. Keep it clean and free from metallic particles, but leave the adjustments alone. In the first place simple logic will tell you that no mechanism can stand continuous adjustment, also that the only way to obtain the desired result is to follow the procedure outlined elsewhere on handling your filters to obtain results. Don't labor under the impression that you can feed anything that comes through your sound channel to the cutting head and that the cutting head has the magical ability to revise what it receives, discarding the bad and keeping only the good musical qualities. It has no such ability or even tendency. The cutting head will record exactly what it receives—therefore the recordist should give it the purest and clearest sound it is possible to obtain.

Another argument often heard runs something like this, "My amplifier gives perfect results and on a loud speaker sounds as good as any I have ever heard. Why don't I get better quality recordings?"

The answer is—You have a good public address amplifier and it should be used as such. The fact that you do not get good recordings through your amplifier proves that it is not a recording amplifier. It might be the best public address amplifier in the world, but is not suitable for recording. The fact that it sounds good operating a speaker in open air does not prove that it will operate an armature with a stylus set in acetate against the resistance load of the material and do the same things.

CUTTING HEADS

Little need be said on the fact that pick-ups were not designed to be used as cutting heads, regardless of what little tricks are used to stiffen the amature. True enough, a result of some sort will be obtained, but since this result belongs strictly to the experimental class, we shall leave this subject where it stands.

ADJUSTMENT OF CUTTING HEADS

Each cutting head is carefully adjusted, tested and sealed at the factory at the time of manufacture, and in addition is again tested before packing for shipment to insure its reaching the user in perfect condition. If it is found necessary to change the factory adjustment to meet the conditions of the indivdual set-up, use the following procedure.

First make sure that there are no particles of magnetic material between pole pieces and armature. Like any permanent magnetic device, they are prone to annex any stray filings or metal particles during the course of handling from benches, desks, and often from packing material. If any particles are found present, the permanent magnet should be removed and particles blown out by air pressure. The permanent magnet must also be cleaned since any stray magnetic particles will eventually find their way to the point of strongest field, i.e., the space between armature and pole pieces.

The next step is to center the armature w the least possible pressure of the dampers. T simplest way to do this is to loosen all damp by unscrewing all four damping screws (the fo 2-56 screws FF and GG Fig. No. 4 allow armature to snap from side to side when pressu is applied to the stylus. In this condition, armature will tend to freeze to the pole pie on whichever side it is pushed. Pressure shou then be applied by screwing in one of the

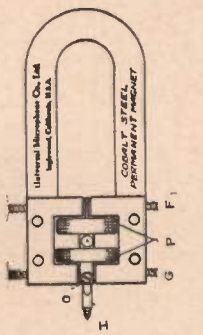


Figure No. 4

dampers until the armature is forced free fr one side and snaps over to the opposite si When this point has been determined, the da per should be backed off one turn and the sa procedure taken with the opposite damper. Ha ing found this adjustment with the second da per, it should be backed off one turn. The sa procedure should then be applied to the t lower dampers, and when their proper setting h been determined, all four should be screwed one turn, which will give equal pressure at four points. The head will then be in its m sensitive normal adjustment, and when used w the Universal Professional Recording Amplifi will have its maximum output and broad frequency response.

MICROPHONES

With the sudden and recent rise of inter in recording, the electronic industry has play one of its favorite tricks. Although it has r been known to the general public, the conden microphone has played the most import part in all types of recordings and has, a still is in use in motion picture recording most cases. Not accepting these facts whi might be considered hearsay, we have ma exhaustive tests at our laboratories and ha found the condenser microphone the most ide for recording. For special effects in orches pick-up, a dynamic microphone is very good.

MOTORS, DRIVES AND TURNTABLES

Undoubtedly, the only types of motors fitt for high quality recording are the interlocki or synchronous types. Although it is argued th synchronous motors require a great deal of mec anical filtering, detachment of a synchron

motor from a heavy balanced turn-table will eliminate any and all vibration set up by the synchronous motor. The drive from motor to turntable is achieved by the used of fine endless belts, and the mass and fine balance of the turntable (110 lbs.) gives such a high moment of inertia, as to make practically impossible speed variation and vibration rumbles detectable to the human ear. In fact speed is so constant with the type of equipment mentioned, that if two oscilloscopes were placed side by side and the output of an audio-oscillator fed into one oscilloscope and ot the recording head; and the second oscilloscope fed from the disc via an electric pickup, the human eye could not detect the difference. Although many other types of motors and couplings are in use, we have found none to give as fine a result as the one described. The use of a powerful synchronous motor with a 110 lb. turntable also overcomes without speed variation the vast difference in load caused by the cutting stylus on the blank disc when recording extreme differences in volume levels.

CUTTING STYLI

In order to obtain a perfect groove, it naturally follows that the cutting tool must be of the highest order; a chipped edge or broken stylus point will result in groove deformities that take the pattern of the defective stylus; while dull cutting edges will result in torn and ragged side walls.

Thus it is of importance to know the exact condition of the cutting edge, and since it is entirely too small to be even superficially examined by the naked eye, (the thread removed by the stylus being of the approximate size of a human hair) we must resort to the use of a

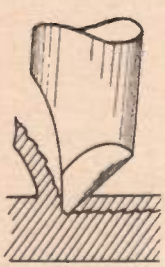


Figure No. 5

good microscope of at least 60 power in order to enable us to examine the side walls of the groove and most important, the cutting edges that produce them.

In order to acquaint the user with the hazards to be avoided, it would be well be examine several used styli and especially note defects as follows:

Natural wear of a cutting point becomes first apparent at the surface line, resulting in two dulled spots, one on either side of the point, averaging .0025" from the top. This is caused by the fact that the surface tension of the disc is much harder than it is down in the body of the material, which naturally causes more wear at the sides of the cutter than at the nose and tip.

The effect is obviously a narrower groove, resulting in inability of the playback needle to properly couple to the groove, and with torn upper side walls and edges, results in excessive surface noise in playback. This natural wear of the cutting point can be greatly alleviated and the useful life of the cutting point thereby prolonged by the use of a proper cutting lubricant, which at the same time assists in cooling the stylus. This cooling action of the lubricant assists in maintaining the temper of the stylus in the case of steel, and prevents chipping of the edges of the cutting point in the case of sapphires.

The cutting lubricant should be applied to the surface of the record just before recording. A cloth should be slightly moistened with lubricant and applied to the record just before making the cut. Use the lubricant sparingly, as it is only necessary to cover the surface without excess. A few drops on the cloth is sufficient for a 12" blank.

After the recording has been made and the waste thread removed, any surplus lubricant may be wiped off. However, the lubricant is not an oil and acts also as a preservative. It is well to leave a slight surplus on the disc in order to lengthen its life and lessen the wear and tear.

The next point of examination should be the extreme tip of the cutting point. While it is not subject to extreme wear at the point, its sharpness and uniformity is of no less importance. Any deformity in the tip (Fig. No. 5) will result in a tendency to modulate the groove with an extremely high frequency, generally above audibility, but apparent at normal groove speeds by an extremely high hissing sound. Close examination of a groove under these adverse conditions will reveal the minute modulations, mostly in a hill and dale direction. When the tendency is only slight, these moduations will appear only at the groove bottom, the side walls appearing comparatively free, while if the condition is in its most aggravated form, the modulations will appear throughout the entire groove, and its frequency may drop down to the upper limits of audibility. When above audibilty, such conditions on a record can be determined by slowly rotating the turntable by hand, thus bringing the frequency down to an audible range, so that the condition can be heard through the playback system.

When the tendency to whistle is only slight, it can generally be eliminated by readjusting the angularity until it disappears. However, if such adjustment fails to eliminate, obviously the stylus must be discarded or, in the case of sapphire, returned to the factory for resharpening and polishing.

Steel styli, even though made of the toughest and highest temper metal available, are still softer than sapphires, and thus are more subject to point damage. They should be kept in the special styli holders in which they are shipped from the factory, and in no event should the point be allowed to come in contact with anything but the packing provided in the container.

