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RADIO NEWS

JULY
1940
25c

**A Complete
BEGINNER'S
HAMSTATION
for \$49.64**

SEE PAGE 6



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Features by
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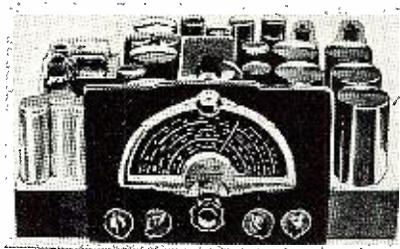
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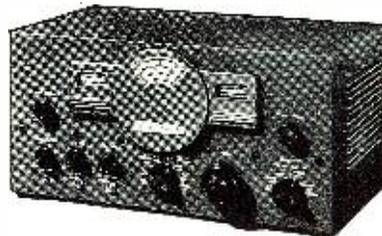
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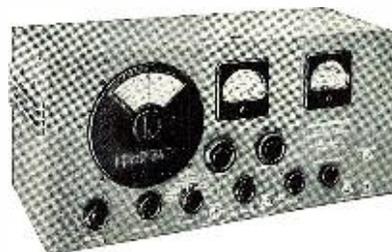
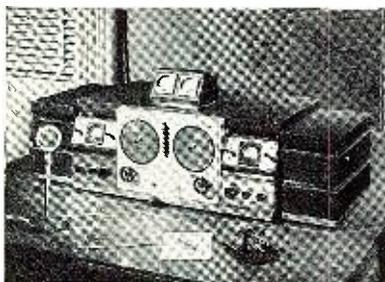
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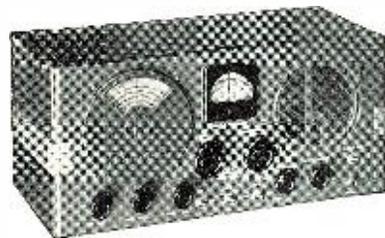
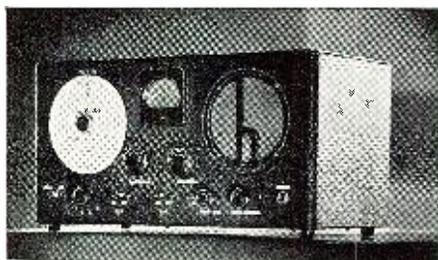
12 payments \$2.26

SKY CHAMPION

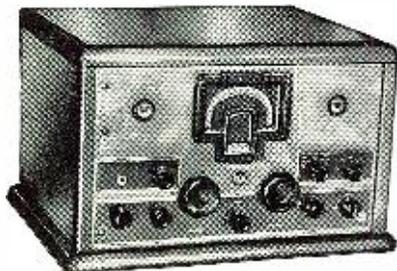
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\$8950

The ACR-III employs a single-signal, 16-tube Superheterodyne circuit with two tuned rf. stages, constant-percentage electrical bandspread, individual carefully isolated oscillators, two I.F. amplifier stages, crystal filter, calibrated input-signal strength indicator (electron-ray tube), noise limiter, noise suppressor, audio driver stages, push-pull power-output stage, and an integral power supply.

Federal Recorder

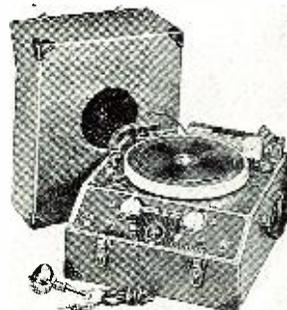
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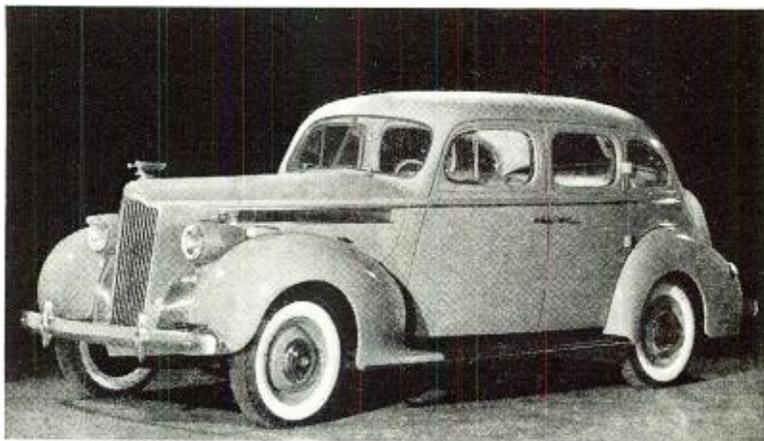
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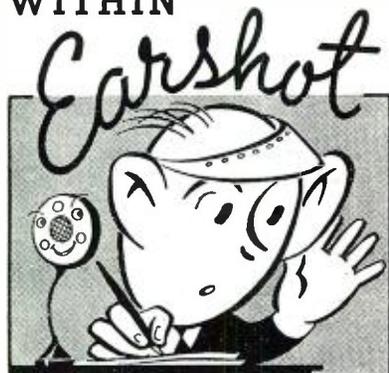
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**COMPLETE DETAILS IN THE
JULY ISSUE**

Popular Photography

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WITHIN



IN 1933, when we were experimenting with 56MC signals and even higher frequency transmission and reception, we had a visitor one day to our lab. He was from the local N. Y. Central Freight yards, and was a ham. We got to talking and he wanted to know why the routing of freight through the yards could not be done better with short wave communications between the various control towers and the engines. We were interested in this, and went so far as to make tests in the yards, although we never tried transmitting from the engine to a tower, confining our tests to transmissions from "parked" cars. The thing worked very well. Our visitor said that he would take up the matter with the RR officials. We never heard from him about this again.

A few days ago the FCC sent out a publicity release that they had assigned some ultra-high frequencies for traffic use by the railroads. Restricted to control tower-engine range, the new frequencies were to be for freight routing within the yards only.

Many times we have ideas, and fail to see them through to their final consummation. Then others come along who independently put our ideas in practical reality. That's what makes radio so fast moving . . . and fascinating.

* * *

FREQUENCY MODULATION moves sporadically, although it seems more to be settling down to a steady growth of late. It has its advantages and its drawbacks. Numbered among the former are the freedom from ordinary atompherics, and the high-fidelity of the reproduction. The disadvantages are that the transmission band is not readily tuned by the average receiver, and hence simple converters are not being developed as rapidly as could be expected. We can foresee a brilliant future for FM, if the engineers will get down to brass tacks and realize that the absorbing of 12 to 20 million ordinary receivers presently in the hands of the public could most easily be accomplished by the design and marketing a cheap converter which will work with the ordinary BC receiver. Or better yet, and more to the point, a simple receiver which will bring in either *amplitude modulated* or *FM* sig-
(Continued on page 44)

RADIO NEWS

Including Articles on **POPULAR TELEVISION**

The Magazine for the radio amateur
experimenter, serviceman & dealer
VOL. 24, NO. 1

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LAFAYETTE

2
GREAT NAMES

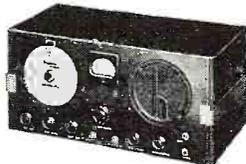
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NEW SUPER-DEFIANT SX-25

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Features: Compensation in oscillator circuit for frequency stability. DC operation socket—battery or vibrapack. Automatic noise eliminator. Six step variable selectivity covering wider ranges from extreme CW crystal to high fidelity. S meter calibrated in "S" and DB units. 2 RF Preselection stages. Complete with 10" PM Speaker in matched cabinet and crystal . . . **\$99.50**



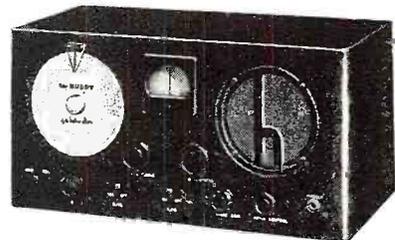
SKYRIDER MARINE S-22

This 8-tube receiver tunes from 16.2 to 2150 meters (140 kc to 18.5 mc) in four bands. Large illuminated main tuning dial and separate band-spread dial. Includes: b.f.o; a.v.c; individual coils for each band; head phone jack; speaker. For 110 volts AC or DC . . . Complete with tubes and **\$64.50** speaker . . .



SKY CHAMPION S-20R

9-tube communications receiver with one stage of preselection and built-in speaker. Features: 4 band coverage from 545 kc to 44 mc; automatic noise limiter; inertia tuning; separate electrical band-spread; two i.f. stages; drift compensated high frequency oscillator; beat-frequency oscillator; socket for battery or vibrapack operation. Complete with tubes. **\$49.50**



SKY BUDDY S19-R

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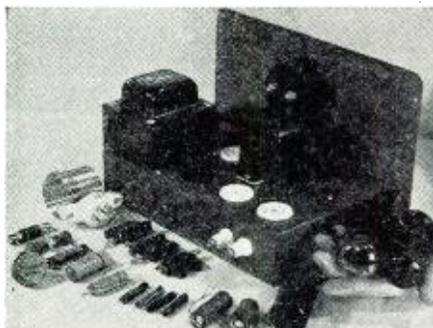
Beginner's Complete Station For \$49.64

by **LARRY LE KASHMAN, W2IOP**

Hewlett, L. I., N. Y.

A picture article for the beginning ham who wants a cheap yet highly efficient station. Every construction step is illustrated.

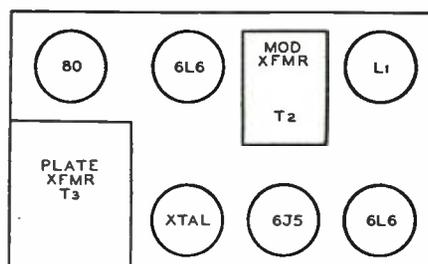
Part 1. The Transmitter.



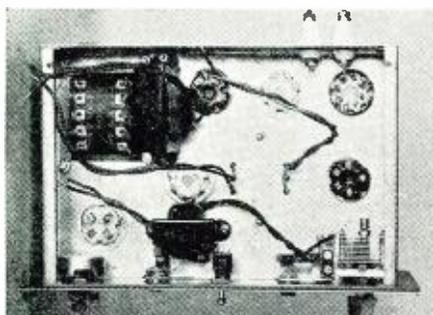
Required parts for the transmitter are kept at a minimum. All are shown in the above illustration, as well as the upper half of the chassis which is mounted. Either size fixed condensers can be used.



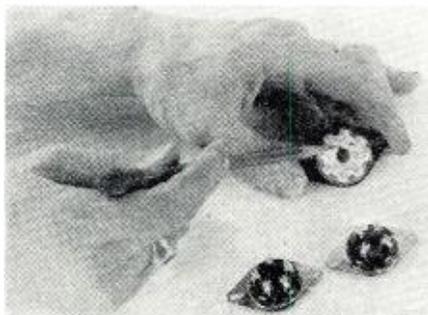
Cutting holes in the chassis is made easy with this punch which is bolted together with the chassis in between. The punch is then tightened with a wrench. The transformer holes are made with a cold chisel.



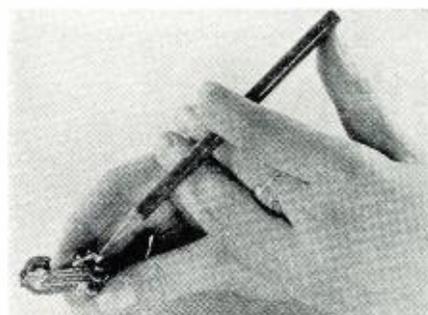
This is the layout of component parts on the top of the chassis. It is not necessary for the builder to follow this exactly, but the author has tried it, and it worked the best of all. The layout makes for very short leads which are a "must" for ultra high frequency transmissions. The above are not accurate dimensions.



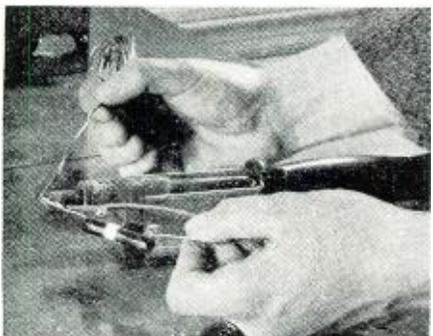
Looking at the bottom of the chassis with all parts mounted ready for the wiring to be commenced. One bakelite socket is for the 80 rectifier tube. Note position of the under chassis transformer and choke.



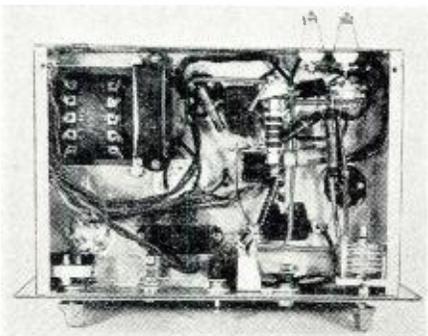
A closeup view of the three types of sockets used in the rig. Pencil indicates the slot or "key" which determines the manner in which tube is inserted and the sequence of the pins. Bakelite sockets have no slot.



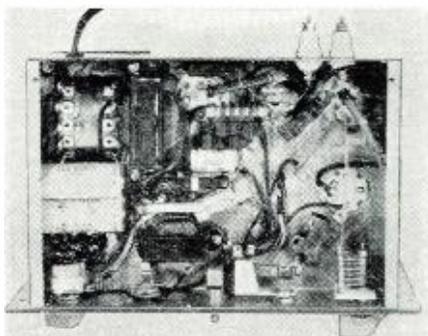
Pencil indicates where the jumper is put across the two contacts of the two circuit jack. Inserting the hand-key, closes B plus to the RF, and closing the key completes the cathode circuit. This is for cw.



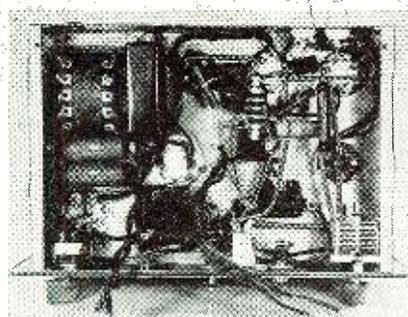
Good soldered joints are necessary for the best results. Wherever possible the soldering of parts should be done outside the chassis and then soldered into the chassis. Allow the solder to run freely.



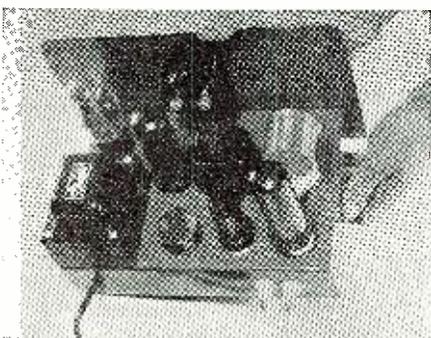
First step in wiring the transmitter, is to complete the RF stage. Wherever possible all "ground" leads should be led to a common point soldered to the chassis. Very short and direct leads must be used.



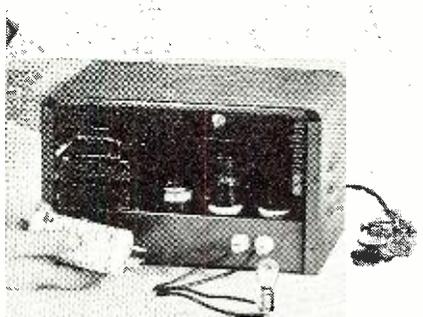
Power supply is next wired. These leads do not have to be short, but they must be well insulated. Use heavy wire for the rectifier filament leads, and insulate them with "spaghetti" if they are enameled.



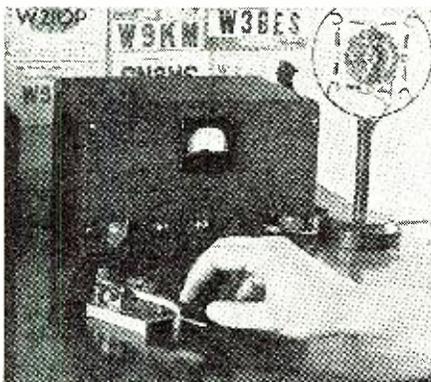
Under chassis view of the completed rig with the modulator completely wired in. Shielded leads are used to carry speech inputs (not indicated in the diagram), and these must be "grounded" at many points.



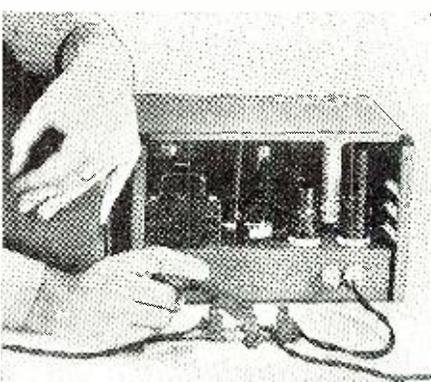
Top view of the transmitter with the accessories in place. Commercial coils are used in the amplifier, and a link coupling to the antenna will work satisfactorily. Usually one crystal will work on 2 bands.



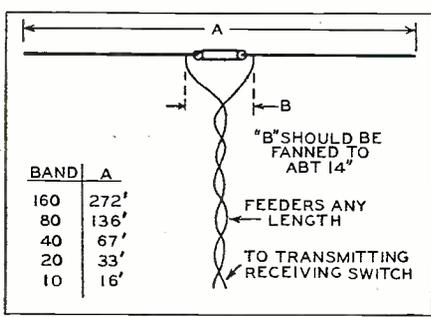
The chassis is now inserted in the cabinet. Testing is done with a small bulb across the antenna leads. With modulation it should glow brighter indicating that upward modulation is obtained in the RF.



A simple carbon mike works very well with the transmitter, and the key, shown, must be closed or withdrawn from the set if it is to be used on 'phone. The unit makes a fine table-mounted radio transmitter.



The antenna change-over switch, shown here in the rear of the set, should really be located in front where the operator can easily get at it. With it, one antenna can be used for transmitting and receiving.

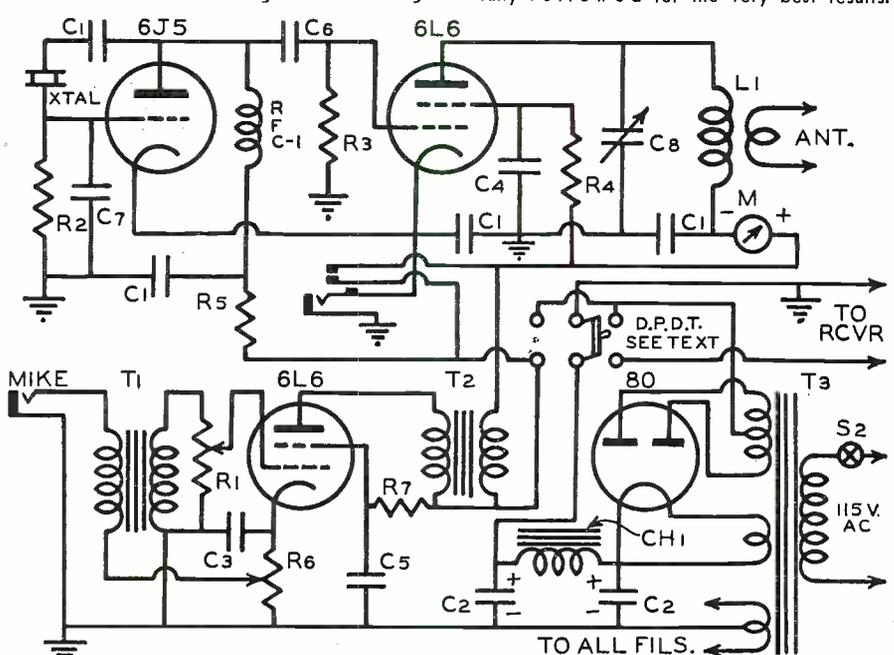


A diagram of some types of antennae which are suitable for the little transmitter. The dimensions are shown at the left and are more or less accurate. For more information consult any handbook. Below, the diagram of the complete ham transmitter, showing all the component electrical values. This should be carefully followed for the very best results.

FOR those who have just acquired their "ticket," or those who are thinking of getting theirs in a short while, this little transmitter and the receiver—which will be run next month—will make an excellent rig. The price of \$49.64 quoted above is figured at current ham prices from the average catalogs. It includes everything from key right through the headphones. Even the antenna and the ground wire has been added in.

There is nothing about this rig that is hard to build, no complications which the builder might encounter, and no "bugs" which will give him sleepless nights. It has all been worked out. For the advanced ham, the little rig will make something that is "right down the alley" for a summer portable or QRR set. It is compact, and while the signal is none too powerful, it has worked Puerto Rico, California, Kansas and Maine within 3 hours after it was on the air at the author's home. For 12 watts, that is pretty good, and many a more powerful rig has yet to work even California.

One thing is certain, in these United States, no matter how small the power output, a license both for the operator and the station is absolutely necessary. Do not violate the law by using this rig without it.



- C₁—0.02 mfd., 500 v., mica, Micamold
- C₂—4 mfd., 450 v., elect., Aerovox
- C₃—10 mfd., 25 v., elect., Aerovox
- C₄—0.1 mfd., 400 v., tubular, Aerovox
- C₅—1 mfd., 400 v., tubular, Aerovox
- C₆—250 mmfd., 500 v., mica, Aerovox
- C₇—50 mmfd., 500 v., mica, Aerovox
- C₈—100 mmfd., var., Cardwell
- R₁—500,000 ohms pot. with sw. for 110 v. (S₂) IRC
- R₂—25,000 ohms, 1/2 w., Ohio
- R₃—100,000 ohms, 1 w., Ohio
- R₄—15,000 ohms, 10 w., wirewound, Ohmite
- R₅—5,000 ohms, 1 w., Ohio
- R₆—300 ohms, 10 w., var., Ohmite
- R₇—25,000 ohms, 1 w., Ohio
- T₁—Single button microphone-to-grid, Stancor
- T₂—Modulation trans. for 6L6 Output, Stancor
- T₃—Power transformer, 700 v., CT 120 MA, with fl. windings for 80, 6L6 and 6J5, Stancor
- CH₁—Filter ch., 10 hy at 130 MA, Stancor
- RFC₁—2.5 MH 125 MA, R.F. ch., National
- SW.—SPST Sw., Arrow
- J₁—Open cir. Jack, Yaxley
- J₂—Two-circuit control Jack, Yaxley
- L₁—5-prong coil with end link, Bud

A S . . . S E E !

by **JOHN F. RIDER**

Dean of the Servicemen

New receivers are showing many innovations.

TO those of our readers who have been wondering where Mr. Rider's pungent column has been, we say that he, too, had a "book to put to bed." That is what has been keeping him so occupied that he was unable to do his stint for us. Now that his books are on the press, we are again having him with us. We've missed you, John. Welcome back.—The Editors.

THE last four weeks have been spent checking wiring diagrams of the 1939-1940 season of radio receiver production in the quest for new circuit arrangements. So many and such interesting details have been found that we deem it worthwhile to give space to just a few in this month's column. Not that we want to make this a technical issue, but we can't help devoting some of the space if only to remark about possible confusion to servicemen because of the unusual circuit systems. Yes sir, if you are sufficiently interested in radio circuits and have watched the development since the first decade of the 20 century, there is actually romance in radio circuits.

We note the extended use of resistance capacity filters in power supplies and the total elimination of chokes in the power units of many of the smaller receivers. Well, we can think back to about 1925, that's fifteen years, maybe a year or two less, if we don't have our dates exactly right. At that time many of the newspapers of the country carried technical radio pages



"Oh, but I must have my radio fixed for my evening to be a success!"

and the *Associated Press* carried an article in papers from Maine to California in which the resistance capacity filter was used and forecast for abundant application in commercial radio receivers.

Some of the developments in the modern receivers are simple; yet without the shadow of a doubt will confuse many men who will have occasion to work on them, unless the diagrams are first examined. Take, for example, the receivers in which the grid condenser is eliminated in the oscillator circuit. A capacity link exists between the grid winding and the control grid of the tube and in all other respects the oscillator circuit is normal. Yet if you hunted for the conventional grid condenser it would be absent. "What do they use?" you ask. The capacity between two windings! The capacity developed between the turned grid winding and another dead-end coil which joins the grid leak and control grid. The reason—economy. The small dead-end coils cost much less than mica condensers.

Such design is extremely interesting for reasons other than the possible confusion it might cause to the serviceman. It shows the extreme measures to which it is necessary to go these days to effect economy in radio receiver construction. It is said that "necessity is the mother of invention;" it most certainly applies in this case. It is also of interest, as are a few other applications of so called capacity, in connection with radio instruction, discussed later in this column.

Take another interesting circuit innovation to be found in some of the lower priced receivers. A portion of the primary of the output transformer is used as the filter choke in the power supply. It is a well known fact that the hum level in these low priced receivers is very high but not very bothersome because of the very limited low frequency response of the speaker. Therefore it is possible to effect economy in construction by such ingenious design. The fact that a high hum voltage is developed in the output transformer is of no consequence.

After all is said and done, maybe the midget is a pain in the neck from the servicing angle, but you most certainly must admit that it has provided ample opportunity for design engineers really to go to town in conceiving ideas which no doubt will be elaborated upon in the future and applied to more expensive receivers.

Another very interesting application, which seems possessed of possibilities for all type of receivers, is that



John F. Rider

wherein a portion of the d.c. voltage developed across the oscillator grid leak is employed as the minimum fixed bias for the i.f. amplifier tube. This circuit is used in one of the loop portable receivers and provides, as you can see, an automatic control of sensitivity during variations in oscillator output over the operating range. This fixed minimum limiting bias supplements the conventional automatic volume control action.

Then we have resistance-capacity coupled r.f. and i.f. amplifier stages. These appeared quite prominently in the television receivers recently announced, but their use in regular receivers, while not absolutely new, having appeared in a few isolated cases years ago, seems like a trend in design, particularly with the high gm. tubes which are available.

Many more such items were noted, but those mentioned will suffice for the present and offer some food for thought while doing service work, particularly when circuit inspection shows something peculiar in wiring arrangements, or possibly when tests are being made to establish the operation of certain particular portions of the receiver. This is of definite significance for example in that circuit wherein the oscillator grid voltage is the minimum fixed bias. The mode of operation used by some servicemen, of "killing" the receiver oscillator while testing, is apt to develop misleading conclusions, unless all the facts are known and recognized.

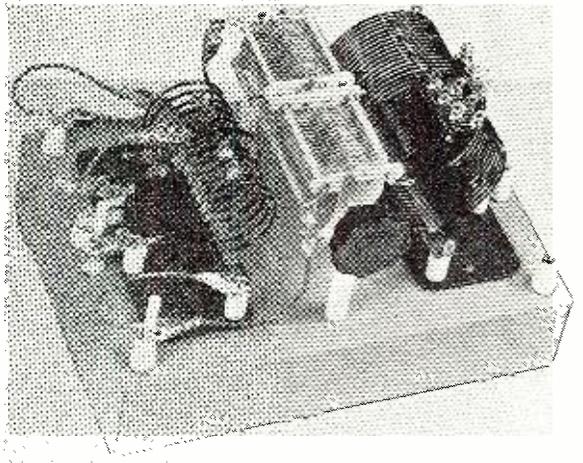
Teaching Radio Theory

WE wonder if a change in the form of presentation of radio theory is not in order. We have discussed this subject with numerous people connected with the radio industry and while the first impression seems to be to leave well enough alone, there are many who feel that much can be done in this direction. If we examine the form of instruction being used in some of the progressive grammar schools of the nation, we find that the manner of teaching as well as the manner of presenting the subject matter is different today than it was when we went

(Continued on page 51)

Construct this UNIVERSAL ANTENNA COUPLER

by JOHN W. MORAN, W8IOB
Cleveland, Ohio



Metal chassis construction allows for ease of construction, tuning.

When you cannot put up the antenna to match the rig, the next best thing is to match the rig to the antenna you have. This coupler will do it.

ONE of the most neglected pieces of equipment in the average ham shack is the antenna coupling device. Too often it is a makeshift haywire affair placed in a fairly inaccessible spot. Ease of tuning is not one of its primary features. The author has seen coupling devices that ranged anywhere from a wire hooked to the plate of the final tube through a blocking condenser to a hastily wound coil perched precariously on scraps of bakelite placed near the final amplifier plate coil.

Arrangements of this sort are tolerated for two reasons. First, we change our antennas quite often, and are content to tune up the current model antenna in as short a time as is possible with the equipment on hand. Secondly, up to the present time no coils have been commercially available to incorporate in a truly universal antenna coupler that could be used to tune any type of antenna that we might put up, and at the same time be easy to change and adjust for all types of installations. Home made tapped air wound antenna coils are not very easy to construct, and most of us would rather not tackle the job of winding such coils.

However, since manufactured coils are now available for such a coupler, it is no longer necessary to put up with haywire arrangements. The actual construction of a universal antenna coupler is simplicity itself, and any time spent on the job will be more than repaid in ease and rapidity of antenna tuning. Furthermore, once it is made and installed, it becomes a permanent piece of equipment, and need not be worried about whenever the rig is rebuilt, or a new sky-wire put up.

The coupler illustrated consists of two of these new coils and one con-

denser. The small coil is for high frequency operation—usually used to tune 10 and 20 meters, and in some cases, 40 meters. Both of the coils and the links on each coil have a large number of taps so that the inductance of the coil as well as the amount of coupling to the plate circuit of the final amplifier can be changed at will.

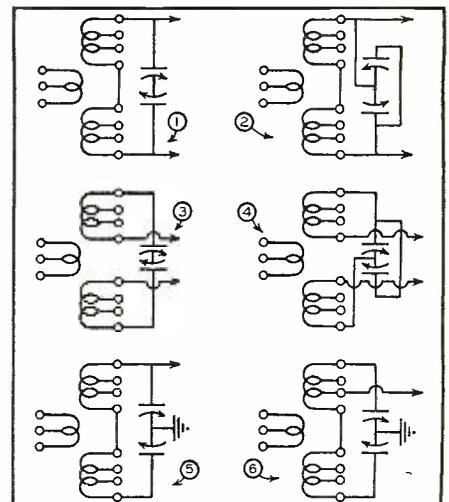
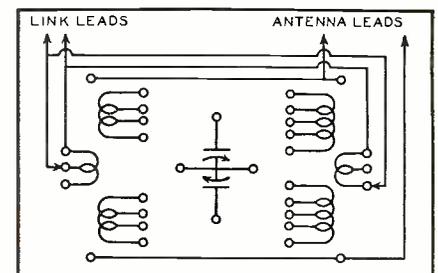
The condenser is a dual 250 mmfd. per section of sufficient spacing to withstand inputs of up to 500 watts. The condenser used is a BUD No. JC-1556 and has a minimum capacity of 11 mmfd. per section, which allows a great range of capacity variation in the coupler. When both stator sections are used in parallel, it is possible to have as high as 500 mmfd. which might be necessary in some cases when tuning on 160 meters. When hooked up in split stator connection, the minimum capacity of the condenser is only 6 mmfd. Taps are placed at all four corners of both stator sections, and at the center rotor contact to enable the condenser to be used in split stator (series) connection, with the sections in parallel, or with a section used singly.

The entire unit is constructed on a 10" x 14" x 3" chassis. At the rear of the chassis, four 1" feed-thru insulators are provided for link leads and antenna leads. In reality these leads are at the top of the chassis, since the unit is mounted on the wall with the knob on the condenser pointing toward the floor. This arrangement allows coupling changes to be made quite rapidly, and keeps the tuning control near the antenna, and out of the way. At each corner of the chassis, feed-thru insulators are provided with banana plug jacks. These insulators are connected underneath the chassis to the antenna terminals, and allow the an-

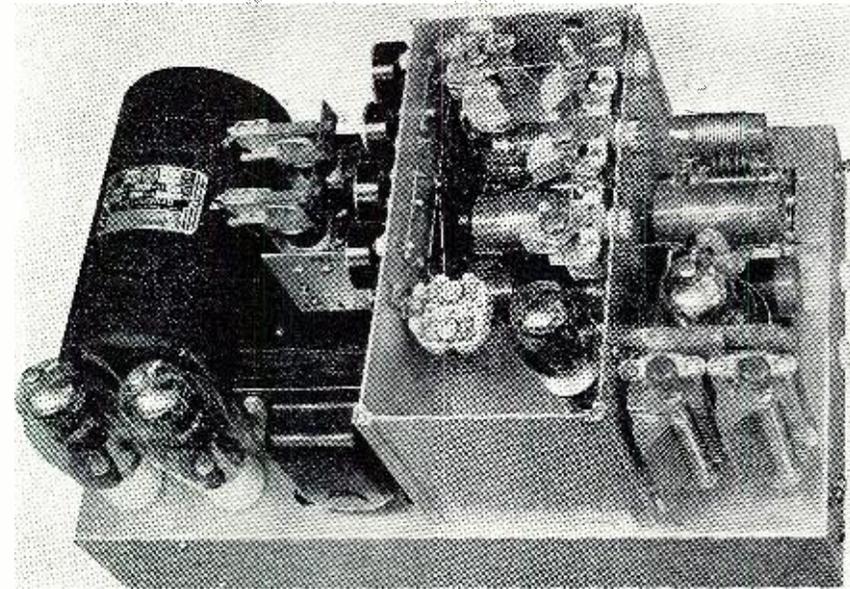
tenna leads to the coils to be plugged in nearest the coil in use.

The link leads are similarly connected to feed-thru insulators located near the center of each coil. One lead is permanently connected to one side of each link, while the other is provided with a banana plug jack so that the adjustable link lead can be plugged in at the coil being used.

As can be seen from the photograph, the three leads that are used to connect the antenna and one side of the link to the coil being used have a Mueller clip on one end, and a banana plug with a small rod insulator as a handle on the other end. A sufficient number of other leads with clips on each end are provided in order to make up the infinite number of combinations
(Continued on page 57)



"The Dialomatic" Revised



Note the extensive shielding in the 1940 edition of the "Dialomatic."

MATEUR mobile operation has fast become a reality in recent years ever since the now popular beam type tubes were introduced. They made possible the design of more efficient transmitters and receivers for portable and mobile gear by their compact structure and other features. Many readers constructed the original *Dialomatic* gear that appeared in last Sept., Oct., Nov. issues of RADIO NEWS. Demonstrations around the country indicated that certain refinements could be made to reduce the original cost as well as to step up the general efficiency.

First, the total drain on the battery supply was a bit excessive for maximum performance of the combined units, namely the exciter and separate vibrator supply at the dash and the additional drain from the amplifier in the trunk compartment, plus another motor-generator for this unit. By some simple calculation, we decided to eliminate the exciter and vibrator supply and to consolidate the rig onto one chassis.

Further economy was had by using the new *Hytron HY69* filament type beam tetrodes. These permit both filament and plate volts to be applied almost simultaneously as will be explained later. The *RCA 6A4* is also of the filament type and lends itself admirably for use as a crystal-controlled oscillator. The two modulators, *HY69*'s, simplify the design of this portion of the circuit. The original driver tube to the modulators was eliminated by using a special high-ratio mike-to-grid transformer. This has an overall ratio of 40 to 1 and allows a single button mike to be used,

and fed direct to the grid circuit without the usual driver.

So far, we have eliminated three tubes and one power supply and are still able to have our original r.f. input of 50-60 watts. The next step in our re-design was to find another means for getting more than one frequency in each band. This was accomplished in the following manner: Two crystals are used for each band in a special circuit as illustrated. A change was also made in the *Guardian Stepper* relay assembly so that more positions could be used, and, in turn, permit the selection of two crystals per band automatically.

The operation of the stepper relay is as follows: the three relays in the assembly are termed—the stepper which does the mechanical work, the dialing (which controls the stepper), and the holding relay (used to limit the steps). These all play an important part in the correct functioning of the method used to turn the selector gang-switch. An examination of the circuit will reveal the operating sequence to be as follows: the telephone dial at the dash unit is spun to any number from 4 to zero. The dial relay is energized momentarily at each pulse from the dial contacts. At the same time the dial jack opens and remains open until the dial returns to rest. This jack then closes and sends one more pulse to the stepper so that the relays be returned to their normal positions.

We may see from this that as long as we dial to a minimum of 4, additional pulses will not cause "overshooting" of the band. This is due to the method used at the stepper assembly in the form of contacts which are so

by

OLIVER READ, W9ETI.

Technical Editor, RADIO NEWS

placed that as we arrive at a determined stopping point, the entire mechanism will come to rest.

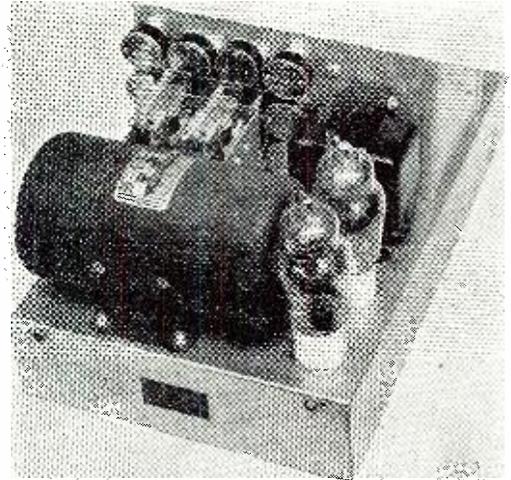
Further examination of the circuit will show how we obtain more than one frequency per band. Two contacts are used for each band for all circuits except the crystal section. If we dial around to the first 10 meter position we engage crystal number one for that band. If we dial again, we move over to the second crystal without disturbing the settings of the tank circuits. This applies to all bands.

If only one frequency per band is wanted, we may use the stepper diagram as appeared in the original articles. This will allow the *Browning Tuners* to be used "as is". For the

Parts List

B ₁	—50,000 ohms, 2 w., I.R.C.
R ₂	—5 ohms, 10 w., Ohmite
R ₃	—50,000 ohms, 2 w., I.R.C.
R ₄	—35,000 ohms, 10 w., I.R.C.
R ₅	—50 ohms, 50 w., Ohmite
R ₆	—100 ohms, 10 w., Ohmite
R ₇	—25,000 ohms, 100 w., Ohmite
R ₈	—15,000 ohms, 50 w., Ohmite
R ₉	—10,000 ohms, 1 w., Ohmite
C ₁	—0.005 mf. padder, Meissner
C ₂	—0.01 mf. 600 v. mica, Aerovox
C ₃ , C ₄ , C ₅	—0.1 mf. tubular, Aerovox
C ₆ , C ₇ , C ₈ , C ₉ , C ₁₀	—75 mmf. variable, Bud
C ₁₁ , C ₁₂	—100 mmf. double-spaced, Bud
C ₁₃ , C ₁₄	—50 mmf. double-spaced, Bud
C ₁₅	—15 mmf. double-spaced, Bud
C ₁₆	—500 mmf. padder, Meissner
C ₁₇	—0.005 mmf. 1,000 v. mica, Aerovox
C ₁₈	—20 mf., 50 v. electro., Aerovox
C ₁₉	—4 mf., 450 v. electro., Aerovox
C ₂₀	—4 mf., 1,000 v. oil filled Aerovox
C ₂₁	—0.2 mf. 1,000 v. tubular, Aerovox
C ₂₂	—4 mf., 600 v. paper, Aerovox
C ₂₃	—5 mf., 600 v. paper, Aerovox
C ₂₄	—10 mf., 100 v. electro., Aerovox
C ₂₅	—50 mmf. mica, Aerovox
C ₂₆	—150 mmf. variable, Bud
L ₁ , L ₂	—Coil Assembly, Browning 5PL "see text"
L ₃	—80 or 160 meter coil, Bud "see text"
Ch ₁	—2.5 mhy. 125 ma choke, Millen
Ch ₂	—2.5 mhy 250 ma choke, Bud
Ch ₃	—200 mf. filter choke, Eicor
Ry ₁	—12 v. D.C. holding relay "part of stepper unit"
Ry ₂	—12 v. D.C. stepper "part of stepper unit"
Ry ₃	—12 v. D.C. dial relay "part of stepper unit"
Ry ₄	—DPST D.C. relay, Guardian
T ₁	—High ratio mike-to-grads, Stancor A-7831
T ₂	—Modulation trans., Stancor A-7404
MG	—600 v. and 200 ma. Motor Generator, Eicor 124
M	—0-200 microammeter, Simpson
SW ₁	—SPST Toggle "Receiver ON"
SW ₂	—SPST Toggle "Monitor ON"
SW ₃	—SPST Toggle "Spare"
SW ₄	—SPDT Toggle "Phones-Speaker"
SW ₅	—SPDT Toggle "Monitor-Receiver"
SW ₆	—SPST Toggle "Send-Receiver"
SW ₇	—SPST Push-to-Talk On handset

The "Dialomatic" of 1939 was so popular that the author was compelled to bring it up to date in answer to many readers' requests. New rig has less controls and dispenses with the ECO. Eight crystals give 10 QSY's.



The crystal-motor generator end of the rig.