Steel styli which have been shipped or handled in bulk invariably have damaged points. Also, care must be taken in handling that the point and cutting edges do not come in contact with the fingers since an infinitesimal amount of perspiration immediately starts corrosion, which in a few hours time completely ruins the highly polished razor sharp edges of the steel styli.

LIFE OF CUTTING STYLI

With reference to sapphire styli. unfortunately, stone is a growth of nature and the hardness and texture cannot be measured and therefore no absolute guarantee can be given. They can be resharpened, however, and since the cost of such resharpening is only $1.00 net, the overall cost per record face is lowered. Some sapphire styli cut a great number of records while others a lesser number.

Diamonds are harder than sapphires and cost many times as much. They are not generally as perfectly polished as sapphires. Sapphires are polished with diamond dust, but when it comes to diamonds, there is nothing harder to use as a polishing medium, therefore the lack of polish. Also, being harder, they are more brittle and liable to loss by breaking off the point.

Steel styli, while much lower in original cost, than sapphire styli, have many additional hazards not common to the sapphire, and since even the hardest steels are softer than sapphires, the cutting life of the steel styli is much shorter than that of the sapphire. Considering shorter cutting life, lack of rigidity and uniformity, possible increased cost due to loss of studio time, talent, and attendant overhead, the sapphire cutting styli is by far the lowest priced in the long run, and the one that will definitely give the better recording.

(To be continued)

In the next article we will give you the information on record material, depth of cut, determining time of recording and playback, tone compensation in pressings, size of blanks to use, kind of pressed material to use, monitoring,, use of high and low pass filter, how to minimize groove noise, piano recording and a general discussion on recording.

Tank Coil Considerations

(Continued from page 6)

sense aids to efficiency has been violated, thus cancelling, to some degree, the merits of an otherwise well designed inductance.

No doubt about it, the trend of the times is to buy quality in commercially manufactured coils. Here as elsewhere we have a right to expect more than just the physical object for our money. We have a right to expect that every coil for which we part with some of our money shall bring to our service the advantages of competent engineering and construction. However, not all transmitter builders are able financially to do this. Others find too much satisfaction in the actual construction of their gear to let them buy what they can make for themselves. Fair enough; these do not need to spend endless hours in cutting and trying in the search for the best design; nor do they need to accept poor results for want of such effort. A few tested practical rules, such as we have mentioned will at least lead to good performance that will be a revelation to those who have, in the past, taken their coils too much for granted.

▼

HERE IS SOMETHING!

Have you seen those nice shiny nickel plated call pins that the boys are wearing in their coat lapel? These pins are being given away Free by the Radio Supply Co., Los Angeles, in conjunction with the Taylor Tube Co. All you have to do to get one is to cut off the top of Taylor Tube cartons. This offer is for a limited time so if you want one of those pins, read the details on page 2 of this issue and take advantage of one of the sweetest little call letter pins you ever saw in your life.

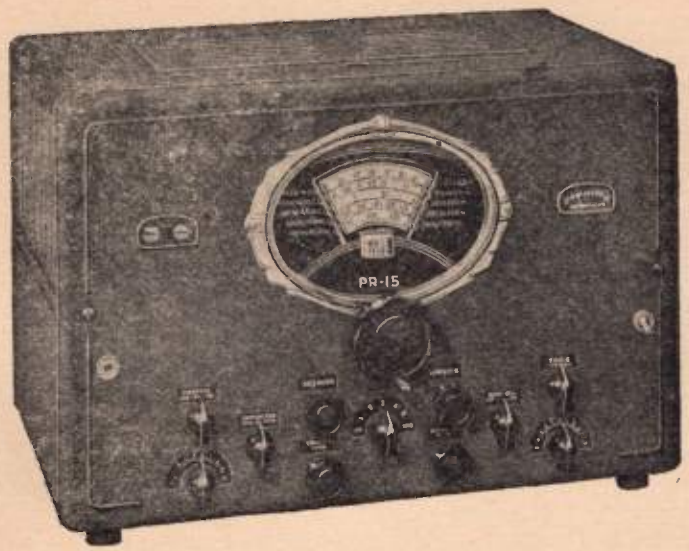
▼

A little melted resin can be used to solder broken meter hands and pointers together again when broken.

If your raw A. C. note is causing QRM see that the matter is rectified. What.

"PR-15"

15 Tubes
●
12 Inch
DYNAMIC
SPEAKER



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5 METER Activities

By Ray Stevenson—W6HDV

W6NQD has moved to a new qra which is very much better for his five meter fixed station. He still goes mobile also. His XYL, Eloise, certainly can handle a qso with dispatch. And her Postum tastes very good too.

We have a new portable call out here signing W2KNZ who has provided many fb contacts for the boys out here. He hails from New York City, and he is looking forward to a W6 call. His name is Marvin Springer.

W6OPF is still punching a hole in the Ether with his 10-T long line osc. Has crystal quality.

A new call worked from Lookout Mt. is W6CBH on five. Has good signals and I hope to work him again soon. W6MMJ in Long Beach has a nice sounding rig. W6AM has been heard on several occasions in and around L. B.

W6MVN is also operating Portable in Los Angeles.

Worked both W6CKV and W6KBN who were mobile on Signal Hill. W6CKV was down here from Susanville to see his team, U.C. play U.C.L.A. and also for the home-coming get together for the Alumni. He seemed surprised at 5 meter activities down here.

I worked W6VQ at Pacific Beach on Oct. 29th at 10:00 P. M. Conditions were very poor. Lots of floating A.C. over the band from power lines.

October 31st, I worked W6OJB of Oak Glen at 6:40 P. M.

Oak Glen is located about 90 miles east of L. A. and east of Redlands. R7 reports were exchanged and a fb qso was had despite bad qrm from ten meter harmonics from stations in and around Beverly Hills.

Those ten meter stations should pay some attention to their harmonics. W6GNZ lives right around the corner from me and I have yet to hear his harmonic, which goes to show it can be partially eliminated.

W6MYR is another steady portable-mobile station. Jack really travels around and makes many tests to get the utmost efficiency out of his rig.

W6RR has not been heard on recently. Can it be his Class B Modulation equipment has arrived?

How about it, Doc?

Heard W6BIH call me several times but conditions have been so bad lately that I could not pull him through. Sorry, Merve.

W6VQ said that W6OIN and W6MKS were both in San Diego but I did not hear them.

W6PDK has been going mobile lately and has been hooking the fellows OK. But I don't know about any dx for him.

W6PAK who lives in Northeast L. A. has been active on five mobile. We had a five hour qso while driving to Big Tujunga Canyon. Fording deep creeks and all, to no avail as the people we were to meet failed to show up. But we had the ride and qso anyway.

On September 19th, W6PCI and W6LEE maintained constant communication from Palos Verdes to the S. S. Catalina. W6PCI was portable-mobile on Palos Verdes using a '76-'41 Transceiver, and W6LEE used a 6C5-6F6 Transceiver portable-marine on the S. S. Catalina.

Communication was established from Wilmington Harbor to Catalina Island with R9 reports on both ends all the way over.

W6PCI also contacted W6OIN, our old friend Ray, who was portable-mobile on Lyons Peak, (San Diego County), and W6LFN at vista also in San Diego County, with R7-8 reports received.

W6PCI is a former fifth district ham with the call W5ENR. We wish you lots of dx out here George. Please inform me of your future activities.

After winning that nice half wave telescope antenna, I fastened it on my rear bumper and left it just as it came, end fed with fifteen feet of feeder and while getting my car greased I stayed in the car and while it was elevated to a height of about ten feet, I hooked up with W6OPF, using my quarter-wave antenna.

Changing over to the half-wave increased my signal strength about 2 or 3 R's So that antenna is going to get a washout.

Can't use Wolf's Peak any more as Lew Ayres house is almost completed and there isn't any room to park up there. So you fellows will have to use Lookout Mountain.

Those chaps in the East are certainly going to town on 5 meters. Of course we have worked from the Ridge Route to San Diego but can't seem to get over the Ridge to the North, although it has been reported even W7 stations have been heard here. It seems that we So. Calif. hams must emulate the East and use beams if we want to do anything. Such as being heard on the Empire State Bldg., like W6DOB! Boy, what a thrill!

We may be able to reach those chaps in Arizona who are going to experiment next Sunday, November 7th. Which dope I hope to obtain before this issue goes to press.

W6LAK had yours truly as one of his guests the other evening and it seems he has given 56 mc the go-by for the lower frequencies. He has two nice rigs at home and a fb operating position. He also has a garage light that does things on 56 mc! His XYL, Hazel is getting too good as a bowler, she beat me a game! My off night, oh yeah!

I wish you fellows would send in some dope on your 5 meter activity. It will seem a bit one-sided if I put everything in by myself. So how about a little cooperation?

What has happened to W6OTF in Altadena. Haven't heard him on for sometime. Also W6NYW.

There has been a lot of diversified opinions regarding my article on bootleg stations in the last issue. But, it has only been a couple of weeks, so lets give them a chance to straighten things out in their own club, and keep their words, regarding non-operation.

Now, a word, on the Convention held in Tempe, Arizona. Boy, what a convention! I have never yet visited a Convention City that was so hospitable. Nor a Convention so ably put on and conducted. My hat is certainly off to W6BUQ, Red Harkins and his charming XYL who made such unstinting efforts in makeing it a convention worth remembering. Thanks, Red O. M.

▼

A ham that could not take it any longer was at last placed in an insane asylum, but all he would do was sit and fish over a flower bed.

A visitor wishing to be friendly walked up and said, "How many have you caught to day?"

"You're the ninth," replied the fisherman.

●

"Mr. Jones, dad wants to borrow your corkscrew."

"All right sonny," said Jones, reaching for his coat. "You run along home—I'll bring it over."

THE SHACK

By Truman E. (Ted) Lamb

Many things have been said pro and con on Ham Rigs and Receivers, but the poor old shack is never mentioned. So here is one on "Shack."

In the first place Shacks range anywhere from a few boards thrown together to small elaborate stucco buildings. We must bear in mind that the shack houses our fondest possessions in Radio equipment and should deserve to be a fairly respectable building and at the same time an economically constructed one. You may have a spare room in your home and say to yourself "Why bother about a shack." Well and good, but you know if there is anything a ham dislikes it is QRM other than his own. So that lets the rest of the family out, and he can make all of the squeals and howls that he wants in his shack on the back of the lot without disturbing anyone else. So that's something.

Now that is over with, so let us say a few words about the shack here at W6PGJ. There is nothing better than number two common lumber throughout the whole building. The mud sills are 3x4 Redwood, straight and free of knots (incidently picked up at a wrecking company). The floor joists are a good grade of No. 2 common 2x4's, same with all of the studding. The sheeting is the regular 4 inch Redwood of the second grade. While the interior is of knotty pine. Now wait a minute, don't throw a fit, this pine is not as expensive as you might think. It happens to be ⅜ inch thick by 8 inches wide and was also procured from a small lumber company who had a supply of it on hand and it compares quite favorably with the 1x12 inch stuff, when you have it all nailed up. (The air may be full of QRM by the time you get the first few boards up but after that you will get the knack of it and the rest will be easy). Well, we will top this off by just dropping a few of our old familiar Asbestos shingles on for a roof and there you have a "Shack" to be proud of, and it didn't cost a million either. The shack here contains a 120 watt xmtr and a FB PR-15 Receiver.

A NEW Dynamic MICROPHONE

Absolutely no hum pick-up. Full rounded bass. Clear brilliant highs. Use it in the hottest climate. Unaffected by heat or moisture. Self energizing. —No polarizing voltage or button current required. Just plug in and use. No hiss of any kind.

High Impedance — direct to grid. Unconditionally guaranteed. Use with amplifiers of 80 d.b. gain or more.

Transformer is double coils on self shielding square core in box lamination giving utmost in fidelity and quality with absolutely no hum.

No other microphone, regardless of type or price, can please in quality of response as much as this ultra new dynamic. So sure are we that this amazing new model will more than satisfy you, we authorize every jobber to give you this guarantee:

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Frequency response 40 to 8000 c.p.s output—58 d.b. — weight 2 lbs. Made in following impedances: High impedance — direct to grid. Also made in 33 ohms, 50 ohms, 500 ohms.

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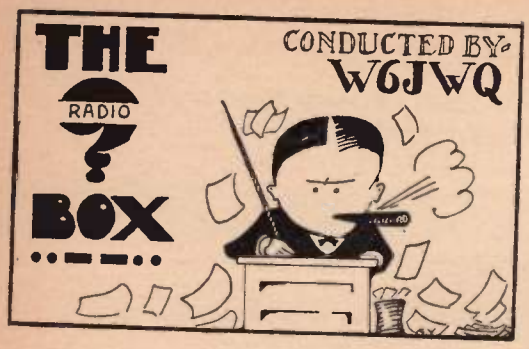


Question: What consideration must be given in the selection of chokes and conditions for use with a high voltage plate supply?

Answer: Choke input is the most desireable for such a filter, but if condenser input is used it must be remembered that the voltage rating must be 1.4 times the RMS voltage rating of the transformer. Assuming that choke input is to be used, the choke should have sufficient inductance and the condenser low enough capacity that the peak load on the rectifiers is not exceeded. The table below gives suitable values for various voltages, based on a 60 cycle supply using 866 rectifiers.

A.C. input volts per tube	Max.D.C. output v. to filter	Min. induct. in henries	Max. cond. cap.	Max. D.C. load
2600	2385	6.0	1.6	.5 amp.
2000	1800	4.9	1.8	.5 amp.
1500	1350	3.3	2.8	.5 amp.
1000	900	2.1	4.2	.5 amp.

These constants often give adequate filtering and if greater freedom from ripple is required the inductance of the choke coil may be increased, with an accompanying proportional increase in capacity desired, or a second filter section may be employed.

Question: Please give a formula for finding the best capacity of tank condenser for a final R. F. amplifier.

Answer: Some difference of opinion exists as to the best capacity-inductance ratio for the final class "C" tank circuit, but the formula below will give values which are quite ideal for high efficiency, yet keeping the harmonic content at a satisfactory level. It will be noted that the size of the condenser will be controlled by the ratio of plate current and voltage, by whether phone or C. W. and by whether push pull or single ended, as well as by the frequency at which the amplifier is operated.

$$\text{Tank capacity (mmf.)} = \frac{\text{plate current (ma.)}}{\text{plate volts} \times \text{frequency (mc.)}} \times K$$

K is a constant depending on the circuit and is as follows:

Single ended C. W.—2600
Single ended phone—5200
Push pull C. W.—650
Push pull phone—1300

Example: What capacity should be used on an amplifier using 2, 35T's in push pull phone operating at 1500 volts and 250 mills on 30 mc.

$$\text{Cap.} = \frac{250}{1500 \times 30} \times 1300 = 7.2 \text{ mmf.}$$

This capacity should include circuit capacities. The inductance should of course be such as to properly match this capacity.

AN APOLOGY

Through an oversight on our part we forgot to tell the readers that P. S. Daniells, W6LMT, of Modesto, was the gentleman who so kindly sent in those pictures of the Stockton Convention. We wish to thank you for them Mr. Daniells.

Hammarlund Develops New Type Console for "Super-Pro" Receiver

After a year of development and engineering research, the enginers of Hammarlund Mfg. Co., Inc., 424 W. 33rd st., New York City, have now created a new type of console to house the popular "Super-Pro" professional receiver. Thus, the professional performance provided by this precision instrument, heretofore, available only in table model or rack and panel style, can now be enjoyed by those at home.