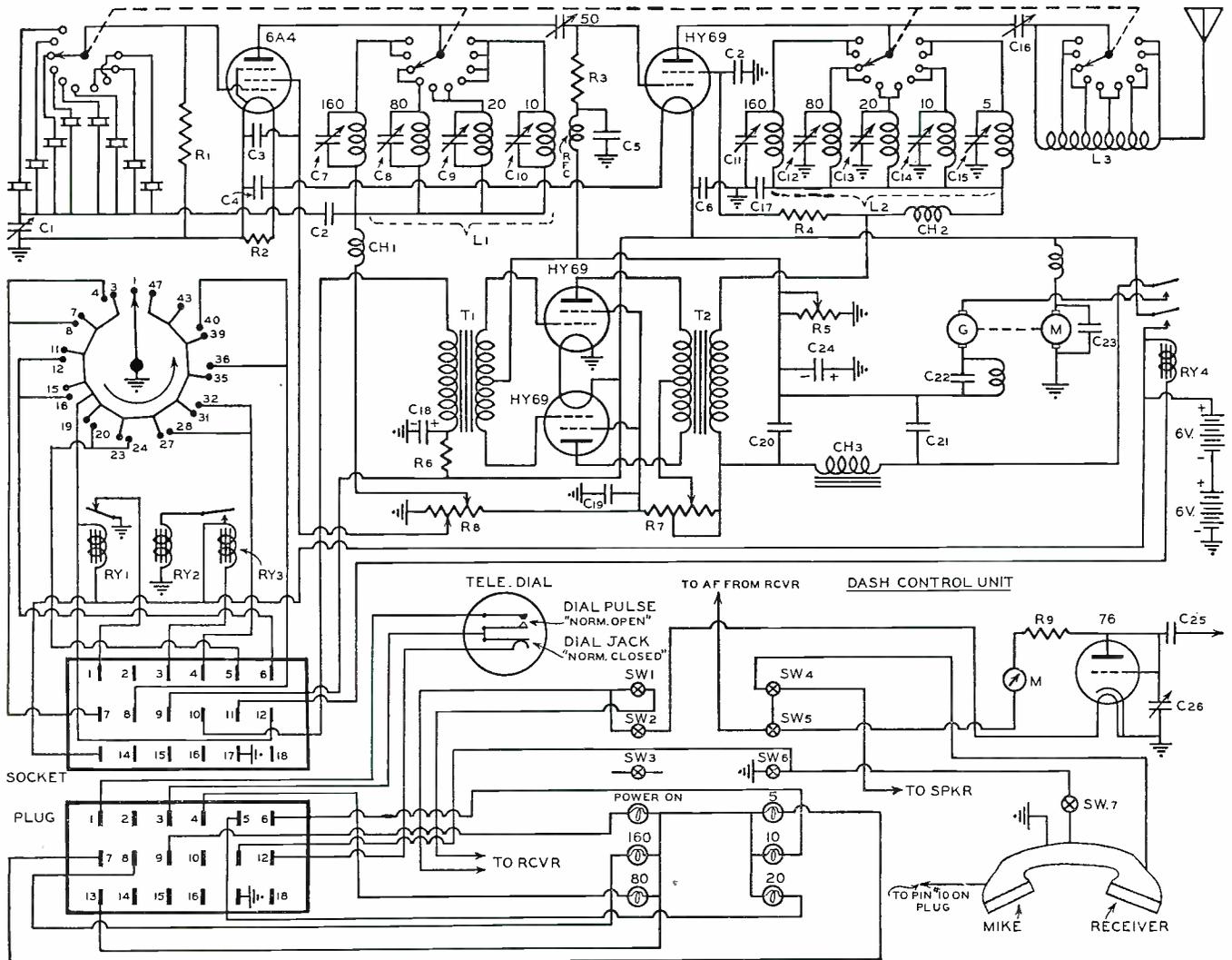
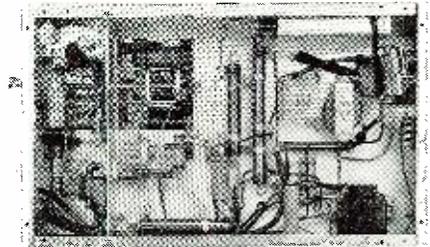
method shown in this article, it is necessary to do some modifying of the coil assemblies and to purchase an additional switch. This has four gangs and each has eleven positions.

The switch is ganged to the stepper by means of a flexible coupling. This is placed close to the frame to conserve space. The two threaded rods of the switch are passed through two holes that are drilled in the baffle. This

holds the assembly firmly in place. The stepper must be lined up accurately with the switch assembly for proper operation.

The eight *HiPower* crystals are mounted on one side of the baffle box as shown. This permits short leads to be used between the crystals and the switch. These are placed onto the baffle, being careful that they do not

(Continued on page 45)



Serviceman's Experiences

by LEE SHELDON

Chicago, Illinois

The handling of a customer is not an exact science, but rather something that is an acquired sixth sense. It will pay to know.

JESSUP, Jessup, Jonathan Jessup, I said to myself, reading the next call, where have I heard that name before? Oh, well—what's the difference, I thought. The day's card is plenty full, and I've no time for special attention.

When I pressed the button, a dreamy-eyed young fellow opened the door. My partner tells me always to be courteous, but when business is brisk, I believe it's better to be brief.

"Salutary Sales & Service," I slurred.

"Ah, yes," he drawled. "Come in and sit down. Have a smoke?"

"I'm busy today," I replied. "Where's the set, and what's wrong with it?"

He threw one leg over an end table, rippled his wavy hair, and quoted:

"Work is a means of living, but it is not living. Relax a while, as the worthy Holland suggests, and let me explain why I summoned you."

"Listen, buddy," I said impatiently, "the worthy Holland never had my competition. What's more, I respect my landlord a lot more than some stranger with a squeaky quill and too much spare time. In short, I can't wait for any Dutch treats. Where's that broken-down wireless?"

"I'll come to the point," he said. "I have just returned from a yachting trip in the Caribbean. My battery portable caused me considerable disappointment. A beautiful thing, but—as Keats so aptly put it: 'Silken, chaste, but hushed.' For a while I was so angry I nearly consigned the beastly box to Pluto."

He breathed deeply, walked across the room, and hooked one leg over the back of a chair.

"Well?" I prompted, "what do you want me for?"

"Give me," he recited, "some music; music, moody food of us that trade in love!"

There's no sentiment in my business make-up.

"Who said that?" I asked sarcastically, picking up my tool-bag.

"The Bard," he replied.

"He should be," I sneered, stepping into the hall and slamming the door.

It's things like that that clutter up a repairman's day. If he had work for me, why couldn't he come out and say so?

Later, when I came into the shop,

I told Al about it. As usual, he found fault.

"Well, my little incident-provoker," he said, "it's perfectly obvious the customer was trying to explain he lugged a battery set all the way up from the Equator so it could be repaired by a local man. And you walked out on him!"

"Do I have to know everything to be in business?" I yelled. If someone wants a set fixed, all they have to do is say so!"

"A businessman," Al orated, "must know at least a little of many things



Television in 1950. "Turn off that set, you Tele-peeping Tom, you . . .!"

to help him in his continuous encounters with all sorts of customers. He must learn to meet a person's subject or mood as closely as possible."

"But this bloke was feeding me a bunch of classical cornicisms," I protested. "How could I answer if I didn't understand them?"

"You could have listened," Al pointed out. "And you should be prepared to do more than that on the average call. Everything a serviceman learns adds to his business background: philosophy, math, golf, astronomy. All these, and many others, whether or not formally acquired, come in handily while you earn a living. Earning and learning aren't so far apart. Even the smallest details of a news item become important when a wavering set owner brings them up."

"I get it," I snarled. "The three

R's aren't enough. Before I can install a by-pass, I gotta study Byron, Brahms, and Bacon. Math," I conceded, "might be all right in its place—but what store owner can find a place for it?"

"All things," Al said, with a great show of patience, "are an expression of some mathematical—"

"I know, Al—but look," I pleaded. "I insist the five minutes spent in soldering in a resistor is more important than five months' education. What is the sense of getting a B.A. degree when all you have to know to sell a tube is which end to stick in the socket? When a customer calls me, it's because he wants a radio technician, pure and simple."

"You're half qualified," my partner laughed. "Seriously—when a repairman answers a call, his conversation plays an important part in the deal. As you say, soldering a resistor is what gets the money; but poor palaver often denies him the chance to solder!"

"So I'm dumb," I replied resignedly. "I'll shut down early from now on and go to night school."

"You don't need to," Al said, sarcastic in a way only a business partner is able. "If you come across a customer you don't understand well enough to talk with, just listen. Incidentally—I've watched while some of our clients were talking to you. During such occasions, you have no more poise than a man falling downstairs."

"Next time," I promised, "I'll stand there with a straight back and a crooked smile. Even if the customer talks Pluto to me!"

"Why—don't you know who Pluto is?" Al asked.

"Of course," I said, "he's—uh—secretary of the internal regions!"

"Very often," Al laughed. "You'll learn some day, if you stay in business long enough, that you must advance with all your mental equipment if you are to be a success."

"Pretty stiff order," I remarked, "for the dough we earn."

Al pulled his hand down over his face in a "slow burn."

"Aw-go crawl back into the ooze," he exploded.

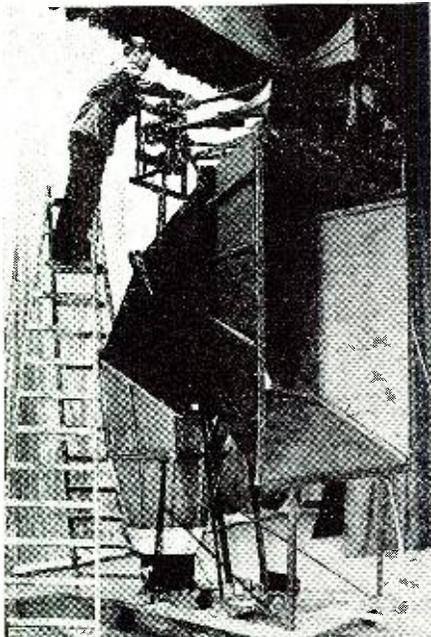
Jessup came in the store that evening with the battery portable under his arm. Al—although he had never

(Continued on page 50)

NEW SPEAKER CUTS DEAD SPOTS

TO overcome the so-called dead spots in big movie theaters the Euronor giant loudspeaker has been devised. In big halls poor acoustic conditions at certain parts occur more often than in small locations because although the laws of acoustics are well known theoretically, practically it is very difficult to apply these laws to large and complicated shaped theaters.

The new power loudspeaker combination is the biggest ever built, being about five times more powerful than the largest standard speakers. It is 13 ft. 1 in. high, 6 ft. 7 in. deep, and 6 ft. 7 in. wide, and it weighs 1433 lbs. Most remarkable is its low frequency part. It is horn shaped like the high frequency parts of standard speakers, something entirely new in loud-



The New Euronor Speaker

speaker construction. It has a large square opening with 6 ft. 7 in. edges which means a considerable power increase in the low sounds range.

For the projection of the high and middle frequencies there are four separated horns, three of them being immediately above the big low frequency horn, the fourth being suspended above. The rectangular openings of the four high frequency loudspeakers are vertically subdivided by two partition walls each. These four horns are 6 ft. 7 in. long and by means of a ladder or a bridge they can be adjusted in any direction to secure a perfect sound distribution all over the theater. By radiating the sound according to the special acoustic conditions of the location large areas may be covered without distortion and any double-speech effects, and faithful reproduction of music and speech is secured.

-30-



Manufacturer's Specifications

Make: Presto.
Models: "K-6," "K-7."
Manufactured by: Presto Recording Corp., 242 West 55th Street, New York City.
Price: \$215.00 list (K-6); \$230.00 list (K-7).
Size: 14" x 15½" x 19½". Weight: 46 lbs.
Motor: Self-starting, constant speed, 115 volts, 60 cycle input.
Turntable speeds: 1 at 78 RPM., 12" for K-6; 33½ RPM., 78 RPM. for K-7.
Cutting Head: Magnetic.
Drive: Rim drive; rubber tire.
Reproduction: 5-watt built-in amplifier. Built-in speaker.
Response: 80 to 5000 cps.
Pick-up: Magnetic, low impedance.
Microphone: Supplied, crystal type.
Meters: V.I.
Remarks: Cuts all records to 12". Will not cut pregrooved records. Tone and Volume Controls. Power consumption: 120 watts. Radio tuner jack included. Leatherette covered case. Cuts 100 lines per inch. Uses standard needles. Wholly portable. Records on all plastic or acetate coated discs.



The Presto Model K-6

Description

The Presto sound recorder is a new and highly perfected instrument that makes permanent phonograph records of all ordinary sounds. It records and reproduces your speaking voice, singing, or instrumental music with a clear natural tone. The needle scratch heard on ordinary records is almost inaudible on Presto recordings. The records can be played 100 times or more, using ordinary steel needles. The small sensitive microphone furnished with the recorder can easily be concealed. It will pick up voices at a distance of 20 feet or more. Features include: 12" turntable, suitable for making 6", 8", 10", or 12" records. The turntable is driven at the rim by a self-starting, constant speed motor designed for continuous operation. An exclusive feature of the Presto recorder is the rubber tire on the turntable rim which absorbs vibration and gives absolutely steady speed. The cutting mechanism is of the under-carriage type, driven by a positive worm and gear system beneath the turntable for protection from dust or accidental damage. This cuts grooves at 100 lines-per-inch, the pitch that gives the greatest record economy consistent with long life. The cutting head, as well as the playback pickup are of the magnetic type. They reproduce uniformly a frequency range extending from 80 to 5,000 cycles. A

built-in amplifier is included having push-pull '45 tubes in the output stage, and has a maximum output of 5 watts with an overall gain of 120 db. The equipment measures 19½" x 15½" x 14" and weighs 46 lbs.

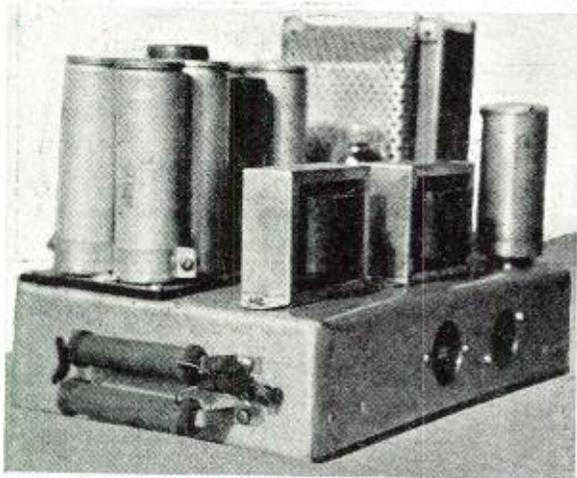
COMMENTS: Several types of record blanks were used in my test to determine which would give the best reproduction at lowest cost. The least expensive which were 6 for 50 cents, produced results comparable with present day commercial records. The surface noise is quite a bit higher than the acetate variety and their life is quite short. A frequency check was made with a standard set-up using an audio oscillator, vacuum-tube voltmeter, and output db meter. The response was fairly uniform from 100 to 3500 cycles, tapered off by 3 db at 4500 cycles and dropped abruptly at 5000 cycles. This is satisfactory for voice frequencies but leaves much to be desired for music. The Presto Green Seal discs were then substituted and the general results were most gratifying. The response equalled that claimed by the manufacturer, the surface noise dropped some 6 db over the plastic types and the playback life was found to be much greater. Cuts were made with both steel and sapphire needles, the latter giving far better results. The turntable maintained even speed when subjected to heavy overloading of the cutting head. This is desirable in recording heavy bass passages. The entire unit is easily carried about and is of such a shape that it does not afford inconvenience when walking. The recorder makes a satisfactory PA system for up to 500 persons and the tone quality is excellent. The use of a magnetic cutting head simplifies the process of recording from the amplifier standpoint. The operator is not required to adjust the tone control for various conditions, but may simply use this as a means for setting the tone when the record is reproduced for most pleasing results. Summarizing—the Presto Model "K" gave an excellent account of itself in the tests from the standpoints of easy operation, good fidelity, and the fact that inexpensive blanks could be used.

Discussion

Speaking of portable recorders—why don't the manufacturers stress the importance of setting the equipment on a perfectly level plane. When one is dealing with motion of the turntable, he must remember that any unbalance will cause no end of grief in the playing back of the record. For example—if we attempt to cut discs with the turntable leaning to one side, the grooves will be cut deeper on one wall of the groove than on the other and the life of the record will be greatly reduced. Furthermore, distortion will result and the playback needle will not remain in the groove at a later time when the table is operating in proper position. A good investment is to purchase a small carpenter's level from the dime store, and keep it with the accessories so that it will accompany the recorder at all times.

The most important consideration in making inexpensive discs on portable recorders is that of using the proper amount of volume "level" to the cutting head. Too often the operator is inclined to force as much audio power to the head as he or she feels is necessary. This procedure will result in distortion or overcutting of the side walls of the groove and is to be avoided. On the other hand—too little audio power will result in the surface noise of the record reaching a high level in the form of a noise "scratch" which is caused by the lack of sufficient modulation to the cutter, and in turn, this normal noise will approach that of the

(Continued on page 51)



The bleeder resistances are mounted externally to provide the best type of ventilation possible.

Improved 32 Farm Power Supply

by ALVIN L. CAMPBELL, VE4APZ
Burdett, Alberta, Canada

This is the 1940 version of the 32 volt farm power supply. It has been improved with newer smoothing ideas, and makes hum-free reception possible with the lower power input voltages.

THE Power Supply to be described in this article contains several improvements over the original model which was described in RADIO NEWS for October, 1939. Any readers who built the original model would do well to incorporate these changes in their unit so as to take advantage of the improved performance which will result.

The Power Supply is now constructed on a heavy-gauge steel chassis 12½"x7"x2½". An opening 3"x6" is cut out of this and a piece of ¼" bakelite inserted on which the 8 mf. wet electrolytic condensers are mounted. This is the simplest way of insulating all of these condensers from the chassis. The outside row of condensers is connected to "B—" by means of a strip of thin copper placed on top of the bakelite in such a way as to make contact with the containers of the condensers when they are fastened in place. A small screw at each end of the strip holds it in place and soldering lugs on these screws under the chassis provide a ready means of making the various connections required. The connections between the pairs of condensers are easily made by wires from the positive terminal of one clamped under the container of the other.

A heavy-duty home-wound transformer is now used for increased output and better efficiency. The core was obtained from an obsolete 150-watt power transformer and has a 1½" square cross-section. The secondary winding is put on first and consists of 2400 turns of No. 27 enamel wire on each side of the center-tap, making a total of 4800 turns for the entire winding.

Each layer of wire was insulated with thin paper. The primary consists of 110 turns of No. 18 DCC on each side of the center-tap. This number of turns does not conform to the turns-per-volt ratio of 4, but was found after experiment to be the number which gave the required output. A static shield is placed between the primary and secondary and consists of a strip of metal foil put on in such a way as to leave a gap of about ¼" between the ends. A wire from this shield connects directly to the frame of the transformer. Shielded wire is used for the connections to the primary. The fancy-looking shield covers on the transformer were made from zinc fanning-mill sieves (hi).

Special attention was paid in this model to taking all possible precautions to eliminate static and the results attained were well worth the extra trouble. Shielded wire was used wherever shown on the diagram and in most cases was grounded at both ends. The RFC consists of 100 turns of No. 18 DCC wire wound in 4 sections on a ¼" bakelite rod.

Bakelite washers between the sections provide a convenient method of holding the turns in place. The choke is then placed in the tin shield can along with the two .25 mfd. condensers, C5, and the can soldered together. Shielded wires from each end of the can provide for making connections. RFC2 can be plainly seen in the photo at the center of the left side of the chassis and consists of a ½" wooden dowel with 5 fibre washers on it about ¼" apart. The spaces between the washers are wound full of No. 24 DCC wire.

The vibrator used is the same as in

the original model, a *Mallory 501P*. The wire from the driver coil is disconnected from the No. 2 contacts and run down through No. 4 prong, making it possible to connect the 250-ohm resistor R1 in series with the coil. Some trouble was experienced with the vibrator as a large spark would occur between the contacts whenever it was turned on, sometimes causing the contacts to arc badly. After due experimentation and cogitation, it was decided that this must be caused by the 250-ohm resistor in series with the coil which prevented the induced current in the coil from being reduced to zero before the points opened.

The 8 mfd. 125-volt tubular electrolytic condenser C4 connected from the coil to ground cured this trouble. This condenser apparently absorbs the remaining current from the driver coil when the points open, hence it is called the "spark absorber." No trouble is now experienced and the vibrator can be started under full load without any sign of any spark.

All ground connections are made to a single point. This consists of a piece of No. 12 bare copper wire which runs from the grounded terminal of the vibrator socket to the grounded side of the rectifier heaters. It is connected to the chassis under one of the bolts which fasten the cushioned vibrator socket in place. This wire can be seen plainly in the under-chassis photo.

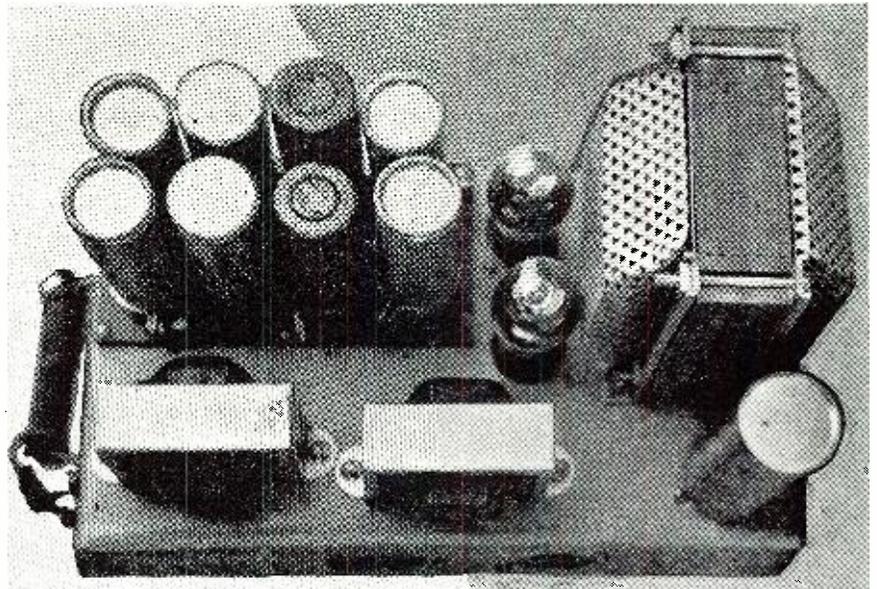
In the photo, just above RFC2, can be seen SW1. This SPDT switch makes it possible to use either choke or condenser input to the filter as desired. When the line voltage is low, increased voltage output at a slight sacrifice in efficiency can be obtained

by using condenser input. The original intention, however, was to use choke input for better regulation on CW work and condenser input for increased voltage for fone work. A connection at the output of the first filter choke provides a high voltage for the modulator plates (PP 25L6's). The lower but better-filtered voltage from the output of the complete filter is used for the final plate (25L6G) and the modulator screen and speech amplifier plate voltages.