The console, of the classic modern style, is exceptionally attractive with burl, matched and oriental walnut artistically blended. In addition, the console has remarkable acoustical properties skillfully developed to match the other advanced features of the "Super-Pro" receiver. This

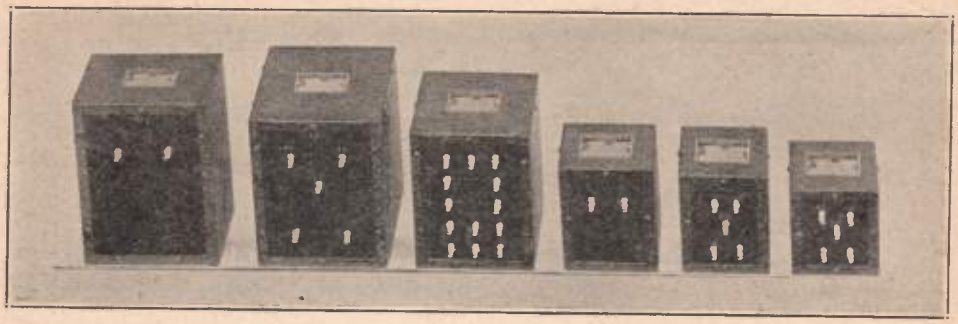
striking acoustical performance is achieved with a new bass reflex sound chamber and a special 15" speaker. The bass reflex system increases the range of the loud speaker approximately an octave. Its design also eliminates the "boominess" of cabinet reasonance providing the reproduction of the natural brilliant tones as they are transmitted.

The receiver itself is identical to the standard model, with its many outstanding advanced features including — 3 to 16 kc. variable bandwidth; electrical band spread; direct tuning; two tuned R. F. stages on all bands, etc.

Models for three tuning ranges are available to cover the 7½ to 240, 15 to 560, and 15 to 2000 meters. The console is 29¾"x18"x44½".

SKAGGS SYMMETRICAL AMATEUR TRANSFORMERS

This Complete Line Cased And Compound Filled As Illustrated Below



Transmitting Plate Transformers

Cased and Compound Filled As Illustrated Above

A. C. Volts C. T.	M. A.	D. C. Volts	Price
750—1000—1400	250	300— 400— 500	$4.50
1400—1550—1950	250	500— 600— 750	7.00
1550—1700—2350	300	600— 750—1000	8.00
1700—2350—2950	350	750—1000—1250	14.00
1700—2350—2950	500	750—1000—1250	17.00
2350—2950—3500	300	1000—1250—1500	11.00
2350—3500—4700	350	1000—1500—2000	20.00
2350—3500—4700	500	1000—1500—2000	25.00
2350—3500—4700	750	1000—1500—2000	30.00
2350—4700—7000	500	1000—2000—3000	30.00
2350—4700—7000	750	1000—2000—3000	40.00

Transmitting Chokes

Cased and Compound Filled As Illustrated Above

M. A.	Swinging Chokes 60/12 Henries	Smoothing Chokes 20 Henries	Smoothing Chokes 30 Henries	Modulation Chokes 50 Henries	Volts Insulation
100	$4.00	$5.00	$6.00	$8.00	2500
150	4.50	6.00	7.50	9.00	2500
200	5.00	7.00	9.00	10.00	2500
250	6.00	9.00	12.00	14.00	5000
300	6.75	10.00	13.50	16.00	5000
350	7.00	11.00	15.00	18.00	5000
500	9.00	13.00	19.00	24.00	10,000
750	12.00	16.00	23.00	35.00	10,000

Above prices subject to change without notice

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SKAGGS TRANSFORMER CO.

5894 South Broadway — Los Angeles, Calif.

Phone ADams 7652

By Ray Harmon, W6GHU

Now all you little boys who shag after this thing called DX get together and hold hands, then we'll sing to the tune of "JINGLE BELLS" —"What has happened to the 20 meter band--tra-la-la-la-la?" Or maybe something sarcastic would help the cause along. When Mrs. Perrine's son Charlie brought out his schedule for fading periods in DX we didn't see anything in it showing where the twenty meter band faded out and stayed out. Of course we can't blame Charley for that because he has a new final on the air with a couple of bottles in the final that look like a pair of 5 gallon water jugs from Sparkletts or the like and he has been sitting around waiting for a chance to use them on some real DX, but for the last three weeks there doesn't seem to be anything to rave about other than OX2QY who just handles traffic and seems to be an impossibility for some of us.

CUH has a new multi-wire "Q" antenna with the bottom 7 ft. off ground—works fine for "W" qso's. Charley now has 7 new countries including OX2QY who was worked on C. W. in the fone band. Now has dope on 122 different countries! ! !

This new "Century Club" has sure been great stuff for some of us—for when some guy starts to fill our ear full of bull we generally stop them by merely saying, — "How many countries can you prove?" Try it on them some time. Then there is always that bunch that say, "Yeah, I can prove enough countries to get in the club or to get listed, but I don't want to take them down, it would make the walls look bare." Then, there's the bunch who say, "Sure, I'm eligible, but I don't want to take the chance of losing them in the mail!" To them we say, "NUTS!" Any ham with the necessary cards to back up his claims will send in his cards for mention or a certificate. Or else he is just blowing anyway, "Them's our senneements and begorra weuns will stick to them."

We managed to dig up a lot of the late doings of W6KIP and here are some of the good ones he's been working. The most recent ones—SV1RX, VQ3FAR, FI8AC, VR1AM, CN-8AH, YS2B, CT2BE, FP8PX, HR7WC and VQ8AS. And just recently ZB1H for his 109th country and 37th zone. Some of Alex's new cards might be of interest to some of you—VS7RF, VS4JS, FY8A, PK6AJ (Molucca Isles), PK6HR (New Guinea), HS1BJ, VR4AD, VK-4KC (Papua). Alex is still trying to find out if PK6AJ is a new country as he is in the Molucca Isles far from the coast of New Guinea whose prefix he has assumed. KIP has found DX none to good on 14mc lately and so took a jaunt up to 7mc where worked AU1AU whose real call is U9AB, but for some reason was signing AU1AU. Must be sentimental reasons as that was his old call before the USSR bunch were re-licensed. Alex says he was near 7090kc and comes through much better than the U9's do on 14mc.

From the way the Europeans talk, W6DUC seems to be head W6 over there. Vic holds a daily sked with OK1FF and both of them using bugs. Forgot to mention, this is on ten. Vic uses his 14mc "Q" on 28 mc and finds it to be a nice working antenna—although on ten it becomes two half waves in phase. From what we hear of the Europeans coming back to DUC with invariably r7-9 plus reports, it is enough!

And then we have another report for ten meters that speaks highly for it. W6JFJ of the 20-40 DX club has been quite up against it on 14mc for antennas due to lack of space so he has dropped to ten, and there with enough room for a 28mc "Q" he has been doing some nice work. Getting a lot of new Europeans and others he managed to work 12 new countries in a week and now has 58 countries and 28 zones. Uses a 50t with 150 watts and the 28mc "Q".

And as this seems to be a bunch of success stories on ten meters, W6MHH's story seems to run in nicely. Getting home too late for 14mc night DX and sleeping too late for 14mc morning DX. There seemed nothnig else to do but to try ten. So doubling to ten with a 35T and using 70 watts, Fred managed to work a few Europeans and became so elated with the low power work he promtply fixed his 14mc final for work on ten. The final now is P.P.P. (yeah! four of em—) 801's. With from 200-300 watts. He uses his 14mc "V" beam and although the angle is way off he finds it works vy nicely. Some of MHH's newer DX on ten is: D4QET, LA4P, YM4AA, EI7F, OK1FF, PAAZ, EI6G, PAQZ, TF5C, D3ANK, F8WK, GM5KF, SM-5UM, OH2NB, ON4FT, G6YL, F8RR, PAPN, D4VRR, SM5ZF, G2DH, PACE, F8BS, G6RB, and G5JU. Quite a few of these being new countries which brings MHH up to 58 countries and 31 zones.

All of which brings us to another sore spot. We defy anybody to prove that TF3AZ or TF3AG (of '36 DX contest fame) are really legitimate hams or that they were on Iceland at the time of qso. TF5 C is the only legitimate TF ham on the Iceland territory and the only one that sends cards. Now when are you going

to prove that 3AG or 3AZ are legal to us? Only a card or letter will prove it.