The heater voltage dropping resistors for the rectifier tubes R2 are mounted outside the chassis for better ventilation. Two resistors were used because these happened to be on hand. One 40-ohm resistor would do just as well. A protective screen has been put over these resistors since the photo was taken. The resistors R3 across the filter condensers are smaller than generally used for this purpose. However, this serves a good purpose because they do double duty, serving both as a bleeder resistor and as voltage equalizers for the condensers. The need of a separate bleeder resistor is thus obviated.

The 1-V rectifier tubes are rather badly overloaded in this outfit but seem to stand up all right. The reason these were used is because, so far, the writer has been unable to find another rectifier tube with a higher current rating that uses a .3-amp. heater. It has been made a practice to use .3-amp. heater tubes all through the rig in order to cut down current consumption and also to make it possible to use ordinary rheostats instead of costly heavy-duty ones.

The remote-control unit shown is located in the bottom section of the transmitter rack. Only the parts pertaining to the operation of the power supply are shown in the diagram. In addition to these, provision is made for turning all heaters (oscillator, buffer, final and modulator) off and on from the same position. The selector switch, SW4, makes it possible to measure all heater voltages and the



Top view of the chassis showing the arrangement of the parts. Note that there is very little waste space. The unit works well.

line voltage using only two meters. The 6-amp. meter measures the vibrator current. The jewelled pilot light, L, shows when the vibrator is turned on. Connection between the power supply and control unit is made by means of two 5-wire cables. One of these uses 5-prong plugs and the other 6-prong so as to make it impossible to connect them wrong.

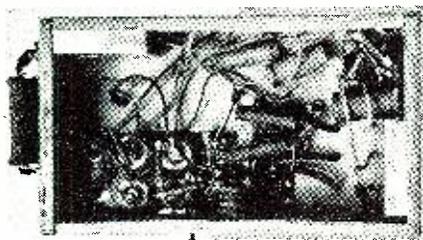
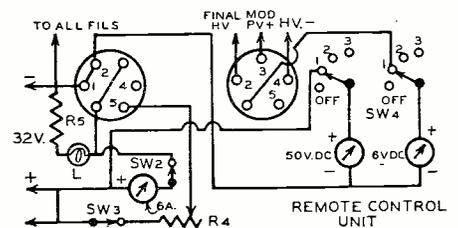
According to the photos, both filter chokes are the same. However, the input choke has been replaced by a 10-henry 200-MA unit since the picture was taken. This gives increased voltage and better regulation. It is also planned to tap the primary winding of the transformer about 10 turns from the end and provide a switch for connecting to these turns to increase the voltage output when the line voltage is low.

Our power here is obtained from a wind-electric outfit so the voltage may be anything from 30 to 40 volts. As

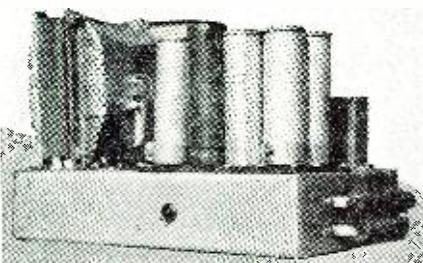
a small change of primary voltage is multiplied about 20 times in the secondary, some means must be provided for compensating for these variations. By using a tapped primary in addition to the optional choke or condenser input filter it should be possible to keep the voltage output fairly uniform under varying conditions.

In its present form, the power supply will put out close to 60 watts (150 ma. at 400 volts) with the line voltage fairly well up. Efficiency at this

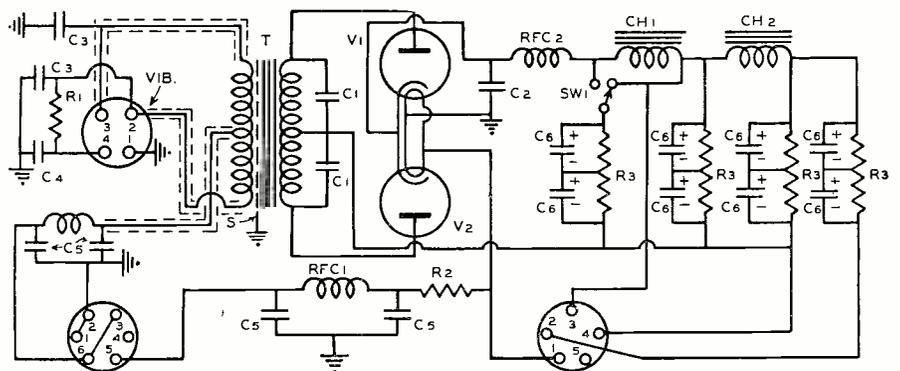
(Continued on page 58)



Underchassis connections view.



Another top-side chassis view.



- R₁—250 ohms, 2 w., IRC
- R₂—40 ohms, 30 w., IRC
- R₃—1 meg., 1 w., IRC
- R₄—30 ohms, 25 w., Rheostat
- R₅—300 ohms, 10 w., Ohmite
- C₁—.05 mfd., 1,600 v., C-D
- C₂—.01 mfd., 1,000 v., C-D
- C₃—.5 mfd., 400 v., C-D
- C₄—8.0 mfd., 125 v., Elec., C-D
- C₅—.25 mfd., 200 v., C-D
- C₆—6.0 mfd., 475 v., Wet elect., C-D
- CH₁—200 MA, Swinging choke, 10 hy., Ham-

- mond 10-200X
- CH₂—100 MA, Filter choke, 15 hy., Hammond No. 158
- V₁, V₂—1-V Rectifier Tubes, RCA
- SW₁—SPDT Toggle Switch, Arrow
- SW₂, SW₃—SPST Toggle Switch, Arrow
- SW₄—Two-Channel Selector Switch (Readrite)
- RFC₁, RFC₂—RF Chokes (See text)
- T—Transformer (See text)
- VIB—Mallory 501P Vibrator, Mod. for 32 v. oper. (See text)
- L—Pilot lamp, 6.3 v., .15 amps.

BENCH NOTES



by **LEE WARD**

Service Manager, San Francisco, California

Ward's awards—The winners of the "Test-it" riddle.

Heisse Hünde

THE announcement, by the *Miracle Appliance Company* of Cressona, Pa., of a grill that cooks hot dogs electrically is somewhat reassuring. Putting aside for the moment the moral question raised by animal electrocution, one senses science has finally reached its ultimate accomplishment, and that radio is here to stay.

Woman's Work

THE feeling we may face the future without flinching is shaken by a report from Serviceman Williams of 1467 Leland Ave., Chicago:

He sold one of those experimental radio construction kits to a customer whose son, it was hoped, would use it to scorch an immediate pathway through science.

Some days later the parts had been assembled as a capacity relay, operating between the seat of an easy chair and the front of the house.

Now, whenever his mother sits down after a hard day's work, the front door-bell rings.

Oh, well. . . .

Ward's Awards

REPAIRMAN'S Riddle No. 5, detailing an encounter between a serviceman, a cryptic customer and a mysterious box of radio parts, elicited some of the slickest math ever slid off a slide rule. So enthusiastic were some entrants about the mathematical

feature involved they forgot the customer factor and the time-saving power of deduction.

Outsiders, especially, were inclined to stress the exactness of condenser values at a sacrifice of the practical considerations involved. A repairman, for instance, must always keep in mind that it is more important to know whether a condenser is paper or electrolytic than to know its exact capacity. Under the conditions given in the problem, it was clearly evident the condensers in the "Test-it" were of the paper variety; electrolytics would have been damaged, and—since they practically short on A.C.—would have made the table readings impossible. It is reasonable and important that a serviceman make this distinction. While few of us would attempt to connect a 2-mike electrolytic across the primary of a power transformer if we had a set before us, some entrants concerned themselves more with exact capacity than with working voltages, applications of the two types, and replacement costs—all of vital importance in store life.

The resistor passed 60 mils without damage on test, despite the fact it was sealed in pitch, so it must have been rated at more than 3.6 watts. The analyst, in this case, could have shown his savvy by estimating it was five watts or more for operating safety; and, since the cost of resistors varies widely with wattage, and little with resistance, the matter becomes all-important if the customer requests replacement.

The Riddle attracted many non-professionals, and among them were most of those who gave math precedence over sales acumen and logical store practise. Their answers would have been correct if the questions were asked in a text-book, but the *Bench Notes* stories are designed for servicemen, and to bring into exercise not only formulas but field knowledge, savvy and the cogent choice of expedient every man must have if he tries to earn a living behind a radio store counter.

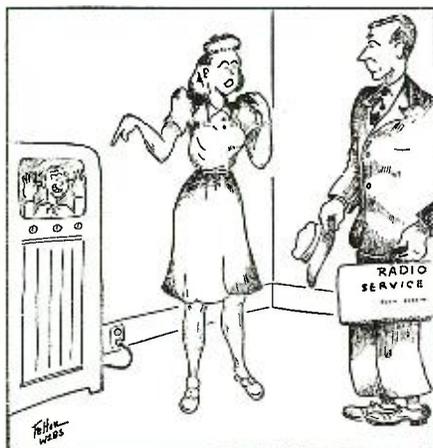
The precise math received from some of the outsiders was beautiful to behold, and obviously came from minds far better trained than the av-

erage; but what impresses the customer most is a quick—even though approximate—answer. It is far better that a serviceman sacrifice exactness for speed; if, instead, he gives an exhibition of slide rule dexterity, the customer usually believes he is being foxed.

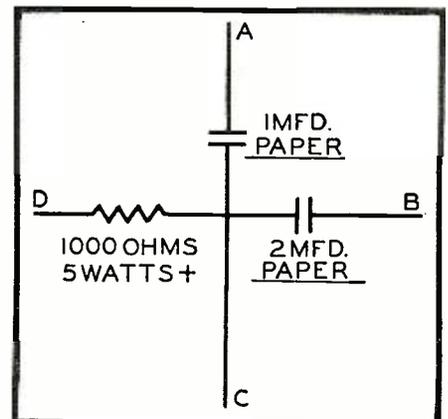
No, these are repairman's—not mathematician's—riddles, as their titles imply, and since both the author and publisher have gone to additional trouble and cost to bring out questions from an authentic servicing background, it is only fair to credit the practical entries for comment that shows the entrants' awareness as well as their ability in math. Extra credit, for example, was given those who knew 120 was the line voltage in commonest use, and who used the math clue as a confirming check.

It might interest outsiders to know there is no such thing as a 1.069 mfd condenser in the usual service shop. Nor can one find a 986.452-ohm resistor. They simply don't exist. Tolerances, in a store inventory collected from divers sources over a period of years, are often so wide between common values they overlap. This saddens me, but it is true. While nothing was taken from the scores for elaborate math, the circuit diagram, resistor value, and comparative capacities could be reasoned without math, and—since it was announced the results were to be judged for deduction, correctness, and presentation—the

(Continued on page 56)



"That's been there since Dad tried to fix it, and seems it won't go away."



The "Test-it" solution.

AIRPLANE RADIO FREQUENCY CHECK STATIONS

Aeronautical Radio Company—Roosevelt Field, Garden City, L. I., New York.

Rates unknown.

American Airlines, Inc.—Municipal Airport, Chicago, Illinois.

Will furnish measurement service to itinerants covering their own frequencies only.

Brainiff Airways, Inc.—Love Field, Dallas, Texas.

8:00 A.M. to 4:00 P.M. daily, except Sunday. \$3.00 per measurement.

Chicago and Southern Air Lines, Inc.—Lambert-St. Louis Municipal Airport, Robertson, Missouri.

9:00 A.M. to 4:30 P.M. daily. Call Winfield 1762, 1763. \$2.00 per measurement.

Commercial Radio Equipment Co.—216 E. 74th Street, Kansas City, Missouri.

\$2.00 per measurement.

C. L. Daniels—Municipal Airport, Houston, Texas.

Rates unknown.

Du Pont Airport—Lancaster Pike and Center Road, Wilmington, Delaware.

8:00 A.M. to 5:00 P.M.; Sunday by appointment. \$3.00 per 15 minute period or fraction thereof. Will check any series of frequencies possible within such time—3072.5, 3105, 4122.5, 4937.5, 4967.5, 5672.5 and 6210 kilocycles only.

Eastern Airlines, Inc.—36th Street Airport, Miami, Florida.

8:00 A.M. to 4:00 P.M. daily, except Sunday. \$2.00 per measurement.

Emrick Flying Service—Central Airport, Camden, New Jersey.

9:00 A.M. to 5:00 P.M. daily, except Saturday and Sunday. Call Camden 6646. \$3.00 per 15 minute period. Will check any series of frequencies possible within such time.

Queen City Flying Service, Inc.—Hangar No. 3, Lunken Airport, Cincinnati, Ohio.

Daily except Sunday upon one hour's notice. \$2.50 per measurement.

RCA Communications, Inc.—66 Broad Street, New York City. Call Hanover 2-1811; Emergency address only—call Riverhead 2290; Western Union Telegraph only—Riverhead, New York; 28 Geary Street, San Francisco, Cal. Call Garfield 4200; Emergency address only—Point Reyes, California. Call Iverness 9-W; Western Union Telegraph only—Point Reyes Station, Marin County, California.

\$3.00 per minute period. Will check any series of frequencies possible within that time.

Spartan School of Aeronautics—P. O. Box 2649, Tulsa, Oklahoma.

\$3.00 fixed charge for measurements up to and including four frequencies. \$2.00 for each additional frequency.

Timm Aircraft Company—Grand Central Air Terminal, 1020 Airway, Glendale, Calif.—Call Kenwood 2280; Los Angeles, California—Call Omaha 34542.

8:00 A.M. to 4:30 P.M. daily, except Sunday. \$3.00 fixed charge for measurements up to and including four frequencies. \$2.00 for each additional frequency.

Transcontinental & Western Air, Inc.—Municipal Airport, Kansas City, Missouri.

Will furnish measurement service to itinerants covering their own frequencies only.

United Airlines Transport Corporation—Municipal Airport, Chicago, Illinois.

Will furnish measurement service to itinerants covering their own frequencies only.

(Continued on page 56)

FOR IMMEDIATE RELEASE ...

Hot & Spot News will be found in this column every month. Don't fail to read it!

COMMANDER E. F. McDONALD, JR., President of Zenith Radio Corporation, today stated at the annual convention of Zenith wholesale distributors of the United States and foreign countries in Chicago that Zenith Radio Corporation plans to introduce four new radio products this year. As a consequence, for the first time since he entered the business in 1920, he stated, he now sees and predicts that the unit of sale will be going up rather than down.

The only one of these products he discussed at length was Armstrong's new invention, frequency modulation radio reception, which he indicated Zenith would introduce as soon as the Federal Communications Commission sets the standards for the width of the band that should be used by this service and the wave lengths which will be made available to it.

He pointed out that Zenith will sell no frequency modulation receivers until these two standards are set because frequency modulation sets produced and sold at this time might become obsolete in six months if the standards adopted by the Federal Communications Commission are different from those now in use. Nevertheless, he emphasized his opinion that frequency modulation has none of the economic hurdles of television and stated that Zenith is licensed by Armstrong and is ready to go ahead with FM for the public when the standards are fixed by the Federal Communications Commission.

McDonald reiterated his statement made a year ago last fall that television for general use, in his opinion, is "still just around the corner for the stock salesman only." Absolutely no progress has been made in the last year and a half in television, he claims, which offers a solution for its economic hurdles. He stated there was nothing wrong with television that money wouldn't cure, and that one day it will be a great industry when and only when a means is found for financing adequate continuing television programs. He indicated that in his opinion the public would demand the equivalent of motion pictures which now cost the movie producers \$200,000 per hour and are sold to the public through the movie theatres at less than ten cents an hour per person. Advertisers haven't that kind of money to pay for the public's entertainment.

Commander McDonald further stated that Zenith Radio Corporation is making progress on its experiments in putting television over the telephone wires, which would offer an economic solution because the programs could be paid for. He stated that the corporation has not only been operating a television transmitter since more than a year ago, but is also operating a frequency modulation transmitter located on the Chicago Towers Club Building, which is on the air 16½ hours every day. He did not elaborate on any of the other three new products but definitely stated that regardless of rumors to the contrary, the Zenith Radio Corporation is not manufacturing, nor does it intend to manufacture or market refrigerators, washing machines or any other products not allied with radio.

A CONSTRUCTION permit for a television broadcasting station in New York City has just been granted by the Federal Communications Commission to the Allen B. Du Mont Labs., Inc., of Passaic, N. J. Work has already begun on the transmitter and studios which will be located on the

top floor of the 42-story office building at 515 Madison Avenue.

The new Du Mont transmitter will operate on Television Channel 4, or the 78-84 mc. band, as a Class 2 television broadcaster for program research. It is planned to utilize the Du Mont flexible system of television, whereby changes in number of lines, number of frames and interlacing schemes can be confined to the transmitter with the receivers automatically following any transmitted signal.

The Du Mont New York City transmitter is in addition to the experimental transmitter W2XVT at Passaic, which has been in operation for over a year, for engineering studies and demonstrations. Du Mont also has a mobile transmitter license with call letters W10XKT.

MILWAUKEE, WIS.—By giving the radio public sensationally improved reception that is entirely new and so desirable every radio listener will demand it, FM radio has opened up a new market to radio retailers that is equivalent to almost the entire number of sets in use today. Such was the welcome message of Lee McCanne to more than 150 radio dealers when the Stromberg-Carlson Assistant General Manager addressed a luncheon meeting at the Knickerbocker Hotel in Milwaukee.

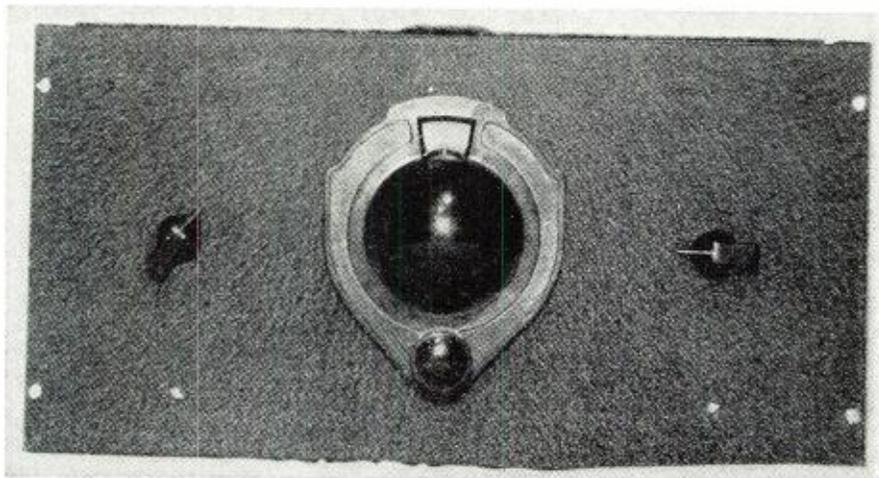
McCanne declared, "Not only does F-M radio create a tremendous potential for radio sales, but it also solves another problem of the radio industry—that of raising the unit of sale to provide the dealer a worthwhile profit."

The meeting was sponsored by Stromberg-Carlson to acquaint the trade in the Milwaukee area with the facts about FM previous to the opening of the FM station W9XAO by the Milwaukee Journal on April 22. The new station will operate daily from one to ten p.m.

PRESIDENT SHEPPARD of the Yankee Network, testifying for FM Broadcasters, Inc., said that investment of the Yankee net work in FM experiments to date was about \$250,000. He stated that FM is now capable of rendering a regular broadcast service, certainly to large urban areas, and recommended that it be given a regular commercial basis now. Increase of the FM power limitation from 1 to 50 kw. was urged by Mr. Sheppard, and he advocated allocation

(Continued on page 50)

5M 01M 2 N 7 E 1 1 E R S



Of utmost simplicity is the front panel and its associated controls.

by **JOHN MULLIGAN, W8RTW**

Elmira, New York

If your superheterodyne will receive 1600 KC, then this converter will make it possible for you to hear signals in the 56 and 30 megacycle bands. With slight alterations to the coils, police signals can be heard.

FROM time to time articles on converters appear: some are simple, while others are quite complicated. Most hams dislike tricky and complicated circuits. The writer has had a varied experience in converters during the last three years and feels that in this article lies the answer to many a ham's prayer for a really simple five, ten, or both, converter that can be added to any receiver capable of tuning in the vicinity of 1600 kc.