And now as long as we are on the subject of ten meters we think some of W6BAM's work merits a little attention, for among his latest we find: F8RR, OK2CC, PAVI, SM-5UM, G2-YL, TF5C, D4VRR, YM4AA, D4QET, OK1FF, GM6RV, G2KU, G5QY, G5VU, OH2NB, F8-GQ, YR5CF, G5VM, G2IT, OK1CX, D4SDF, G5SR, G5OJ, GM5KF, G2DH, and EI6G to make his 44th different country and 21st zone on ten. BAM now has 90 countries with cards and confirmations from 76 of them. Shelley says that W6NSA and he worked YK7AA on 14400 kc who claimed he was on Bell Island off the coast of Greenland. Anybody have anymore info on him?

From W6BXL we are indebted for the following information on FI8AC; he uses an HRO receiver and pp 210's in the final in a cc rig. The first three days the FI8 was on the air he worked 30 different countries and had over 200 qso's and made WAC three times. He is not a new ham as he used to be on the air in 1926-1927 under the call FI8FAD. His frequency is 14260kc, t9 and he was 6BXL's 80th country. Another thing about him is that he is on fone now and is working CW less everyday and will probably be on fone continually soon, so you better get him while the gettin's good. The same applies on HS1BJ as he works almost all fone nowadays.

W6HEW hasn't been sleeping on the DX lately either, but he has been getting quite disgusted with it. We might add that HEW was the first qso that OQ5AE has had with the USA on his new rig. This rig, by the way, was donated to OQ5AE by personal friends and some society. It was damaged enroute and he has been up to now repairing it. Although the note sounds like a cross between squealing brakes and a pig snore, it comes through nicely on about 14300 kc and OQ5AE is going to use it for fone as soon as the note is fixed up. (My gosh, fone again! can't something be done about this?) HEW is up to 86 countries and 34 zones now with cards from 61 countries and more coming.

Was down to see W6CXW the other night and have a peek at the new "Century Club" certificates. And are they wows! Boy! Oh! Boy! Three colors and darned nice. Henry sent in 101 cards and has since received more so that he can now prove 104 countries! The funny part of it was that Henry found out that U8 is going to be counted as a new country and so he was spending the evening looking for one! U8IB is 14399kc and UK8IA is about 14340kc, t6 and according to advance info it is to be counted as a separate country from Siberia and Russia.

W6NIK is either beating his T20 to death or else he sure has what it takes because the stuff he has been working lately would make some of those boys with Calif. KW's look sick. On 14mc his newer ones are: YU7TE, YR5TP, VQ8AS, CP1AA, OX7GE, FI8AC, and scads of the more common stuff, while on Ten he has added CN8AV. All this with 70 watts and a 80 meter zepp plus a two tube blooper. Sports 55 countries and 31 zones and from what we hear of him on Ten it must be considerably more now.

W6LEE, alias the Terrible Turk, alias The boy with the bandspread note, alias Adolph the malt rooker, alias eeny, meeny, miny and moe the scourges in Europe and other aliases has some more power now that W6MHH has loaned him a 2½ kw transformer and seems to blot the band out in Europe. (Ask ON4AU for an honest opinion.) Besides this the Terrible Turk has worked one on fone that half the boys would give their modulators to get and that one is VP3BG in British Guiana. The freq. is 14130 fone. Another one on fone is FI8AC who was also worked and these give LEE his 58th country and 31st zone. Speaking of transformers, W6MHH won the 2nd grand prize at the convention which was a 2½ kw plate transformer with 4000 and 5000 volts each side at 500 mills. Now MHH is looking around for some tubes to use it on so if any of you want to get rid of some hi-power jugs you know where to go!

W6NMH has so many 8JK beams in his yard now the neighborhood women ask if they can borrow the use of them to hang the weekly wash on. Bob has raised his power to 660 watts on pp 35T's and with this and his beams puts a fair sized signal most anywhere. The beams are one for Europe and another peaked E.W. and another for Europe on Ten. Although he hasn't so many countries as a whole, he is mopping up in Europe and will have plenty soon. (He hopes). Has just purchased a pair of 203Z tubes for modulators and a new Class B output transformer for fone so its our guess that the qrm on the high edge will be considerably less. Has 29 zones and some of the newest work is: ES5D, HA8D, SM5UM, FY8E, G2IM.

Haw! Gee, but some of the guys get the breaks. W6GAL has moved from the fat into the fire or at least that is the intention now. The folks are thinking of moving in close to our neighborhood and W6GAL is moving 4 houses from 6RZ who has an '52 and a block and a half from 6HEW, who has pp 150T's and fairly close to W6NMH who has 600 watts and 6DFO also a kw. Again we say, "Haw." That makes all of this gang within a radius of 1½ miles. 6HEW, DFO, KTH, GHU, MVL, NMH, RZ, LVF, GSL, LWB, GAL, LUR and others too numerous to mention. LWB, GHU and GAL look to be behind the eightball as they are the only ones in the whole bunch with TRF receivers. (Anione having a super to sell cheap—and soon, see GAL and GHU—soon pse).

W6KBD dropped a line or two down here and from what he says there is going to be a new K7 on the air soon, as he has already sent for his RME69 and parts for a new rig. He is now working for the Alaska Daily Press in Juneau. He says there isn't a ham in Alaska that knows the difference between a G1 and a VQ8 so he gets quite lonesome at times. Will have his new K7 call soon and will advise us of it and then he wants to work all his pals long and often. Also says that KRI and his lusty Kw are muchly disliked in Portland, hi. And that W6MR is r364½ in Juneau.

During a qso with W8MAH a week or two ago he gave us a list of frequencies that might be really helpful for the budding ten meter ham or for any ham on ten for that matter:

ZS1AH—28050-28092	CT1KH—28210
ZT6J—28330-28550	YL2CD—28170
ZT6AU—28200	OH2NM—28300
ZE1JJ—28230	LU6AX—28200
ZT6Y—28330-28100	LU5AN—28200
EI9J—28820	FQ8A—28000—dfts
OK2MV—28125-28300	U2NE—28400
CN8AV—28530	VU2CQ—28330

W8MAH says that all these frequencies were checked with a freq. meter and are all quite close. FQ8A is in the territory where he should sign FF8A, but uses FQ8A as he has not received an official license yet.

To our knowledge, W6GAL can prove the most countries outside of 6CXW. George sent in 87 cards for his proof. Some others we know of are HEW—63, BAM—76, KIP—78, GHU—65. These are countries proved.

Please send in all the dope you can lay hands on next month—pse oms.

▼

Customer (in drug store): "I want to buy a 2MF. 2500 Volt filter condenser."

Clerk: "I'm sorry but we don't carry filter condensers."

Customer: "This is a heck of a drug store."

Tempe Convention Hugh Success

All of those who attended the convention at Tempe were mighty well pleased with the way that Red Harkins put over one of the swellest conventions ever held.

The meals that were served were simply scrumptous, one being a barbeque on Saturday night and the other the final banquet.

Tempe was really a swell little town and those of you who did not get there missed a fine time.

The ladies' scavenger hunt was a wow! Imagine a bunch of ladies out gathering sheriff's badges, lawyer's sigs, dried chewing gum, manhole covers, foreign license plates, horseshoes, etc., what fun.

All in all we want to congratulate Red and his wife on the shindig as a whole and wish him all kinds of luck.

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TUBE CONTEST

If you want to get yourself a nice new tube, just turn to the Radio Television Ad on the back page and get started. Here is a novel contest for amateurs and all you have to do is secure a contest entry blank and follow instructions. Any of the boys at Radio Tel will be glad to assist you.

WITH The CLUBS

Helix Amateur Radio Club

San Diego County, California

Kenny Hallett, W6GNP—President
Cliff Kimball, W6MMV—Vice President
Henry Haenke, W6NWY—Sec'y-Treas.
Carl Boltz, W6FTT—Serg-at-Arms

By the Keyhole Kommittee—
Here Zall, C. Zall, and No Zall

After the rigors of the well known Hamfest, the club meetings have been going on in an unusually quiet manner.

NOTICE: W6NWG, who was your friend who made the 10 meter contact with 6BXQ of Laguna Beach, who was operating in his automobile, portable mobile in Mobile, Alabama, on Mobile Street?

A couple of more screwy contacts! W6MMV contacted MI72 and KBEX, all legitimate, and listed. Cliff, you should get credit for abt 6 countries on that story!

Right through the QRM we hear that the Tired Business Man of LaMesa went off his vacation to build a fb signal exhaler for W6?, the XYL at 6LYY.

W6MQH is now throwing some unknown percentage of 200 watts into the ether. We hear it is a 203A in the final. W6NWY thinks he should get about 600 watts out of that tube.

We hear the old Germ has gotten out of the dog-house and has managed to get up a 10 meter V-beam. From what we have been able to find out, Howard was only able to do it because he had lots of time to put it out of doors. His old lady wouldn't let him in the house! That's what you get for showing up at 3:30 A. M. after club meeting, Howard! We haven't yet found out if she were patiently waiting with a rolling pin, or just patiently waiting.

Carl Boltz seems to be out of the picture lately. What's the matter, Carl?

Garsh! Dopey turned his receiver on for the first time in months. He says it worked swell after he dug the rats' nests out of it.

6NND is still trying to ride a motor bike with the Police Dept. He was watching some swell looker cross the street when another one in a gas buggy took him for a loss What kind of flowers do you like Erick? You can't win!

As this copy goes to press W6NWY has one more month's credit on those tens he is running 250 watts to. We are keeping an eagle eye on those bottles. waiting for them to come right out of the sockets.

We hear that Kenny Hallett has gotten himself another ticket for pushing that old jaloppy too hard. The morals and character of this club are going to bear looking into in the near future!

W6HVT is in the hospital in very serious condition. We all sure hope that Earl pulls through OK!

William Harrison West (we got it that time!) is always good for news. (Oh Yeah?) This is just a filler! We hear he joined up with the ARRL.

W6MMV says that he is on 160 fone once in a while, but we think that anything that comes out of 6MMV is because he accidentally got the rig tuned up right.

W6EPW has so many transformers in series that it takes him half an hour to find out which one he burned out. Incidently, Vern is still waiting for word from Karl Pierson, where are you, OM?

The above delectable dish of mud dished up by those enemies of the human race, those biters of the hand that feeds them, those knife stickers in the back—THE KEYHOLE KOMMITTEE.

▼

Orange County Amateur Radio Club

By W6LQX

The regular meeting of Sept. 27th found no officers present. It began to look like the makings of a very poor meeting when NSA was persuaded to take things over and preside, which he did very ably. W6HEZ and W6LEG from Laguna Beach were visitors. The Doings of the Big DX roundup were rehashed with especial emphasis on BVX's good luck in winning a 100th. The major portion of the evening was turned over to a round table discussion of first rigs. This proved a most entertaining and interesting event.

On October 11th, NSA again acted as temporary President. Visitors were Bill Bows, CIG (on air again now) and NGO. The latter proved to be the feature of the evening having just returned from Japan where he had been attend-

ing school. First hand information on ham radio in Japan as he found it while there, proved of intense interest to all, and many were the questions answered.

Oct. 25th found our president, Noral Evans back from his sojourn to way points, bringing with him a very distinguished visitor, Mr. Goodman from headquarters in Hartford. As was to be expected, he turned the meeting into a junior DX roundup and gave some interesting side lights on DX in the Eastern U. S. versus DX in the West. LYM gave a brief outline of doings at the Convention at Tempe.

Meetings next month fall on the 8th and 22nd at 8:00 P. M. in YMCA Building in Santa Ana.

Club Gossip, Highlights and Personalities

It is rumored that LPK has side bands at least 100 kc wide on 10 meters.

NSA bought a couple of yards of tickets at one of the raffles and forgot to put his stubs in the box—Hi.

What nearly happened to the eats October 11th?

LXM purchased NSA's Bretting and discovered that there are signals to be heard on 10 meters so it won't be long now. At least not any longer than it is necessary to put ventilating fins on a sub-panel that smokes everytime the key is pressed.

PUZZLE—Who uses a hammer to hold the key down now instead of a book while eating lunch? Well anyway, 35T's can take it better than T20's.

NIK is taking no chances. He uses 10 KW stand offs for his final tank (T20).

Several of the gang are going way up thar —(240 megs.) within the next couple of weeks —see you then.

▼

OUT OF THE AIR FROM ABOVE THE HARBOR

THE UNITED RADIO AMATEUR CLUB

By His Knibbs

President, W6MED, Al Goldschmidt
Vice-Pres, W6DIS, Mesrop Zervantian
Secy-Treas., W6IZT, Ed Hughes
Activity Mgr., W6ERT, Al Goodyear
Publicity, W6IVG, Al Sayer

Meetings 2nd and 4th Friday of each month at 8:30 P. M., Banning Home, Banning Park, Wilmington, Calif.

If you didn't attend the big URAC Stag party, you really missed a good show. With an attendance of over a hundred, and lots of cold beer that was free, everyone enjoyed themselves immensely. The bald headed boy who tried to start a fight seemed to think the raffle tickets were something to eat and has now earned the title of billy goat. Imagine anyone eating raffle tickets when a 100TH and an 808 was among the prizes.

We finally found out what has been ailing Sandy, W6GST. His wife recently presented him with a junior op and we understand Sandy has rigged up a nipple on a burned out 100TH and feeding the kid on RF. We also hear that the first sound the kid uttered was a husky CQ with some raw AC in his note, but the little imp didn't sign his call. You'll have to train him better than that, Sandy.

The Mud Duck, W6MDX cluttering up the ether on ten meters with a new 100TH and a new 8JK beam, to say nothing of a new modulator. He certainly has added a lot of R's to his original signal strength.

The long expected blow-out finally arrived at the QRA of W6ERT, Al Goodyear, the other night. That poor old 800 that he has been showing oodles of watts at for so long, finally gave up the job and has been buried with full military honors. We understand the new tube is also carrying a heavy load. Some guys just simply won't learn.

W6CWK, Vendee Johnson's honeymoon, seems to be over. At least he came to a recent meeting for the first time in ages.

Perry Livingston has returned from the wilds of Minnesota and will soon have a rig on the air again. Welcome back, Perry. What's the matter, wasn't the Minnesota Heaviside layer as good as ours out here?

Ask someone if Charley Feay knows any good stories.

The URAC welcomes their new Auxiliary Unit, the QRM Club, composed of the YL's and XYL's of the club members. We'll hear from these girls a lot in the future, and not only that, but there'll be no more members in the dog house from now on because the meetings kept so late. We hope.

Seems like a high power fever has hit the local gang, what with MDX, ERT and IVG all raising their input. More DX to you fellows.

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THE BELL CLUB

By W6NGQ

Meets every Tuesday at 8:30 p. m. at the Ebell Club Room, Fishburn Ave., near Gage

Prosperity seems to hit the club for there were over 30 members at the Southwestern Convention in Tempe.

It seems as tho Charley Faey has left 40 meters for good as he can be heard consistently on 160 meters a month ago and has not been movie camera around.

W6FDO can smoke anything, dry weeds, hemp, etc. He was heard working on 5 meters and says he can copy code.

What do you think—W6CNJ is working

40 meter CW, will wonders never cease. Ask him how he got all the service jobs, and what he is going to do with the money—I'll bet the stork will have something to say about this.

W6DPT has his heart set for a pair of 250 T's in the final (plate modulated) but in the meantime works out fine. He made most of the contacts for Los Angeles with W6BUQ on 80 meters.

W6OAQ can't seem to get enough CW.

W6CL can't stay put for long, he was heard on 160 meters a mont hago and has not been heard since; but does he read mail? You should try to pull a fast one with your DX on CW and hear him put you straight.