Although the circuit about to be described is not new, there has been very little said about it. So, let's see what it's all about first and also how it works.

Looking at the diagram, we see nothing more than the simple autodyne detector, but what are the coils labeled L1 and L2? Well, forgetting them for the time being, let's hook a pair of head phones in the plate circuit and listen in on what happens when we tune in a signal. Since the tube is in an oscillating condition, when the tuning condenser "C" is tuned to an incoming signal, a beat note is heard in the phones. The frequency of the beat note changes as we

tune through the signal where, at the zero beat frequency position, the note is at the lowest frequency or is no longer heard.

As we tune away from zero beat, the frequency of the beat note goes higher in frequency until the ears no longer respond to the increasing pitch whistling sound. This beat note does not stop at this spot but keeps increasing, as we tune farther away from the received signal, until it finally reaches a frequency within the radio spectrum again. If the output from our simple autodyne detector is now fed into an r.f. amplifier of, say, 100 kc. when our beat note reaches this frequency, it will be amplified and then can be regularly detected and turned into an audible sound. Well, anyway, that's the way it works, and this in itself makes a nice converter, the tuning range being governed by the coil and condenser (LC).

By the addition of a tuned r.f. stage ahead of this autodyne detector, we get a very substantial gain in signal strength. And now we see the completed converter with nothing but a tuned r.f. ahead of an autodyne detector. The signal can be traced very easily through the complete circuit.

Transformer T1, in the plate circuit of the autodyne detector, is tuned to the desired receiver input frequency. In our case, we decided on 1600 kc. as being the best for the elimination of repeat spots (quite essential on five and ten meters).

The circuit constants are common and nothing is special in any way. Tubes can be most anything; 58, 78, 6D6, 6K7, 6K7G, 1851, or 954. All of these work nicely as r.f. amplifiers, while 57, 77, 6C6, 6J7, 6J7G, 1852 or 3, or 954, make excellent autodyne detectors. However, some adjustment of R3 may be necessary. This resistor should be adjusted until super-regeneration stops with the particular tube type used.

The coils may be wound easily with #12 enameled antenna wire on a $\frac{5}{8}$ " diameter form. After winding the form can be slipped out and the coils spaced. Plug-in coils may be used, using pin tip jacks and phone tips or, as in the writer's model, coil switching may be used, in either case. The coil data is as follows:

L For all bands—5 turns, closely wound.

L1 For 5 meters—8 T spaced $\frac{1}{8}$ ".

L1 For 10 meters—13 turns closely wound very slight spacing.

L2 For 5 meters—8 turns spaced 1/8" between turns.

L2 For 10 meters—13 turns closely wound very slight spacing.

No. 14 enameled aerial wire can be used if #12 is not available. Tap in either case from grounded end—1 turn.

By using a doublet antenna directly across L1 (grounded end ungrounded) only one antenna coil need be used for both bands if band switching is used, the arrangement may be seen in the photograph. It is also good policy to use the antenna coil as a doublet coupling coil as this eliminates to a great extent auto ignition noise caused by capacity coupling between L and L1.

A word might be said about the output transformer T1. This is a regular antenna coil as used by most midget a.c.-d.c. broadcast sets and is readily obtainable for a few cents. C10 will bring the secondary (used here as a primary) to resonance at 1600 kc. with leeway for other frequencies, if for instance the converter was to be used on receivers such as the *National 101X* in which the lowest frequency is 1690 kc.

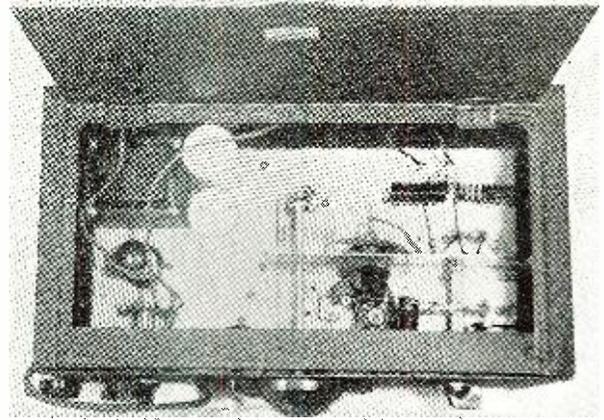
Alignment is quite simple, first place the receiver in operation on the desired frequency (1600 kc. or ?) C10 on the output transformer is then adjusted for maximum hiss in the loud speaker. Next C5 across C2 is adjusted for converter dial coverage of the band (a very easy job on ten any Sunday afternoon. Hi!), signals will be heard even with the r.f. greatly detuned. C5 across C1 can be adjusted for maximum background noise in an off station position. Since the autodyne detector is so very sensitive, the setting of coupling condenser C5 between the r.f. plate and detector grid is not critical. However, since this condenser has some effect on the detector tuning due to loading effects it should be set at about half capacity first and then *not* touched again.

This converter together with a good receiver makes a very sensitive and

selective five and ten meter receiver which is capable of receiving signals as good and better in lots of cases than most of the receivers on the market today. However, if you want more gain, figure 3 shows an additional stage of 1600 kc. amplifier which can be added between the converter and the receiver. This circuit uses an 1852 tube and makes R3 signals R9+ believe it or not! (apologies to Ripley).

The photographs show the writer's same circuit have been built and all gave equally good results. If you have stuck with us this far, we're sure you'll agree "she's" sure simple and gives good results.

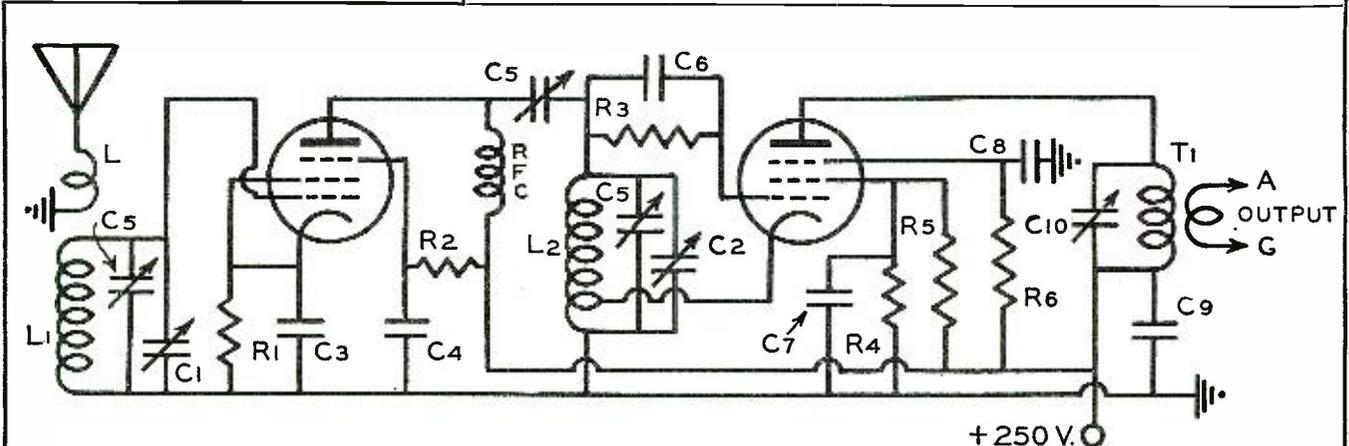
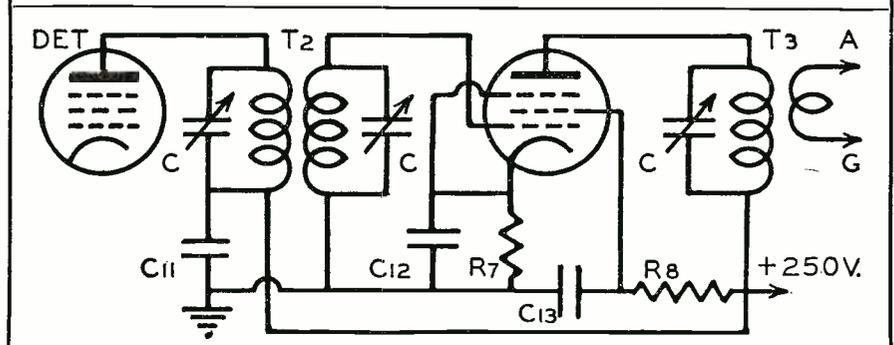
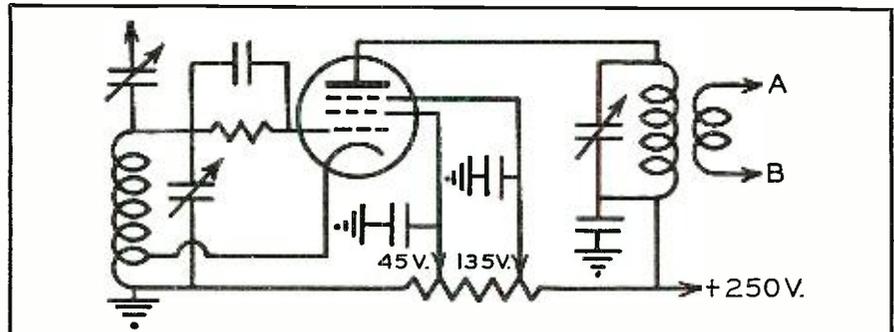
A number of other models using the



An inside-the-cabinet view of the extremely simple and easy to build 5 and 10 meter superhet converter.

same circuit have been built and all gave equally good results.

If you have stuck with us this far, we're sure you'll agree "she's" sure simple and gives good results.



- C₁, C₂—15 mmf., var. dual, Hammarlund
- C₃, C₄, C₇, C₈, C₉—01 mf. paper, Sprague
- C₅—3-30 mmf. mica trimmer, Hammarlund
- C₆—0001 mf. mica, Sprague
- C₁₀—10-50 mmf. mica trimmer, Hammarlund

- C₁₁, C₁₂, C₁₃—01 mfd. paper, Sprague
- R₁, R₇—400 ohms, 1/2 w. IRC
- R₂—100,000 ohms, 1/2 w. IRC
- R₃—25 -I megohm, 1/2 w. (see text) IRC
- R₄—20,000 ohms, 1 w., IRC

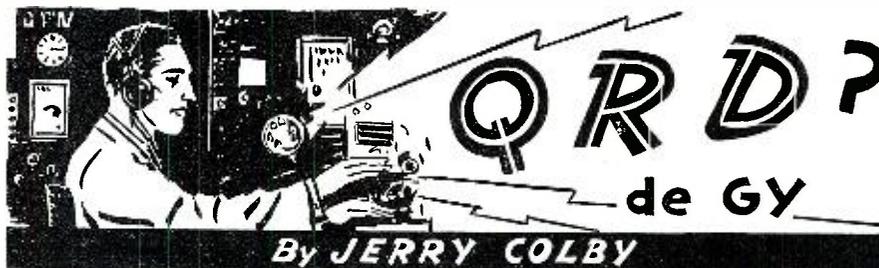
- R₅—50,000 ohms, 1 w. IRC
- R₆—10,000 ohms, 1/2 w. IRC
- R₈—100,000 ohms, 1/2 w. IRC
- T₁, T₃—Antenna coil from midget BC radio
- T₂—1600 KC IF transformer

TECHNICAL BOOK & BULLETIN REVIEW

VIBRATOR POWER SUPPLIES, published by P. R. Mallory & Co., Inc., Indianapolis, Indiana, is Supplement Number 7 to the Third Edition of the *Mallory-Yaxley Radio Service Encyclopedia*. Information on the subject of vibrators and power supplies using them has been lacking in recent months. The *Mallory Company* has endeavored to take the reader through a short course in the construction and proper adjustments in the design of this type of supply. As usual, the text is most complete and is written so that even the more inexperienced layman may clearly understand the requirements of proper application and design. The first chapter deals with *General Theory of Vibrators*, which includes general history of the item for both present and past vibrators. Among the many types described are the "Half-Wave" Interrupter, The "Full-Wave" Synchronous - Rectifying type, the "Dual-Reed, Full-Wave" Interrupter, the "Eight-Contact" Vibrator, the "Tuned-Reed" Vibrator, and the "Split-Reed" Vibrator. The second chapter covers the design requirements of *Bias Supply Systems*, and includes information on Types of Tubes, Circuit Diagrams, All-Heater type tubes, Heater and Filament type tubes in combination, and All-Filament type tubes. The next chapter deals with *Vibrator Power Supply Design and Operation*. All types are shown, illustrated and described. The final chapter covers R.F. Interference Suppression in many phases and explains methods for proper treatment in order to eliminate this troublesome condition.

SIMPLIFIED FILTER DESIGN, by J. Ernest Smith, published by *RCA Institutes Press*, 75 Varick St., N. Y. C. 55 pp. Price on application. The theory of filter networks is well known and, in fact, forms a necessary part of every electrical engineer's technical training. The practical design of these networks, on the other hand, has not been adequately developed in the literature. Consequently, the design engineer does not have available beforehand the type of precise information he needs to properly choose filter structures best suited for his particular applications. The purpose of the present book is to present this information in graphical form which will not only aid the engineer in selecting the best network structure, but will also eliminate the lengthy calculations normally required.

The essential material of this book was originally organized and reduced to its present form for use by engineers in the Radio Corporation of
(Continued on page 54)



FOR years we have been advocating continual study for the advancement of the radio art and now that Television is "just around the corner" we thought that a timely statement from none other than Dr. Lee DeForest would not be amiss. So we ambled out to see that renowned gentleman to get a statement. His conservatism in prognosticating on the future prospects of radio is well known so you can understand why the following remarks made us even more enthusiastic than we ever were (if that is possible!):

"It is an encouraging sign that today one need not answer so frequently the question: 'Do you think we will ever have Television?' Now the queries run: 'How soon can we have Television?' The era of cynical skepticism which resulted from the scientists' and promoters' too early assurances that 'Television is just around the corner'—the recent sentiment that Television is a fake, or dead, has finally terminated.

"Today in New York, Chicago, and Los Angeles, at least, there are tens of thousands who have actually seen television pictures, thousands who are actually proud owners of a television receiver, while the number of people who are planning and saving to own a set is growing by leaps and bounds.

"With the continual, consistent improvement in the quality of the transmitted picture, and of the entertainment content of the television program, the time is not very far distant when the present supply of receivers now in warehouses and on dealers' shelves will be completely exhausted, and some of the few manufacturers who are licensed under the *R.C.A.* and *DuMont* patents will find themselves wholly unable to supply the ever growing demand.

"Especially now since the drastic cut in prices offered by *R.C.A.* has put this merchandise within the reach of thousands of would-be customers who have been hitherto unable to afford such a luxury.

"Other manufacturers are certain to follow this long awaited, badly needed example in wise merchandising. The result, I doubt not, will be a greatly accelerated demand for televisions, with a corresponding many fold increase in popular interest in television.

Thus only, by a rapidly rising increase in the number of viewers, can the present telecasting companies and the others who will be fortunate enough to obtain Federal licenses, feel warranted in continuing and enlarging the heavy expenditures which these more and better programs will necessarily entail.

"The very nature of television transmission—short wave lengths and short ranges of propagation—call for the establishment of a very large number of stations scattered widely all over the country, one or more in every good sized city or town. Thus one may expect to see a much larger personnel engaged in the establishment, servicing, and maintenance of a nation-wide television service than is today required for our audio broadcasting systems. This, regardless of whether or not a large percentage of these local telecasting stations are to be connected by radio relay networks. If this latter proves to be the answer to chain telecasting, then there again will large numbers of trained engineers and helpers be required; because although such radio relay stations be entirely automatic in operation, they will nevertheless demand regular inspection, servicing, policing and repairs from time to time. Such maintenance is always inevitable.

"I can foresee the time when the newborn television industry will top today's gigantic radio industry as regards the number of employment jobs, which, directly and indirectly, it will offer to American engineers, technicians, directors, artists, and employees generally.

"Those therefore who begin now to study this new and growing science, to equip themselves to become the most highly skilled in its intricacies, and proficient in its multifarious management (provided always that they find themselves to be talented along these lines) will be the ones from whom the future leaders of this new art will be chosen.

(Signed) Lee de Forest.

ALWAYS wishing to be fair, this column believes that the statements made by Fred Howe, recently ousted secretary of *Local No. 2, ACA*, before the *Dies Committee*, should be either retracted with a public apology or else proven, if they are true. The statements credited to Mr. Howe are: (1) that Mervyn Rathborne, President of the *ACA*, is a Communist; (2) that Communist radiops are infesting American vessels for purposes not to the best interests of this country. We do not believe that President Roosevelt would appoint any man to a position of trust like that to which Mr. Rathborne was appointed—the Executive Board of the *National Youth Administration*—if his background was not first investigated. There is no question in my mind but that the *FBI* would have apprised the Chief Executive of Mr. Rathborne's affiliations with Communism, if this were so. And being in such a high position which could control one of the most important industries, if not the most important industry, in the event of war, we cannot believe that he would have been permitted to continue there, if it could be proven conclusively that he was Moscow-controlled. Therefore, it is a case for Mr. Howe to either "put up or shut up."

IT would seem that the old adage, "he who hesitates loses out" doesn't always hold water. A two year agreement was recently completed between the *ARTA* (local secs Jordan and VanErman) and the *Pacific Coast SS Co.*, operators of coastwise lumber and general cargo boats. One of the important clauses was a minimum pay of \$150 per month, plus \$1.25 overtime for a stipulated 8 hour watch. Also, complete jurisdiction over the radiophone apparatus which had hitherto been operated by the Chief Mates or the Skippers. This agreement was made after quite a controversy had been raised over the *ARTA* locals' inability to supply ops to work for the then prevailing wage of \$115 per month. No radiops would take the jobs offered, so the company had to do the next best thing—raise wages.

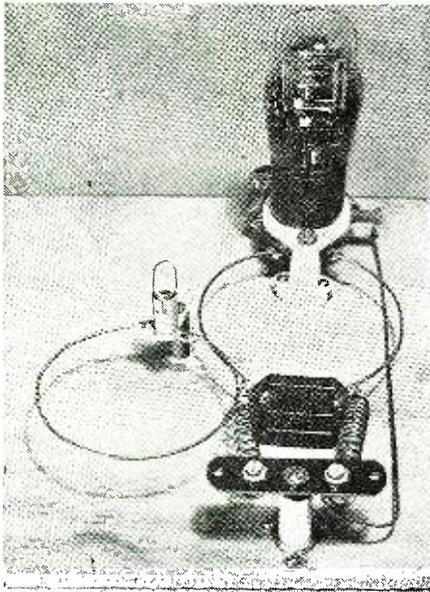
TO us, sitting up here in the observation car, it seems wonderful the way both unions are doing their best for the radiops.—gaining them recognition, wage increases and better living conditions. Of course, we appreciate how both unions feel towards each other. But just like the states in this glorious country have certain barriers between them, each fighting for the welfare of the population within its borders, when the final showdown comes, they are arguing about the same thing: Americans all. And so do both unions fight: for radiops all.

(Continued on page 54)

The Experimenters' Super Ultra Short Wave Oscillator

by JULIUS GREENBLATT
Montreal, Quebec, Canada

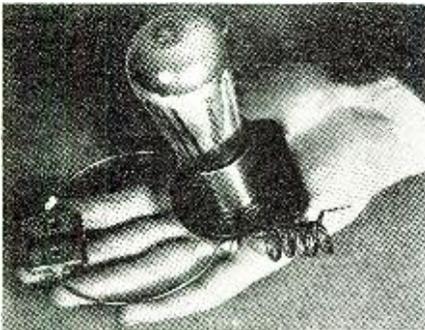
There are many experiments which can be performed with this little, easily built oscillator. It will educate you into u.h.f. quickly.



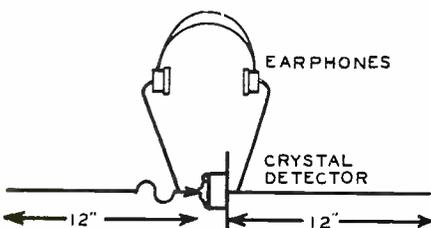
The entire oscillator is shown with its r.f. pick-up loop at the left side.



The power supply and the oscillator set up ready for the experiments.



Note the size of the oscillator in comparison with the author's hand.



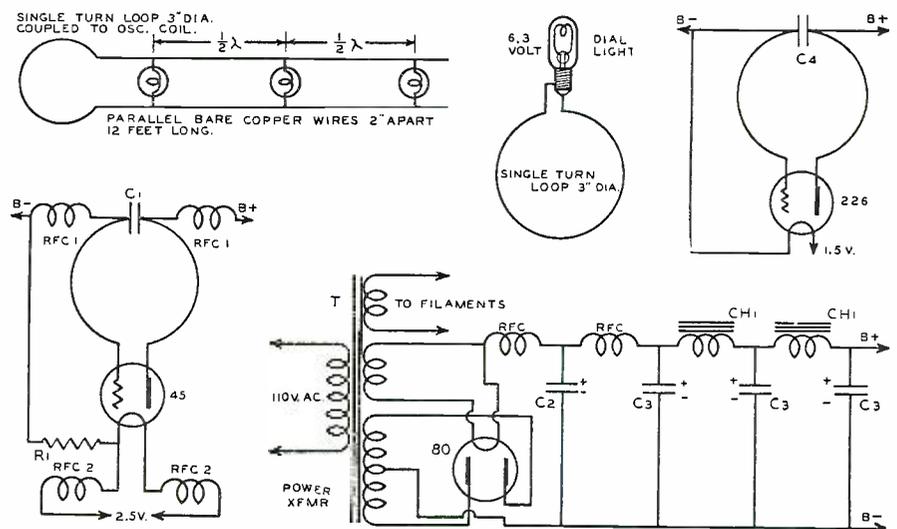
THIS unit is one of the most inexpensive ultra-short wave oscillators to build. For the novice it is an easy way to experiment with high frequencies and perform the many interesting experiments demonstrating a large number of radio principles. The photographs show a very simple model, and a more elaborate and efficient version which may be constructed for high school and college laboratories at a great saving over commercial apparatus. I, myself, have used this oscillator in several lectures I have given.

My first model consisted of a socket from an ancient *Atwater-Kent* battery set, a loop of wire 3½" in diameter cut in two, an ancient open type tin-foil condenser, and a 201-A tube that was eight years old. With two hundred volts on the plate it worked smoothly.

The best method of detecting oscillations is to use a 3" loop of stiff wire soldered to a pilot light socket in which is inserted a 6.3 volt dial light. This loop is held parallel to and about ¼" above the oscillator coil; the lighting up of the bulb shows that the oscillator is functioning properly.

The next step was to build more efficient and impressive-looking apparatus. White ceramic insulation is highly efficient and give a professional appearance to any equipment. This deluxe model is designed to give more output which may be necessary for some experiments. As for the construction:—a mica bypass condenser of 2500 volts test rating was used because the total d.c. and r.f. potential is across it. The r.f. chokes were made by simply winding the wire about a pencil and then stretching the

(Continued on page 51)



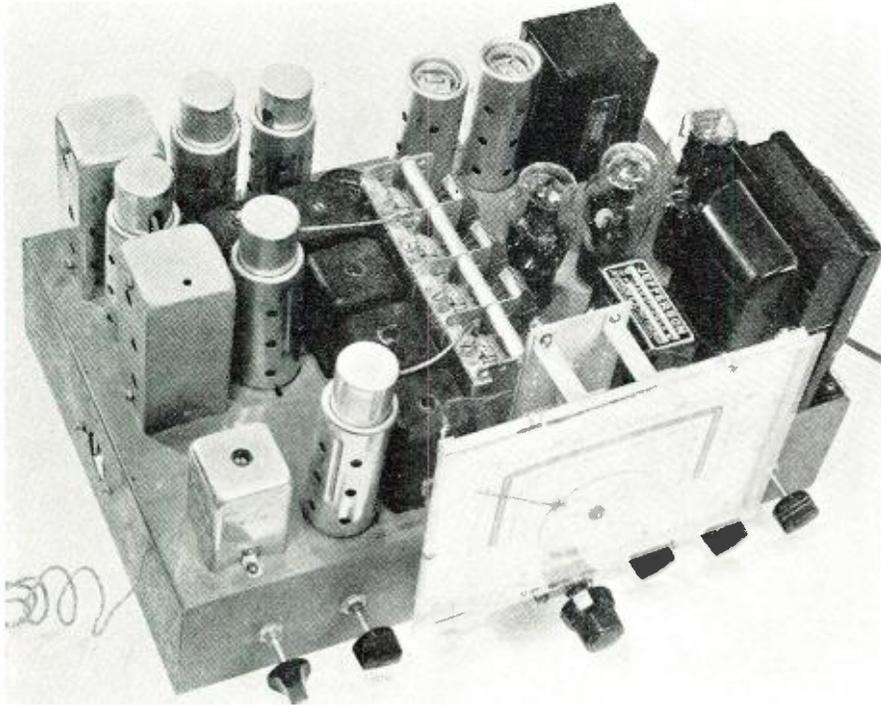
- T—Plate & fil. trans. Pri 110 v. 60 cycles. Sec. 5.0 v. @ 2 A., 2½ v. @ 2 A., 300.0-300 v. @ 60 ma.
- CH₁—30 hy. 75 ma. filter chokes
- RFC—2½ mhy. RF chokes
- RFC₁—12 turns No. 18 dec., ⅜" diam., 2" long
- RFC₂—12 turns No. 14 bare, ⅜" diam., 2" l
- C₁—006 mf. mica, Sangamo
- C₂—001 mf. mica, Sangamo
- C₃—8 mf. electro. Cornell-Dubilier
- C₄—002 mf. mica, Sangamo
- R₁—10,000 ohms, 1 w., Centralab

A Broadcast Superheterodyne for the Home Builder

by

**RAYMOND P. ADAMS,
W6RTL,**

Hollywood, California



The controls are conventional and the set simple to build.

There are still many home builders who like to construct their own superhets. This one for the broadcast band only, will give very fine music reproduction.

NOT so very many years ago, the "typical" radio receiver for home use was a broadcast band superheterodyne having perhaps this stage line-up: turned r.f.; self-excited mixer; i.f.; diode-triode detector and first audio; and pentode output. The intermediate frequency was 175 kc., selectivity and sensitivity were usually first-rate, audio level was sufficient for full room volume. Tone quality, on the other hand, and in the light of *present-day* expectations, was hardly perfect; the narrow acceptance of even that single i.f. stage cut sidebands (emphasis in design was on increasing selectivity, remember); audio distortion was considerable; and if a set featured means of tone adjustment at all, that means suggested simply a potentiometer and condenser, variable filter which when adjusted for "mellow tone," so called, merely by-passed higher audio frequencies to ground and emphasized rather than alleviated the poor response.

Now of course we all know that such a receiver is hardly acceptable today—particularly to the fidelity-conscious listener. That once typical super—simple, sensitive, and in its day quite a "last word"—might still bring 'em in on each and every channel and

might haul in just as much DX as next year's 38 tube top-notch. But Beethoven's Fifth Symphony, directed by Stokowski, and broadcast by a high fidelity transmitter, will sound about as thin and as characterless as a worn dime feels and looks.

That's why the fellow who can afford it and who wants his set to provide both hair-splitting selectivity for the reception of short-wave signals and reasonably wide-band acceptance for the reception of locally transmitted broadcast buys or builds an all-band job incorporating means of varying the band-pass width. That's why the fellow who *can't* afford a modern, all-service super or who isn't interested in short-waves but simply in the wide-range pickup of network programs put on the air by broadcasters operating in his particular metropolitan area acquired a TRF affair of reduced sensitivity and full modulation acceptance such as that designed by the writer and described in *RADIO NEWS* for February, 1938.

That's why the fellow who not only can't afford a small-service job but resides in a locality so remote from network stations that a strictly "local area" high-fidelity job is next to useless is sticking to his antiquated super

and—if he's at all fidelity-conscious—wondering why in thunderation somebody doesn't come through with information on the design of an instrument peculiarly and particularly developed to meet his own requirements.

Well, with that said to explain the "reason why" for this writing, we'll get on at once to the subject at hand—the design and construction of a *strictly modern broadcast band superheterodyne* which may be built at surprisingly low cost, which has sensitivity enough to permit its successful use regardless of location, which has wide range audio design and independent and functionally proper high and low audio frequency controls, and which is band-pass engineered to provide an 8 to 10 kc. acceptance, with the tuning curve flat-topped and straight-sided and with adjacent channel interference severely attenuated.

General Design

It's not a perfect receiver. Cost limitations prevented the use of an audio channel which we might describe as a last word, and certain necessary compromises in design prohibited the featuring of a tuned-circuit for acceptance as wide as that which might be desired. But, all things considered (selectivity, sensitivity, tone

quality, and so on), it is functionally right.

Three tuned r.f. and 6 tuned i.f. circuits provide 8 to 10 kc. or standard channel bandpass while 12 single r.f. and i.f. stages afford more than ample sensitivity and gain. Infinite impedance second detection assures excellent detector modulation capability and contributes to the maintenance of the desired selectivity curve. Push-pull beam output tubes operating Class A give plenty of distortionless volume, and two cascaded voltage amplifiers, circuits in correct tone-functional arrangement, make possible independent control of highs and lows—in other words, independent emphasis of either the bass or the treble response (or both).

All items except, of course, the 14" speaker are mounted on one standard 10"x17"x3" chassis, and all parts and standard items, available through recognized jobbing sources.

The r.f. stage is conventional employing a 6K7G and is both manually and automatically controlled for gain. The Mixer stage, likewise in the usual circuit arrangement (self-excited) employs a 6A8G. Two tuned circuits precede the converter, the two required coils being *negative-mutual inductively coupled* to provide good signal-frequency circuit bandpass.

Both the input and output i.f. transformers are triple-tuned, three-winding components. These afford really flat-topped, steep-sided selectivity, with the width of the top limited to the optimum 10 kc. which for most listeners is entirely satisfactory. (While a 5000 cycle upper register limit is half what it should be in a truly high fidelity receiver, it nonetheless assures pleasing, well-rounded reproduction; besides, we can't have *both* a maximum effective bandpass width and all-channel selectivity in a receiver of this simple type.) One 6K7G in the i.f. stage gives us plenty of gain with a minimum of tube noise. The stage, by the way, is gain controlled automatically and manually.

As we have previously explained, the second detector is of the infinite impedance type. A diode, experimentally used prior to the completion of the receiver in its present finished form, eliminated the necessity for a separate AVC channel but took considerable power from the i.f. stage and dropped the selectivity down considerably. The present set-up is frankly more in line with general tuning and bandpass requirements.

The AVC transformer is a single-tuned affair having closely-coupled windings and center-tapped secondary. Tuned to i.f. frequency (456 kc.) it couples the amplified output of the 6B8G pentode section to the same tube's diode section. Signal energy for the pentode is obtained from the second detector grid, and control of the "take off" is effected through variation of the potentiometer supplying delay bias.

In the audio system we have two

6C5 voltage amplifiers, the second of the cascaded pair transformer driving 6V6s in push-pull. One triode's bias resistor is *not* by-passed, and the circuit for the two stages is such that with the high and low frequency controls R24 and R28 in the off adjustment, the effective response is reasonably linear. As the potentiometers work toward the right (toward their free or floating terminals) the highs and lows are raised, R24 being the *treble* control, and R28 emphasizing the *lows*.

Inverse feedback from the 500 ohm winding on the output transformer to the primary of TR1 is an optional refinement. The response is quite good without it. Judicious use of the frequency controls with any one program being received has an effect on the speaker output quality suitable to the most critical ear. Perhaps the major justification *for* feedback, if it is to be used at all, would be its effect in leveling off any irregularities in the response as might be caused by peaks in the curves (operating conditions) of the TR1 and TR2 transformers.

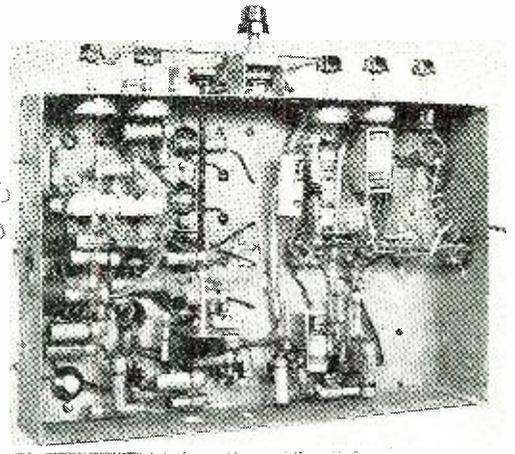
A standard power transformer supplying 360 volts d.c. into 8mfds. input filter capacity and rated at 125 ma. will be an entirely suitable unit in this layout — providing, of course, strictly Class A operation is assured for the 6V6s and the voltage applied to the beam plates and screens does not greatly exceed 250. An input choke together with a 1000 ohm speaker field are used in the filter system, the necessary capacitors being three 8 mfd. electrolytics, one at input and one at output positions, and one at the point of juncture between CH1 and CH2. Bear in mind that condenser input is quite permissible so long as the beam tube plate-screen drain does not vary greatly, as it would in AB₁ or AB₂ operation.

Construction

Great care has been used by the author to make the construction as simple as possible.

In constructing this receiver, which has a logical and functional layout, it is suggested that the arrangement of parts be followed in more or less exact detail and that the components as mentioned in the list of required parts by manufacturer's catalogue number be acquired and employed. Proper selection and positioning of major items cannot help but assure correct receiver operation (granting that the builder is reasonably well experienced in set construction), as layout and parts list refer to a tried and tested laboratory model.

The very first job to do is to remove the coil assembly from the input i.f. transformer can, then drill the can so that the grid lead for the 6K7 will



Notice the extreme simplicity of the wiring due to the small amount of component parts.

work directly back toward the rear of the chassis with the can so positioned that the three holes for trimmer adjustment face the left hand side of the receiver base. The second is to drill and stamp the chassis so that the various components may be positioned as indicated; four gang tuning condenser centered on the chassis, r.f. inductances to the left and in the L2, L3, L6, L4 order shown, etc.

The negative mutual coupling coil may be made by the builder. This item should have about five turns of primary and five of secondary, wound close together (interspaced) in the same direction on a three-quarter inch form. Ordinary cotton insulated push-back will do for the coupler, which once constructed, should be well doped so that the windings will remain securely in place. If the form is provided with four lugs for lead termination, so much the better.

The coil is then mounted below chassis between TR2 and TR3. The finish lead of the primary winding connects to the *start* lead of the secondary, the common tie returning to ground through the condenser C9. The start lead of the primary then connects to the L3-secondary return or ground terminal, and the finish lead of the primary to the ground or return winding of L6. Note that the regular primary of L3 is not used.

The audio volume control should be mounted on a bracket or partition placed conveniently near the first AF tube, and its shaft should be extended for knob adjustment from the front of the chassis. All other controls may be mounted on the front chassis drop, though the two AF potentiometers might well be similarly located near tube sockets with which they are associated if the builder wishes to go to the constructional trouble involved.

In wiring the receiver and installing small items such as by-pass capacitors and the various resistors, the usual practices governing set-building should be followed. That is, parts grouped electrically should be grouped physically, preferably near the socket of the

tube with which they are related in functional circuit position, and ground returns brought to one chassis point for each stage. RF and AF leads should be kept short and direct. Use plenty of tie-points, by the way.

Position the voltage divider below chassis and as far away as possible from circuits and parts which might be affected by the heat loss in this resistor. Tap the various high voltage leads to the divider. By-pass all screen and plate circuits shown to be so bypassed in the circuit diagram. And don't omit any of the smaller items. We will want this receiver to run wide open at times, with no sign of instability, which is very undesirable.

Shield the leads across the chassis from the frequency control potentiometers to associated circuit points—but use *low capacity* conductor for this service so that the higher frequencies will not be attenuated. In wiring up these potentiometers, remember that as the knobs are turned to the *right*, the contact approaches the free or open ends. You don't *attenuate* highs and lows with these controls as you open them up—but *emphasize* the base and treble response. You have normal, linear response with the knobs turned as far as they will go to the *left*. Remember, too, that if inverse feedback is to be employed the TR2 component should be installed below

chassis so that the feedback lead will be as short as possible—and that this transformer must have *separate* voice coil and 500 ohm line windings.

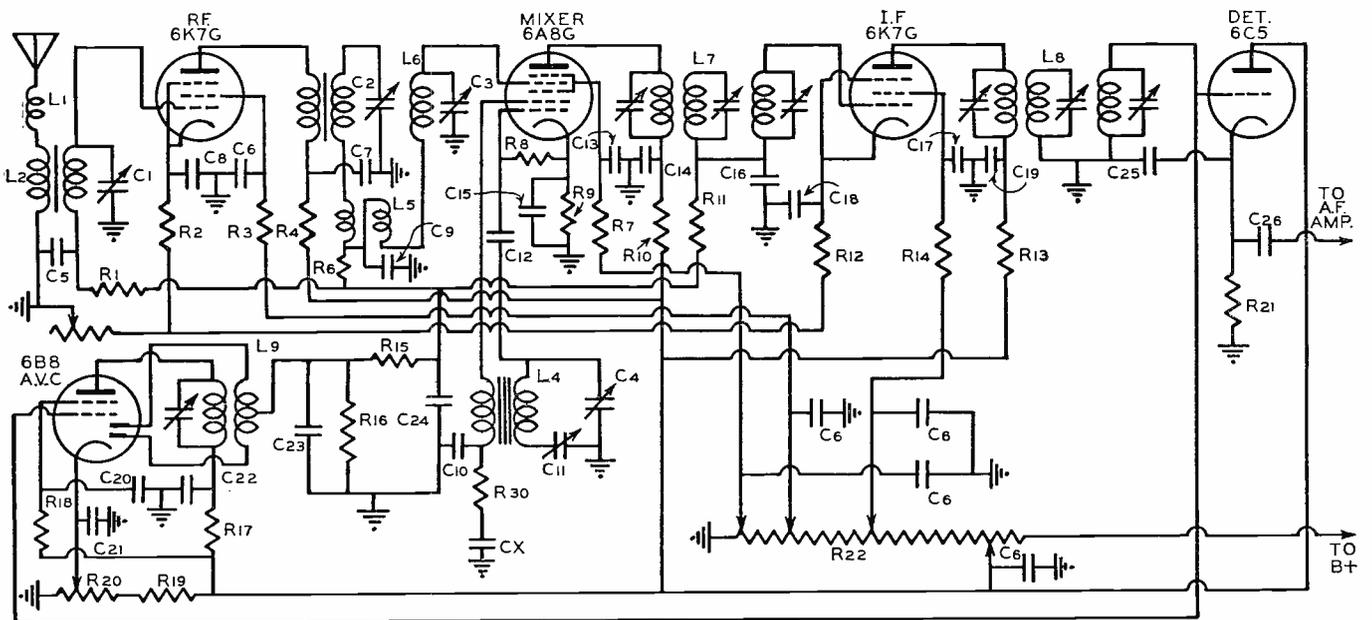
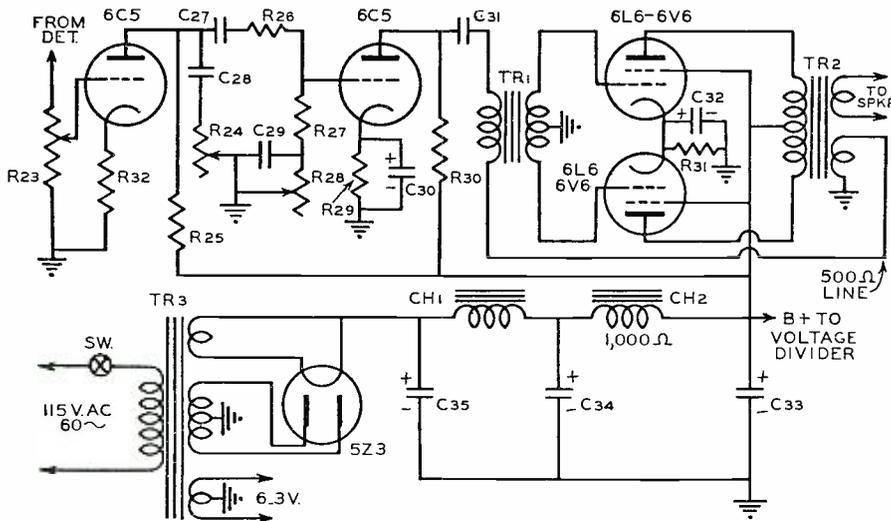
Alignment and Adjustments

The voltage at the 6V6 plates and screens will read approximately 260 with the B connection made to the high end of the voltage divider. Plate supply leads for the voltage amplifiers, and possibly for all other tubes, may be brought to this same point. Screen leads, of course, must tap down on the divider until, with the r.f. gain control adjusted for wide-open receiver operation, the r.f., i.f., and Mixer screens measure 100 volts to ground *at the tube sockets*.

If inverse feedback is employed and AF oscillation indicates improper phase, reverse the connections at the TR2 500 ohm winding. Make sure that the plate voltage for the second 6C5 AF tube does not appear at the TR1 primary. C31 *must* be employed to isolate the audio driver transformer input winding from d.c.

Align the i.f. circuits to exactly 456 kc. This isn't a difficult job if the upper and lower trimmers for each transformer are adjusted first for maximum signal indication in the output meter, speaker, or magic eye (if used)—and the middle trimmers then adjusted for still greater output.