W6KMO left 20 meters and moved up to 160. You can hear him on both ends of the band at one time—I tell you that man's good.

W6MOS had shore leave long enough to come to the club; Hope boats don't go to his head.

W6MDQ is on once in a while, just listen some evening, any evening.

W6MHH got the big 5000 volt power transformer at the convention but would not trade. And him with his 210's.

W6GHU writes about DX, throws the bull about DX and you should see him ALSO RAN in an international prefix contest in the club room. Get rid of those 210's and buy a few good 01A's and you might know a few prefixes.

W6NAT and his 300T —you can hear him on any band—well almost any band.

The low frequency end of the 160 meter fone band now gives forth good DX as LIZ has left for the higher frequencies with that half killowat.

W6OEF is a real man among men for he still sends his pretty XYL to club when he can't come himself. PS—listen for QST's by Harold about what is going to happen at club.

W6IGO is rebuilding. Wonder what the new job will have to do with the rig.

W6HCF must be a saint these days—won three times in one evening on the raffle.

W6MQS still in love with his new QRA and knows he can work WAC any old day when he gets those T20's going on 10 meters.

W6MCT is going and probably gone by the time you read this—A girl by the name of Maxine (we hope) took him out of circulation.

W6PCA is going places fast and so is the pocket book—into a peach-er-ino of a rig.

W6LAK has been quiet this last month but when we least expect it he will probably spring some new DX.

W6NGQ might get a rig on the air some time and then use it—who knows?

W6LFC certainly is busy but he gets to the club every once in a while.

W6JWQ won't ever be the same again after that train trip down to the convention. Ask W6NOF or the gang for details.

Hold on to your chairs—W6GZQ drove all the way to Tempe and did not get lost. Just like one of those flowers that comes out and blooms once in a while. However we think we solved the problem, as he used the old indian system of trail blazing—on the way down he passed out his business cards and on the way back gathered them all in.

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VALLEY RADIO SOCIETY

Pres. Rudy Jepson, W6KEI
Vice. Pres. Jack Gardiner, W6CKR
Sec'y. R. D. Nagel, W6CAH

Well fellows, believe we are finally going into our winter activities. Have raffled off as attendent Prizes 3 Eimac 34T's in as many weeks. The idea being every member will have one in time, as a winning member is not eligible to win again until every member has won—result, lots of fun and you can't loose.

W6NYW, our newest member starts in by winning one of the 35T's first night he is a member, what a guy.

W6CAH has roof on new garage radio shack combination and says let it rain he will have plenty space, the radio room being 10 feet by 20 feet, FB Bob we all know Doris wil lbe glad to have the house back again.

W6MYJ has been under the weather of late. With all these colds going around he snagged one of them, hope you pass it on right soon, Doc.

W6HDC has managed to get down from Boulder Dam to the last two meetings and says he is studying Law. So we now have a legal adviser in our ranks.

W6LS is supervising Building New KNX Station. Says he may have to move down to SW LA so as to be near construction of station.

W6DDA wins Turkey shoot put on by our entertainment committee and gets 12 pound Turkey.

W6JDB has been coming over from Glendale to meetings pretty good of late. Says he is also in the act of moving, hope it will be closer, Lenord, OM.

W6IBS has been very scarce of late but we are all going to bust in on him next meeting night and find out what it is all about.

W6EIV finally gets 56 mc Mobile rig in car even if it is only sitting on the cushions.

W6JJH is now a proud papa and has been passing the cigars around. Floyd also builds new 160 M rig but afraid to use same account nearby BCL trouble—better stay on 10 OM.

W6KEI also has been passing the cigars around, but in his case it was a girl, so we don't snap the suspenders quite so loud as SSH got a boy.

Well fellows, it is really no fun writing up this stuff when 10 M Sig are rolling in, so will sign off for the time.

L. A. CLUB DOINGS

By W6CFW

Every Wednesday, 8 p. m.
L. A. Swim Stadium, 2nd Floor
Exposition Park

With an excellent new place to meet, the L. A. Gang will be found every Wednesday evening at the serious business of hamming. To date this month we've had an unusually interesting photo-cell demonstration by Mr. Gilbert and Mr. Larson, whose job is to find every practical use for the cells. Some of the radio problems were discussed by Robert Needham, of the U. S. Naval Communications. An Open Forum brought to light many items usually lost in routine meetings. Initiation Night proved interesting to all and shocking to at least one (do I hear the hiss of a Ford Spark-Coil?). Among future bright spots is YL-NITE, at which time all YL's and XYL's are admitted without charge. The programs also will be non-technical When is the ladies' night? The first meeting of every month.

The new Board of Directors include the following: Don Draper, 6GXM; Kieth LaBar, 6KX; Noel Forte, 6JPP; Helen Wolpe, 6-2-B soon. All are doing their derndest to make the club better and as a result everything is clicking smoothly.

STATIC

W6HDR, Dave Josephson, thinks he'll go on 40 CW and give 160 a break. W6OJC, Ruby Thompson is only YL sporting a commercial ticket. Earl Wiseman, W6CPG, sees that we get ice cream every week. W6DPD is working way over in Whittier now. Johnny Heineman, W6CZU has a better job. W6GXM, Don Draper, may have to learn the code cause Mrs. Draper won a tape machine and oscillator at the convention. W6GDS, W6LIX, W6CFW, went to Tempe in Al's Stude and averaged 75 MPH. Never again. Keith LaBar, W6KX, took greetings to Tempe in the form of Porky Pig movies. W6HDV, Ray Stevenson, was also among those present. Did you know the special ham train returning from Tempe struck a hay truck and the driver really "lost his head" in the fog. W6OJL, Matt Murray shows real activity with a versatile rig. Ed Goris, W6LPR is going to remain in town. W6NXA, Swede, returns to club after a long absence. Ed Hahn, W6NHZ and Bill Wallace, W6NOT are most always present at club. We'll have to get some medals. W6IAH QRL night work.

W6JPP has to get his call renewed. Dick, W6NTM, was the guy seen in "100 Men and a Girl" who was necking with a YL during the concert scene. W2KNZ gave us the dope on how the bootlegger situation is handled in the East. W6NYF, W6GOI, and W6ODN still hang out in the ham boarding house on Beacon Ave. W6NCE and W6KSY QRL store and school. Latest additions to membership are Morris Gilbert, W6MXN, W6PDE, W6NQD, and W6ORE. How do you like the new shiny club buttons which are being sported about?

Will wind up by reminding you to listen to the Ham Program over KMTR every Saturday Midnite and join the gang up on the 2nd floor of the L. A. Swimming Stdium every week.

ANOTHER HAM TO BE!

One of the features of the convention was the showing of two animated cartoons, brought to Tempe by W6KX and furnished by Mr. Leon Schlesinger. The cartoon, "Porky's Railroad," was of especial interest because of the fact that in it a message in code is sent. Instead of a confused bunch of dots and dashes Mr. Schlesinger had an op send a message to all amateurs, offering a picture of Porky Pig to any ham writing in.

Although the message is pretty well covered by QRM from music, yet a number of hams from all over have written in. The cards are carefully pasted in Mr. Schlesinger's album and saved. He is quite familiar with the doings of amateurs, often sitting up until 2 or 3 o'clock in the a. m. to listen to ham phone.

W6KX ordered him an instructograph and the way Mr. Schlesinger is learning, it may not be long until he has a ham license and is on the air. Then we will hear a real rig.

At a recent meeting of the Los Angeles Amateur Radio Club, Porky Pig was made an honorary member of the club. As far as is known, this is the first time that any radio club has had a cartoon character as a member of the organization.

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"HEW" Portable Transmitter

(Continued from page 5)

to keep the cost down, such as, one transformer supplies the filaments for the RK20, the four 866 Jrs., plate and screen voltage for the 6L6 and the RK20. The trans. is bridged for the high voltage on the RK20. Grid neutralization is used on the final to facilitate clipping the antenna on the tank and also when doubling in the final to TEN you don't have to mess around with taps on the coil. This also keeps from having to use a high voltage spit stator condenser which are quite expensive at high voltages. Since the rig has been built it has been used on two trips during which Miller managed to snaggle some of these DX stations he has been wanting. The moral of the whole thing is: Don't stay home and fight the noise, put the rig in the car and drive away from it." Now what we're waiting for is to see Miller put something like KFI in a bathtub.