Permeability tuned Antenna, r.f., Bandpass, Detector, and Oscillator coils permit precision adjustment of the front-end stages. Here proper procedure is to remove the regular



- L₁—456 KC wavetrap, Meissner 15-7518
- L₂—Antenna coil, Meissner 14-7413
- L₃—Var. R.F. coil Meissner 14-7558
- L₄—Var. Osc. coil, Meissner 14-7560
- L₅—Negative MI coupler (see text)
- L₆—Var. R.F. coil, Meissner 14-7558
- L₇—456 KC input, Meissner 16-6858
- L₈—456 KC output, Meissner 16-6860
- L₉—456 KC AVC Meissner 17-6762
- C₁, C₂, C₃, C₄—Four-gang 365 mmf., Meissner 21-5223
- C₅, C₆, C₁₆, C₂₄—.05 mf. 200 v. tubular, Sprague
- C₇, C₈, C₁₅, C₁₈, C₁₇, C₁₉, C₂₀, C₂₁—.1 mf. 200 v.,
- C₉, C₁₄, C₃₀, C₂₂—.1 mf. 400 v., Sprague
- C₁₀, C₂₃, C₂₇—.05 mf. 400 v., Sprague
- C₁₁—Padder condenser, Meissner 22-7029
- C₁₂—.0001 mf. mica, Sprague

- C₂₅—.00025 mf. mica, Sprague
- C₂₆—.00005 mf. mica, Sprague
- C₂₈—.02 mf. 400 v., Sprague
- C₂₉—.01 mf. 200 v., Sprague
- C₃₀, C₃₂—10 mf. 25 v. electro., Sprague
- C₃₃—8 mf. 450 v. electro., Sprague
- C₃₄, C₃₅—16 mf. 450 v. electro., Sprague
- C₃₁—.25 mf. 400 v., Sprague
- R₁, R₈, R₁₁, R₁₅, R₁₈, R₂₁—100,000 ohms, 1/2 w., Continental
- R₂, R₁₂—300 ohms, 1 w., Continental
- R₃, R₇, R₁₃—15,000 ohms, 1 w., Continental
- R₄, R₁₀, R₁₃, R₁₇—2,000 ohms, 1 w., Continental
- R₅—25,000 ohms, pot., Yaxley J
- R₈, R₂₆, R₂₇—50,000 ohms, 1/2 w., Continental
- R₉—600 ohms, 1 w., Continental
- R₁₀—250,000 ohms, 1/2 w., Continental

- R₁₉, R₃₀—30,000 ohms, 1 w., Continental
- R₂₀—5,000 ohms, pot., Yaxley Y5MP
- R₂₂—30,000 ohms, 25 w., with slides, Yaxley Tru-volt
- R₂₃—500,000 ohms, pot., Yaxley N
- R₂₄—250,000 ohms, pot., Yaxley M
- R₂₅—200,000 ohms, 1/2 w., Continental
- R₂₈—250,000 ohms, pot., Yaxley N
- R₂₉—1,000 ohms, 1/2 w., Continental
- R₃₁—200 ohms, 3 w., Continental
- R₃₂—2,500 ohms, 1 w., Continental
- CH₁—Filter choke, Jefferson 466-430
- TR₁—Audio driver, Jefferson 467-454
- TR₂—Output trans. PP 6L6's to voice coil.
- TR₃—Power trans., Jefferson 463-361
- Chassis—17" x 11" x 3" Par Metal
- Speaker—1,000 ohm field, 14" cone

trimmers provided on the four gang tuning condenser. Decide on your starting frequency—1500 or 1600 kc. or anything in that vicinity related to minimum reading on your dial (if a calibrated scale is employed)—set up a signal at that frequency, open the gang condenser to minimum mesh, then adjust the inductance trimmer in the oscillator coil (accessible from the top of the can) for maximum response. Now set up a signal at 1400 kc. and without changing the oscillator alignment tune the gang condenser for maximum signal. Peak up the r.f. circuits through permeability trimming of L2, L3, and L6.

The next job to do is to align the front-end at the low frequency end of the dial—say at 550 kc. or the last scale marking of a calibrated control. Set the gang condenser near *maximum* mesh, set up the desired signal, then adjust the oscillator circuit padder (C11), which should have been mounted below chassis, for maximum output. If the scale is not calibrated to frequency, rock the gang condenser back and forth slightly while making the last adjustment, but if calibration must be matched, leave the dial setting in the proper position related to the low frequency signal emitted by your test oscillator.

Now return to 1400 kc. and readjust the trimmers slightly for all coils except the oscillator transformer—L4—if, of course, such readjustment seems necessary. Connect in your antenna, readjust L2 again for maximum noise level. Then, with the gain control wide open for maximum set sensitivity, tune across the band. Noise level should be even throughout the tuning range. If it is not, bend the outer plates of each section of the gang condenser in or out at three or four points until the alignment is accurate.

Turn the AVC bias control knob to the extreme right, keep the r.f. gain control wide open, and then trim L9 for maximum noise level *loss*. Back off the bias control in steps, each time readjusting L9 for this same effect. The AVC circuit will now be in proper alignment.

Operation

While this receiver is sufficiently sensitive to permit its successful use with only a few feet of wire connected as an antenna, it is recommended that it be as long, as high, and as in the clear as space permits. Forcing the gain when signals are to be received will only adversely affect the very excellent signal to noise ratio which is featured when a good antenna is employed and the set sensitivity is kept down to the minimum consistent with effective operation.

If code interference, judged to be emitted on a frequency in the neighborhood of 456 kc., rides through to prevent clear reception use the wave trap L1, connecting it as shown in the circuit diagram. Adjust its trimmer until the disturbance is attenuated to maximum degree. It is advisable to

(Continued on page 55)

SERVICEMEN'S LEGAL ADVICE



Ed. Note: This is a new department devoted to a discussion of the legal problems confronting the serviceman. In it only those questions of interest to the field as a whole will be published. Feel free, however, to write the author your inquiries. While it will be impossible to give any legal advice to individuals, still those letters of interest to all servicemen will be printed together with proper answers wherever possible.

Set, Set, Who Has the Set?

IT is axiomatic that to sell radio receivers and equipment, the serviceman must first buy these from either a distributor or a manufacturer. Oftentimes, the question arises as to who owns the set or equipment after it has been ordered. This becomes important when the set is delivered in a damaged condition or not according to specifications. Then starts one of those long trains of letters, wires, and telephone calls between the service shop and the distributor or manufacturer, as the case may be, in an effort to place the blame where it belongs and to have the set replaced or the value in money returned or credited.

In all fairness it must be said that most reputable manufacturers and distributors make complete adjustments, and that these are usually made in favor of the buying serviceman. But it is wise to know just where each party to the transaction stands in the wide general field of the law.

Firstly, let us understand that all radio sets and equipment are classed, legally, as *personal property*, and this name should not be confused with all property that is owned by you. The law divides all property as *real property*, which is land and things pertaining to the land, and *personal property* which is all other property, with the possible exception of stocks and bonds, etc.; although they, too, are physically classed as *personal property*. So when you talk of radio sets and the appurtenances thereto, you are talking of "personal property".

Considering now this *personal property*, the law says that the owner thereof pays for the damage thereto.

In other words, the man who owns the equipment is liable for it, even if he does not actually have it in his possession at the time of damage.

Immediately, you ask, "When am I the owner?"

That's comparatively simple, also. Ownership in the law rests in that person who has *title* to the personal property. This *title* is not generally something you can see or feel. *It is the thing which by having it in your possession, you own something by*, to paraphrase our good friend Col. Stoopnagle. Now, since you cannot see or feel a *title*, the question of ownership resolves itself wholly into a question of who between yourself and the manufacturer or distributor has *title* to the radio set or equipment.

Let us here state some law which will help you decide the problem for yourself. The law says that "The title to personal property does not vest in the purchaser until the purchase is complete and nothing remains to be done under the agreement."¹ That means that when you buy radio equipment, pay over your money and take the stuff with you, you have *title* and you *own* the set. This is a principle followed by all of us in our everyday lives and is easy to understand.

Supposing that, however, you merely sign an agreement to buy the set, and that the seller signs that he will sell it to you. Then "on a mere contract for the sale of goods, the title to the goods rests with the original owner (the seller)."² So you do not yet *own* the set. The same would be true if you signed an agreement to buy the set, say, next week or next year, or in the future.³

From this we can draw our first general rule. "In the sale of personal property, where anything remains to be done to complete the contract, such as ascertaining quantity, or delivering possession, the title does not pass until the contract is thus completed."⁴ So, servicemen, if the seller has still something to do, such as to help with the installation, give you pamphlets, come to your shop to demonstrate the set, you do not acquire *title*, you do not become *owner*, until all that has been done. Of course, it must be in writing,—this installation help, pamphlet business, etc., to be binding, to prevent the title to the set from passing to you.

Supposing that you buy radios on a basis that you can return them to the manufacturer if you do not sell them. Then, "Since a contract on 'sale and return' is a sale on a condition . . .

(Continued on page 41)

¹ Stanley v. Robinson, 14 Atl. 480.

² Jennings v. Gage, 13 Atl. 610.

³ Wright v. Gardiner, 66 Atl. 94.

⁴ O'Keefe v. Kellogg, 15 Atl. 347.

⁵ House v. Beak, 141 Atl. 290.

⁶ Gibson v. Chicago Packing & Prov. Co., 108 Atl. 100.

⁷ Mooar v. Wheeling Tire Co., 202 Atl. 278.

⁸ Rosenfeld v. Ehrhart, 202 Atl. 617.

⁹ City of Carthage v. Duvall, 202 Atl. 234.

¹⁰ Ellis v. Roche, 73 Atl. 250.

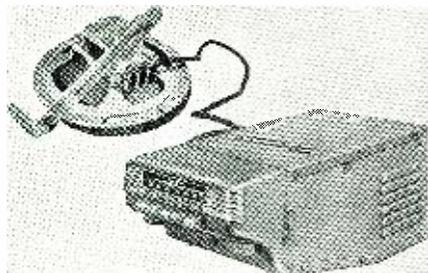
¹¹ Helburn Leather Co. v. Stone, 205 Atl. 347.

¹² Webster v. Granger, 78 Atl. 230.

What's NEW in Radio

Five new automobile radio receivers, ranging in price from \$14.99 to \$34.95, have just been announced by *The Crosley Corporation*. The line has been planned to provide models to suit all makes and types of automobiles, with prices in the reach of every car owner. In designing the receivers the trade-in feature of automobiles has been kept in mind, and each *Crosley Radio* automobile receiver can be quickly reformed without difficulty.

Four of the models are 5-tube receivers with self-contained speaker. Model A-160 is a 6-tube two-unit receiver; that is, the speaker is not incorporated in the same case with the receiver, but is mounted separately. Two different types of speakers are available with this model. One is a 6-inch speaker that can be mounted by

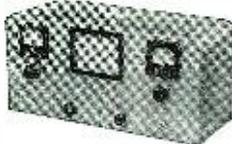


means of a bracket behind the grille opening on the dash board of the newer cars. Because of the baffle and the location of the speaker, remarkably clear and undistorted reception is obtained that would not be possible with a 6-inch speaker in any other location. The new narrow face on the receiver with the separate speaker mounting makes an extremely practical and efficient installation.

For cars that are not equipped with the grilles, an 8-inch speaker is provided that can be mounted on the bulkhead of any car. It also gives full tone and undistorted output.

Many new features are included in the new *Crosley* automobile radios. Among them are improved push button tuning, non-flare dial, two-position tone control, new beauty to match latest model cars, compact streamline design with easy installation, higher sensitivity, illuminated call letters, stations easy to set with single screw adjustment, complete in one unit, hermetically sealed oscillator coil, and antenna matching.

A complete six tube transmitter and receiver mounted in a small and attractive cabinet, has been announced by *Radio Transceiver Laboratories* of Richmond Hill, N. Y. This unit has been designed along the lines of previous 56 Mc. types, but with special emphasis on 112 Mc.



efficiency. All r.f. circuits are insulated at required support points by the highest grade steatite, micalex or polystyrene. The parts have been arranged for future conversion to 224 Mc. by substitution of smaller inductors. The transmitter employs a resonant line oscillator and has a carrier power of 7 watts modulated at high level.

The new *Amperite P.G.* (pressure gradient dynamic) is a big step forward in dynamic microphone development.

The familiar mechanical sound due to diaphragm peaks is entirely eliminated resulting in natural reproduction over the entire audio range from 40 to 10,000 CPS. It has an improved ellipsoid pickup pattern which reduces back pickup to a minimum. The combination of the ellipsoid pickup pattern and the flat response results in a microphone that will give an unusual amount of volume before feedback. Its output is high, —55 db.

The P.G. diaphragm follows air particle velocity where amplitude is a *gradient of the pressure*. In ordinary dynamics amplitude is restricted from following air particle velocity due to the stiffness of the diaphragm and the enclosed chamber behind it.

All models are equipped with a switch and cable connector. Finish—satin chrome.

The *Ward "Flex-Angle"* auto antenna is the only one of its kind, and it was designed to do exactly what its name implies. The unit is single mounting and can be adjusted to a vertical position on any body contour without resorting to use of special parts for angle compensation.

It is possible to adjust the "Flex-Angle" antenna to a vertical position thru a range of 16 degrees which is ample for any cowl contour. This original *Ward* development will mean time saving, efficient and attractive installations.

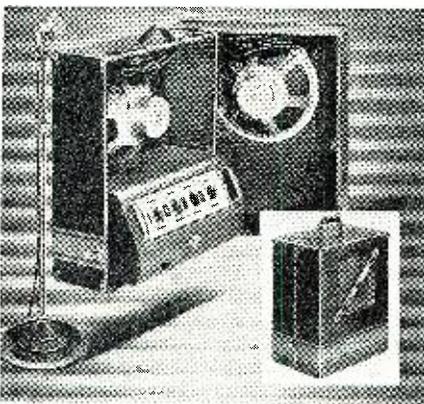
Music Master announces new all-electric high fidelity phonographs. These units reproduce the old mechanical recordings quite well.

The table model usually retails for \$15.95 and the portable for \$18.95.



The machines are available for AC as well as AC-DC. In the case of AC-DC models, the price is somewhat higher. If you should desire any additional information please write *Music Master Manufacturing Co.*, 508 So. Dearborn St., Chicago, Ill.

The most popular unit in the new 1940 *Clarion* line is the Model CS-38 Portable System. The amplifier used in this system has a rated output of 25 watts with a 35 watt peak—plenty of power for all normal P.A. requirements. Its exceptionally fine frequency response—40 to 12,000 cps.—affords true high fidelity reproduction and makes the unit suitable for use even in conjunction with frequency modulation receivers. A new circuit incorporating inverse feedback, push-pull output and D.C. filaments to reduce hum, is employed. Tubes used are 2—6L6G's, 2—12SJ7's, 2—6CSG's, and a 5U4G rectifier.



Microphone gain is 114 DB and the hum level is —22 DB below zero level. Output impedances of 2, 4, 8, 16 and 500 ohms are available. Two microphone and two phono inputs are provided, with facilities for mixing any three simultaneously, and a pitch control affords full control over bass and treble frequencies.

The system, compact and light in weight, mounts in a single carrying case. Two heavy duty 12" PM Speakers, chrome plated floor stand and any of a selection of four modern microphones complete the system. All cables and plugs are provided.

The CS-38 System lists at only \$139.13. Further information and catalog is available by writing to *Transformer Corporation of America*, 69 Wooster Street, New York City.

Supplied free of charge upon request to jobbers with the purchase of *Sprague Condensers*, is the *Sprague ST Metal Mounting Strap*. Strong enough to hold any combination of *Sprague Atoms* into one firm, compact assembly, the strap provides the ideal answer for those hard-

to-get replacement jobs where different capacities and voltages are required in a single condenser.

By using the *Sprague Atom* midret dry electrolytics or PTM rectangulars which are available from any *Sprague Jobber's* stock, almost any needed replacement combination can quickly be obtained. Moreover, several different condensers strapped together with the ST strap will be found to be smaller than the original unit, and even cheaper in price than an exact duplicate replacement.

For instance, if a replacement calls for a condenser consisting of an 8 mfd. 350 volt section; an 8 mfd. 350 volt section and a 25 mfd. 25 volt section, it is only necessary to strap together the following *Sprague Atoms* to obtain it.

The *Mohr Signal Booster & Lightning Arrester* can be used with any receiver employing a doublet or all-wave type antenna. This unit, (composed of a knife switching arrangement) provides maximum signal strength on all bands because of its direct matching of the antenna to the receiver. It can be used with any length antenna, from the ordinary size to short lengths where space is limited, thus enabling you to use your present antenna or to construct a new one to suit your particular needs. In making up a new antenna, the Signal Booster eliminates the use of accessories such as matching or coupling transformers, junction box, lightning arrester, etc.

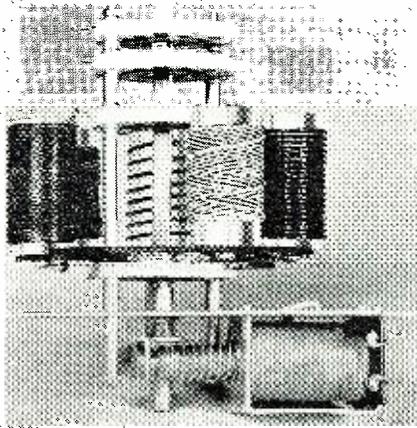
The switch of the Signal Booster has 3 positions. To determine best signal strength and minimum interference, simply tune in receiver



(any wavelength) and adjust switch to Pos. 1 or Pos. 2 for maximum signal strength. Different wave lengths are similarly controlled. For example: On most receivers Pos. 2 is used for standard broadcast, while on the short wave bands, one position will be superior to the other, depending on the frequency being received.

The Lightning Arrester (a part of the switching arrangement) not only directly couples the antenna to ground, but automatically disconnects the antenna from the receiver. . . . unlike the ordinary type lightning arrester where the antenna is always connected to the receiver.

Coto-Coil Company, Inc. have introduced a unique magnetic stepping switch for performing complicated switching operations. The motor unit is energized by momentary impulses from a push button and drives the switch sections through their predetermined sequence. The illustration shows an adaption of the basic unit to a bandswitch turret for changing the operat-



ing frequency of a radio transmitter by remote control. Various combinations of poles and contacts make it possible to adapt this switch to most any kind of a radio or industrial switching problem. Outstanding features are the versatility and low price.

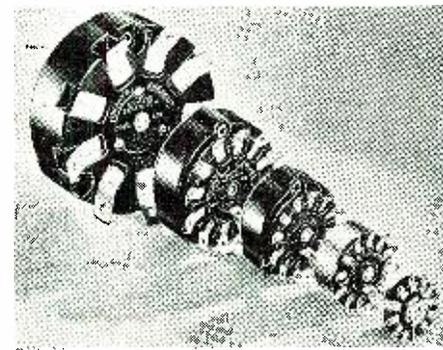
The *Browning Laboratories*, Winchester, Mass., has recently announced a new band switching coil assembly designated as the 5PL. This, when used in conjunction with a 100 mmfd. transmitting condenser, covers the 10-, 20-, 40-, 80- and 160-meter amateur bands. An Isolantite switch selects the desired band at will. The five low-loss coils are mounted rigidly on this band switch and have separate link circuits for output coupling. The unit is designed to be used in the plate circuits of such tubes as the 807 and RK39, in exciters, transmitters, etc. The rating of which is 75 watts or less. Due to lead symmetry and careful design, the 5PL is somewhat more efficient than the plug-in type of coil.



New increased ratings have been set for each of the five *Ohmite High Current Tap Switch* Models. Model 111 is now rated at 10 Amps, 150 volts AC; Model 212 at 15 Amps, 150 volts AC; Model 312 at 25 Amps, 300 volts AC; Model 412 at 50 Amps, 300 volts AC; and Model 608 at 100 Amps, 300 volts AC. These ratings apply to alternating current circuits operating at any power factor.

Ohmite High Current Tap Switches are multi-point, load-break, non-shorting, single-pole rotary selectors of extremely compact, permanently insulated, ceramic construction. They can easily

be connected in tandem to form multi-pole assemblies. Silver-to-silver contacts. "Slow-break," quick-make action especially designed for alternating current use.



Ohmite High Current Tap Switches are ideal for switching requirements for any number of applications, such as battery chargers, radio transmitters, switchboards, heater or oven control, arc welders, diathermy, and X-ray equipment, voltage regulators, motor control, tapped transformers, electrical machine tools, dryer control, pyrometer circuits, ventilating fan control, meter circuits, etc.

Universal Microphone Co., Inglewood, Cal., on May 1 issued a new loose leaf catalog sheet announcing a new microphone item in the form of the "KO" model with stands and accessories.

Rec Rhoostat Company announce further improvements in their line of controls. They are of the "Slide-Contact" types and possess many features not found in ordinary units. *Rec* rheostats are of rugged construction and high-watt capacity. Carefully planned to assure ease of operation in minimum space, they are compact, efficient and pleasing in appearance. They have broad application in laboratory and industrial work. The winding is of copper nickel alloy, with a negligible small temperature coefficient, so that the ohmic resistance does not change noticeably with the temperature. The windings are either of oxidized resistance wire, or ribbon, depending upon the required current capacity, as described in their catalog R. The porcelain tube which carries the winding is glazed inside and out. The use of porcelain assures high insulation, and safety in operation.



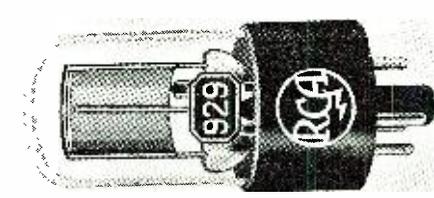
"KO" is heralded as a new high output crystal unit with slightly rising frequency characteristics together with exceptional tonal quality with well rounded bass response.