Ham Advertising Department

This department is maintained for the amateur, however commercial ads of same nature printed at double rate. Material not pertaining to radio accepted but placed separately. Rates, 20 words for 25c, additional words 3c each. Closing date 15th of month. This magazine does not guarantee quality of merchandise and used material should be so described. Send money and copy to W6CL, 1315 East 58th. Place, Los Angeles. We reserve the right to reject part or all of any ad. Money refunded if ad not accepted.

FOR SALE—150-T and Fil. Trans.—$12.00. Class 'B' input and output suitable for 50-T's or P.P. Par. T-20's—$9.00. Thordarson Power Trans. 600 V. A., 1000 Volt—$13.00. Call any evening. James Velek. EX9HS. 719½ W. 55th St., Los Angeles.

TRADE Amperex 211 for S. W. 3 B. S. Coils.
FOR SALE—RK 20, never used—$10.00 cash. W6HCF, 1211 Ronan Ave., Wilmington, Calif.

FOR SALE—WE251A. Perfect condition, the cream of them all. $35.00, with GE Fill Transformer that will handle two of the Tubes if wanted. Call W6KEI, No. Hollywood 1717.

WANTED—To buy for cash 1½ KW Xformer, 3000 volts at 500 Mills. W6IVG, 1061 W. 26th St., San Pedro, Calif.

FOR SALE — 400 watt Xmitter, 100% modulated, 7 4 in. jewell meters, 3 crystals, Johnson "Q" ant., Univ. "LL" mike, 4 power supplies. Phone W6EIP for details. AN. 8266 days or UN. 3912 evenings. Will consider any reasonble offer.

EXPERT STOVE REPAIR SHOP on wheels. Service at your home. Repairing and welding. Springs, catches, parts for all stoves. E. W. Spratt, 6917 Santa Fe Avenue, LAfayette 2809.

FOR SALE—Several Weston Model 301 Meters 6L6 Modulator and Power Supplies, Universal Dynamic Mike, 2000v 1 mfd. Filter, 1000v 1 mfd. Filter—W6III—310 No. Rural Drive, Monterey Park, Phone Alhambra 1902.

WANTED—Class "B" input es output Transformer to match a pair of 212D. Modulators. See or write Ralph Mercer, 43C West 52nd, No. Long Beach.

WHY Worry Yourself

About . . . .

Power Supply - Antenna Couplings
Coils - Tubes - Layout
Circuit Constants - Condensers
WHEN

The New 100-Watt

Phone Transmitter Kit by Hadley . . .

Solves Your Problems

Easy to Build

●

High Fidelity Modulation with Class A 6L6 Modulator

●

Excellent Driver for Larger Output Stages

●

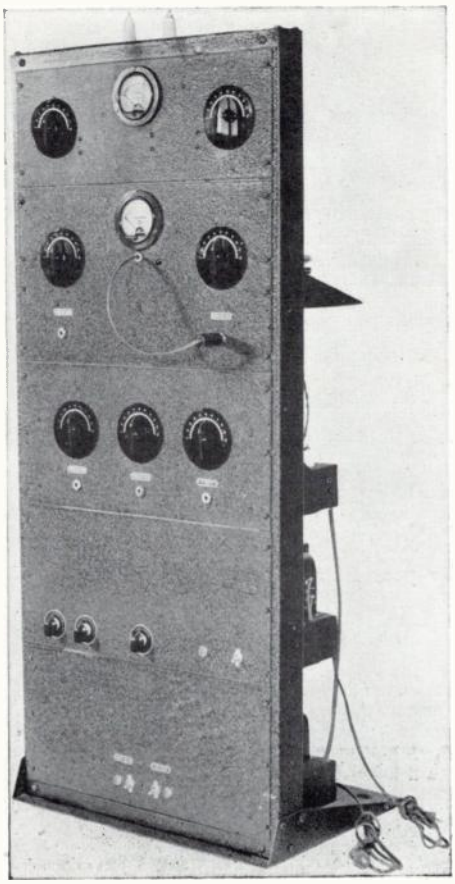
All Band Operation

●

New Stabilized Tritet Oscillator

●

Flexible Antenna Coupling Circuit



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Low Cost

●

Commercial Appearance

●

Sturdy Construction

●

Laboratory Engineered

ROBERT M. HADLEY COMPANY

LOS ANGELES, CALIFORNIA

NEWARK, DELAWARE

RCA TRANSMITTING TUBES

RCA AMATEUR TRANSMITTING TUBE CONTEST

●

WRITE 500 WORDS OR LESS TELLING

"Why I Use RCA Tubes in My Transmitter."
or
"Why I Don't Use RCA Tubes in My Transmitter."

●

HERE'S ALL YOU DO TO ENTER

(1) Get contest entry form and letter of instruction from your nearest distributor of RCA transmitting tubes.

(2) Fill out entry form. Then write a letter (500 words or less) telling (a) "Why I use RCA Tubes in My Transmitter," or (b) "Why I Don't Use RCA Tubes in My Transmitter." A duplicate set of prizes will be awarded on each subject. You have an equal chance to win a prize whether you use RCA Tubes or not.

(3) Mail entry form together with letter to RCA at the address below. Envelopes will be provided. No postage required.

Contest Closes December 15, 1937

All entries must be post-marked not later than that date!

PRIZES

	value
1—ACR-111 (16-Tube Receiver)	$189.50
2—ACT-20 (Less accessories) (20-Watt Trans.)	129.50
3—ACR-155 (9-Tube Receiver)	74.50
4—Two RCA-806 (450-Watt Triode)	44.00
5—One RCA-803 (210-Watt Pentode)	34.50
6—Two RCA-805 (215-Watt Pentode)	27.00
7—Two RCA-808 (140-Watt Pentode)	15.50
8—One RCA-906 (3-inch C-R Tube)	13.50
9—One RCA-834 (75-Watt u.h.f. Triode)	12.50
10—One RCA-808 (140-Watt Triode)	7.75
11-20—One RCA-802 or 807	3.50
21-50—Pair RCA-866	3.00
51-100—RCA Metal Tube Cigarette Lighter	1.00

Drop in for your Entry Form

●

FLASH!!!

THE NEW NATIONAL NC-80X

receiver is here! Drop in for a demonstration. See it! Hear it! Tune it! Or ask any of the following about it

W6CUH - W6QD - W6CGQ - W6LFC - W6FMK - W6NYU W6NOF - W6JWQ - W6DUX

RCA-802

The favorite for crystal and buffer stages. Easy to drive. No neutralization. This popular type sells for **$3.50**

RCA-805

This husky favorite—125 watts max. plate dissipation, 1500 max. plate volts, 210 max. plate ma.—It's in the price class of tubes having considerably less capabilities, now sells for **$13.50**

RCA-806

This heavy-duty, tantalum-plate triode, a popular tube, at a new low price. Now only **$22**

RCA-807

With new improvements the RCA-807 is an even greater value today. Tremendous acceptance makes possible the new price **$3.50**

RCA-808

Here's a real buy! High-mu, low interelectrode capacities, 1500 max. plate volts, 150 max. plate ma., rugged construction, heavy-duty filament — all combine to make this tube a sensation at . . . **$7.75**

NEW!

75-WATTS MAXIMUM INPUT

RCA-809

Look at these features: 6.3 volt, 2.5 amp. filament; 750 maximum plate volts, 100 maximum plate m.a.; 25 watts plate dissipation; Mu of 50; easy to drive, Ceramic base. **$2.50**

RADIO TELEVISION SUPPLY COMPANY

"WHERE HAM SPIRIT PREVAILS"

1701 SO. GRAND AVENUE, LOS ANGELES **Richmond 6123**