Technically the output level is 48 db. below one volt per bar and the frequency range from 50 to 6,000 CPS. The stand coupling is 5/8 inch, 27 thread with microphone diameter of 2 1/4 inches and depth of 2 3/8 inches. The assembly includes 10 foot of low capacity, rubber covered cable in color to match the microphone, which is furnished in luxurious satin stauary bronze finished case, with polished chrome face and grille for contrast.

The new model "KO" weighs a trifle over one pound packed and lists at \$16.25. It is licensed by ERIPI under patents of A. T. & T. and W. E., as well as Brush Development Co.

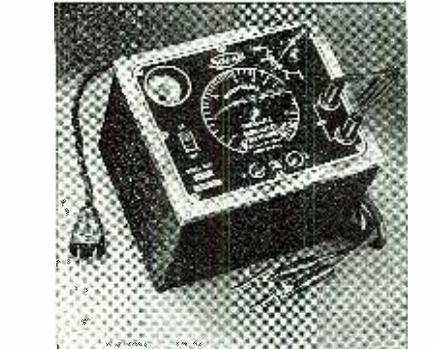
Accessories for the new *Universal* microphone, adapted especially for recording use, p.a. systems, amateurs, call systems, orchestras, carnivals and so forth, includes the SK suspension eye, for suspending the microphone from boom or ceiling; the HK handle, which converts the microphone for hand mike operation; the BK base, a non skid base that, in combination with the HK handle, makes a desk stand; and the MS floor stand, a two-sectioned, adjustable stand with round cast iron base.

The *RC1 929* is a new vacuum phototube with a new type of caesium photo-surface which has extraordinarily high sensitivity for light sources predominating in blue radiation. Although this tube is not infra-red sensitive, it has a sensitivity of 45 microamperes per lumen to light from a tungsten filament operated at 2870° K. To daylight, its sensitivity is several



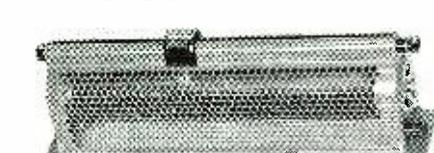
times this value, and to an H-4 mercury arc, its sensitivity is many times the tungsten value. Other features of the 929 are its excellent stability and its consistent spectral response. Because of these features, the 929 is well suited for measurement and relay applications.

The sensational *Solar Capacitor Analyzer*, that actually checks up on condensers while they're at work in the circuit. Model BQC tells quick as a wink if condenser is bad, open, shorted, intermittent, also indicates r.f. impedance and power factor. Built-in Wien Bridge gives separate



capacity measurements from .00001 to 70 mfd. The Model QC, not shown, incorporates all above features except those of the Bridge. Both these useful units at exceptionally low prices, and complete data may be had by addressing Solar Mfg. Corp. at Bayonne, N. J.

Of wide interest to the music lover, the professional musician and the home is the *Lafayette Model BB-96*, a combination which in one 40-inch burr walnut cabinet includes a high-fidelity radio, recorder and record playing equipment.



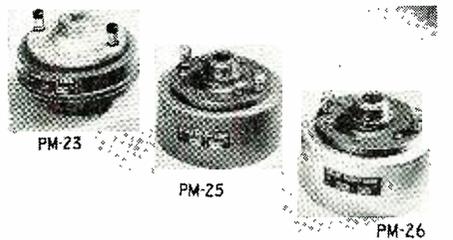
This latest product of *Radio Wire Television Inc.*, 100 Sixth Avenue, New York City, through a simple switching arrangement provides an instant choice of (1) radio reception, (2) recording of radio programs off the air, (3) recording of speech or music picked up by microphone, (4) public address service by means of which microphone pick-up is directly reproduced through the loudspeaker, and (5) playback of both home-recorded and commercial records.

The radio equipment consists of a high-fidelity, 12-tube, 3-band receiver chassis including all modern refinements such as six-button station selection, built-in broadcast and short-wave loop antennas, static control circuit, tuning indicator, etc. Its audio system, in which phase inversion and inverse feedback contribute materially to high overall fidelity, serves also as the audio system for the entire combination except that a separately built-in preamplifier is used for microphone bolstering.

The recording equipment employs acetate blanks up to 12 inches in diameter. Its carefully balanced turntable is rim-driven by a self-starting, heavy-duty synchronous motor coupled through a rubber idler pulley. The cutting head is of the magnetic type and screw driven. Its response characteristic is carefully matched to that of the associated equipment to afford exceptional faithfulness in recordings. The playback pick-up is of the crystal, tangent-arm type and similarly matched.

A new line of "Dyna-Flux" Compression Type Permanent Magnet Speaker Units, used in conjunction with *Atlas Sound "Morning Glory" Reflexed Projectors*. The magnetic material used is a nickel, aluminum, cobalt alloy (ALNICO).

These units also feature non-corrosive diaphragms which are electro-chemically treated; later heat treated for a "toughness" that is fat-



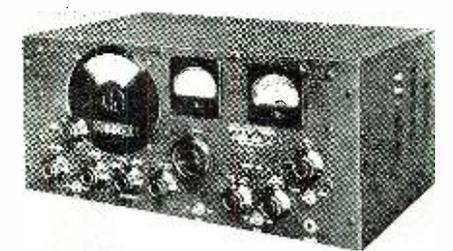
tigue resistant and protected against crystallization and shattering. The complete unit is protected from adverse weather conditions by cadmium-plating, and other protective finishes.

Model PM-23, \$30.00 List; PM-25, \$45.00 List, PM-26, \$50.00. The power ratings range from 18 to 20 watts (conservative). V. C. impedance 15 ohms.

Atlas Sound Corporation, 1449 39th Street, Brooklyn, N.Y.

The rapidly growing need among commercial engineers, amateurs and experimenters for a receiver to cover the regular and experimental services utilizing wavelengths down to 2 meters is met by the new Model S-27 just announced by *Halliercrafters, Inc.* It not only offers continuous coverage of 27 to 145 megacycles in three ranges of 27-46, 45-84 and 81-145 mc., but provides for reception of both amplitude and frequency modulated signals.

Fundamentally the S-27 is a highly refined u. b. f. communications receiver providing the wide variety of features found in the better grade communications receivers designed for the lower frequencies, plus a number of others necessary



to meet the specialized and rigorous requirements of the ultra-highs and of frequency modulation. Among these latter are: acorn tubes throughout the r.f. and converter systems, front-panel trimmer to permit maximum antenna gain, voltage regulation for oscillator, converter and metering circuits, extra-wide bandspreading, a new converter system for uniform gain, double-spaced tuning condensers with silver wiping contacts, cushioned r.f. assembly, improved automatic noise limiter, oscillator plate-tuned to eliminate hum modulation, separate a.m. and f.m. detectors, 1852 limiter, expanding i.f. including wide band-pass in f.m. position, push-pull audio output with phase inversion and generous inverse feedback for flat and broad response, meter for accurately tuning f.m. signals, etc.

Fifteen tubes are used in all. The entire receiver except the loudspeaker is self-contained in a single crackle-finished cabinet.

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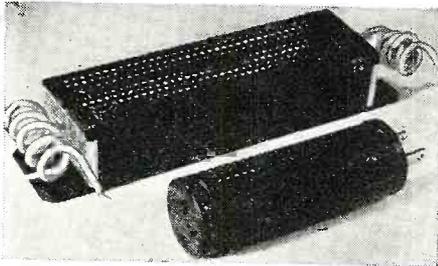
To meet the higher voltage requirements encountered in some applications, three new types of wet electrolytic condensers are now announced by *Aerocore Corporation*, New Bedford, Mass. These units are available in 4, 8 and 16 mfd. capacities, with a 600 volt D.C. surge rating, as compared with 350 and 500 volt ratings heretofore available. Can sizes are 1 3/8 and 1 1/2 inch



diameter, and 3 3/16, 4 1/16 and 4 13/16 inches high. The ability of these "wets" to withstand higher surge voltages, and to reform if momentarily broken down by excessive voltages, and to operate at higher voltage under steady operating conditions, makes them most desirable in circuits subject to violent surges.

Series resistors for inclusion in the power circuit of fluorescent lamps operated on D.C. are now announced by *Clarostat Mfg. Co., Inc.*, 285-7 North Sixth St., Brooklyn, N. Y., either as an accessory or as built-in initial equipment. These resistors are intended for use with the G.E. type DC reactors or their equivalents.

Series FT or accessory type, plugs into the power circuit of a fluorescent desk lamp or other fluorescent lamp operated on D.C. The perforated metal case of this resistor is finished in black wrinkle-finished baked enamel, and houses a sturdy Glasohm resistor. Male and female Edison ends facilitate plugging into outlet and tak-

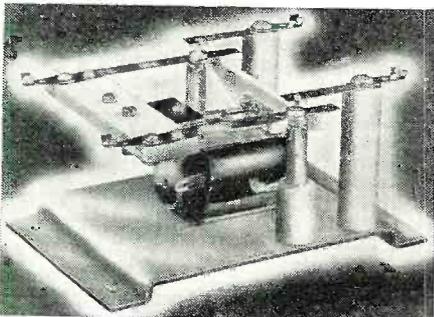


ing the connecting plug. Unit measures 3 3/4" long by 1 1/2" dia., and weighs 1 1/4 ounces. Available for 15-watt and 20-watt fluorescent lamps.

The built-in or initial equipment Series GT unit is oblong-shaped, quite flat, and readily fits into any standard fluorescent fixture channel. Square perforated metal casing and base with mounting slots. Black baked enamel wrinkle finish. Asbestos-covered leads. Contains a wire-wound cement-coated power resistor. Unit measures 7" long by 1 13/16" wide by 1 1/4" high, and weighs 6 ounces. In five types to take care of 15- and 20-watt lamps on 120 v., and 30- and 40-watt lamps on 240 v.

Meissner Manufacturing Co., of Mt. Carmel, Illinois, has announced the introduction of a new antenna-switching relay as an addition to their rapidly growing line of Amateur parts and accessories. It is primarily designed for automatic transfer of the antenna from the transmitter to the receiver in Amateur station operation but is well adapted to any type of high-frequency switching, providing a double-pole, double-throw arrangement.

Contacts are unusually large, wide opening and designed to handle heavy loads—a 1-KW transmitter may be switched without danger of arc-



ing or burning. The contact arms are so arranged that a "straight-thru" feed is provided—transmitter connections at one end and antenna at the other—equally spaced thru-out.

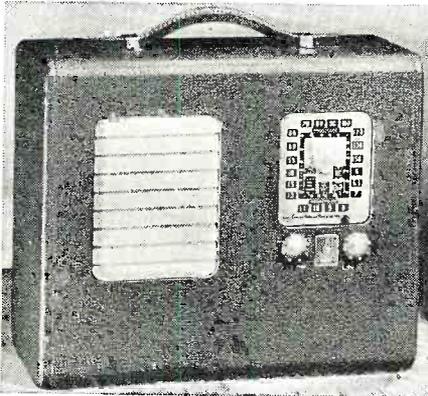
All insulation is of highest grade ceramic—Alsimag 196—permits operation on 60 MC with negligible loss. Mechanically, this new relay is fool-proof, fast and positive—unusually quiet in operation. Metal parts, including the base, are highly polished Chromium finish providing a very

attractive appearance. Standard unit is provided with coil for 110-volt AC operation.

Emerson Radio and Phonograph Corporation are now introducing the new 1941 line of Emerson "3-Way" Portables throughout all territories.

The new line "3-Way" Portables, consisting of 7 models, includes a promotion leader at \$19.95, complete with batteries, a "super-power" long-distance model at \$29.95, an American-foreign set at \$34.95 and a selection of other models, in a choice of colors at \$24.95. There is also an all-walnut model at \$34.95. Prices are slightly higher in West and South. All sets complete with batteries.

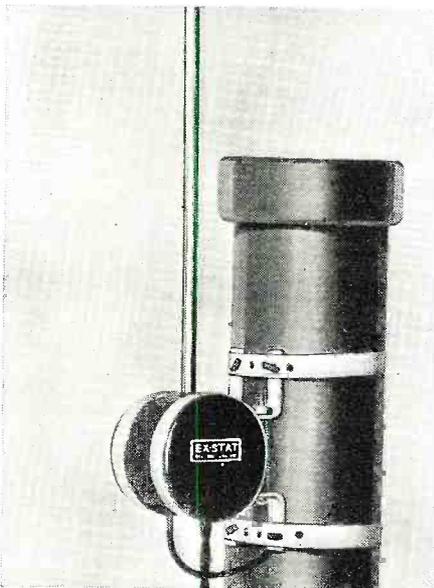
Among the features of the new 1941 line is an automatic, fool-proof power-shift for battery and light-socket operation on which U. S. patent claims have been granted. As stated in *Emerson's* descriptive literature, "the plug itself is the switch—with no supplementary devices to get out of order." This development, which employs two independent output tubes—one for battery operation and one for AC-DC light-socket operation—makes it possible to get the full out-



put of house current and also the most economical and efficient output from battery operation. Because of other exclusive i.f. and built-in loop developments, the sensitivity of the new Emersons, particularly the long-distance and the American-foreign models, has been vastly increased. It is expected by Emerson executives that these engineering improvements will greatly widen the market for their sets, in that they now make it possible to get battery performance equal to long-distance light-socket reception.

A new rod antenna with a rotary base, containing a special transformer, has just been released by the *Tilton Electric Corporation*, 15 E. 26th Street, New York City. Known as the Model 101 EX-STAT Antenna, it is said to possess the four most important features demanded for antennas . . . (1) Maximum reduction of noise (95%) . . . (2) Corresponding signal increase . . . (3) All-Wave Frequency range . . . (4) Startling simplicity of installation.

Maximum noise reduction is accomplished by



the use of new isolation-wound, iron core transformers. The antenna transformer is housed and sealed in a moisture proof porcelain shell. Special coils in this transformer are symmetrical wound, and fitted on to a unique iron core, suitable for R.F. work. The transmission and ground leads are connected to this transformer on the inside of the shell. Thus, there are no exposed leads, and the splicing of wire is completely avoided. By means of a twisted pair of transmission lines the antenna transformer is

connected to another transformer, that is connected to the receiver proper.

The primary winding in the antenna transformer is separated from the secondary winding in such a way as to reduce internal capacity to a point where noise cannot enter either the radio set or the exposed 9-foot aerial rod. The electrical symmetry of the transformers afford a perfectly balanced condition at both ends of the transmission line. This balance permits the highest degree of discrimination between parallel noise currents and circulating signal currents and, accordingly, the greatest transfer of signal energy results. The transformers are wound to peak, in not only the broadcast bands, but all of the important popular short-wave bands, covering a range of from 500 Kilocycles to 22 Megacycles.

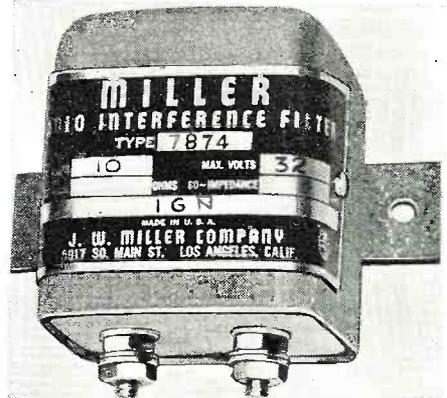
Owing to a returning demand for armchair style radio receivers, *Allied Radio Corporation*, Chicago, is currently featuring a new *Knight 8-Tube Model*. The cabinet which houses this radio has a top face of select walnut. The gracefully curved ends are built up as shelf compartments. The large speaker grille area is attractively latticed and adds a distinguished touch to the design. Features include a 10"



Dynamic Speaker; 2-Band Range (5.7-18.3 M.C., 540-1600 K.C.); "Air-Magnet" aerial; Push-Button Tuning; Electric Eye; Tone Control; A.V.C.; Slide Rule Dial; Television Connection; 3 Watts output; Bass Compensation, etc. Uses the following tubes in an R.C.A. and Hazeltine licensed circuit: 1-6SA7, 1-6SQ7, 1-6SK7, 1-6SF5, 2-6K6G, 1-5Y4G, 1-6U5. For operation from 110 volts, 50-60 cycles A.C. *Allied Radio Corporation*, 833 W. Jackson Blvd., Chicago, Illinois.

The *J. W. Miller Company* of Los Angeles, who for many years has been one of the foremost manufacturers of industrial and household interference filters, has just announced a complete line of Marine filters.

While working with local yachtsmen, commercial and state agencies, a catalogue line of filters was developed with current carrying capacities of five to three hundred and fifty am-



peres. The units are designed for the optimum inductance capacity ratio, using dual inductances in each side of the line and high voltage paper condensers. Even though 1500 peak volt capacitances are used, the larger filters are fused in each condenser leg.

One of the most versatile filters in the line announced is the Type 7874 which lists at \$5.00. It was primarily designed for use in one side of the battery line of ignition systems though it may be effectively employed as a general utility filter in circuits carrying less than ten amperes. After several months research on battery ignition yachts, it was found that by shielding the engines with a hood made of dural or copper and using this 7874 filter, all ignition interference could be suppressed.

The use of dual loudspeakers of different sizes, in place of the usual single speaker, in new radio receivers developed by the *General Electric Company*, is the result of extensive work on the part of the *G-E* engineering staff to get the higher frequencies nearer the listener's ear level and to supply adequate radiation of the low frequencies. The story behind the development has been disclosed by L. J. Kaar, in charge of engineering and manufacturing of the company's radio and television receiver division at Bridgeport, Conn.

The difficulty to supply the necessary field power has been a restraining influence in the past on attempts to use multiple speakers, Kaar points out, but with the advent of permanent magnet speakers this obstacle was removed. The engineers found themselves free to choose a combination of loudspeakers best suited to the desired result. In the new *G-E* sets, a 1-inch and a 6½-inch *Alnico* permanent magnet speaker are combined.

"It often happens that, because of absorption by furniture, carpets, and draperies, much of the high frequency output of the loudspeaker fails to reach listeners' ears," Kaar said. "To alleviate this condition, the smaller speaker is mounted at the top of the speaker baffle. Its small diameter aids in this respect, for the center of the speaker is thereby nearer the chassis shelf, and this all helps to get high frequencies nearer ear level."

"Another problem is that of obtaining adequate distribution of the high frequencies over a wide angle. This is because the diaphragm radiates the high frequencies in the form of a beam. The width of this beam depends upon the ratio of the diameter of the diaphragm to the wavelength of the sound to be radiated. The larger this ratio, the sharper the beam. If a single speaker is used, of sufficiently large diameter to make it function well for the low frequencies involved in the lower tones, then the high frequencies of the higher tones will be correspondingly restricted. Obviously dual speakers offer a solution. The smaller unit contributes wider angle high frequency distribution, while the larger unit supplies adequate low frequency radiation. The result is that the radio listener gets the added 'tone dividends' on each end of the musical range."

The use of a single small loudspeaker, to get the advantages of high-frequency performance, seriously limits the low-frequency range. The engineers found that in order to move a sufficient volume of air the small diaphragm must undergo large axial movement. Sound distortion usually results due to the limit of the elasticity of the diaphragm suspension being reached at the extreme of the movement. The diaphragm of the larger speaker, however, can move the same volume of air with a correspondingly smaller excursion.

A new line of intercommunication units for which patents have been applied, has been developed by the *Regal Amplifier Mfg. Corp.* which is said to set a new standard in flexibility. These *TokPhone "600"* series units provide 2-way communication between any Master and any of ten or less Remote Stations. It is said that now, for the first time, it is possible to have five simultaneous private conversations with no possibility of cross-talk or interference.

A pioneer in the manufacture of intercommuni-



cation systems, the *TokPhone* Division of *Regal Amplifier Mfg. Corp.* has recently inaugurated a special department to solve the problems of Radio Dealers, Servicemen and others who have realized the profit to be made in this field but who have been reluctant to make an intensive drive for business because of lack of first-hand and authoritative information on the subject. Problems and inquiries addressed to the Company at 14 West 17th Street, New York City, will receive prompt attention—without obligation.

National Union Radio Corporation announced from their Newark, N. J. headquarters this month the availability of a complete line of *National Union* replacement radio batteries. The new batteries are for sale exclusively by the radio service profession in the replacement field and

(Continued on page 55)

The VIDEO Reporter

by SAMUEL KAUFMAN

WHEN FCC chairman James Lawrence Fly made his initial statements hindering *RCAS* newly launched television merchandising campaign last Spring, he really created the greatest promotional boom ever accorded the art of video entertainment. The long and argumentative FCC television hearings that followed were ideal as ballyhoo material for the budding television industry.

True, there were negative as well as positive points brought out at the hearings and it is too early to determine the full effect of the contradictory testimony on future FCC regulations governing telecasting. However, the amount of newspaper space accorded the controversial issue of whether Mr. Fly was stepping beyond his jurisdictional bounds in an apparent attempt to rule on radio manufacturing and merchandising policies focussed widespread public attention on television. And it's the *Video Reporter's* guess that television stands everything to gain and nothing to lose by this invaluable amount of publicity.

The New York and Washington date-line stories, the numerous editorials and some clever editorial page cartoons appearing in leading big-town newspapers served to bring home the fact that television is an important topic concerning everyone. Best of all, the flood of publicity enlightened Mr. and Mrs. Next Door Neighbor on a topic that up to the time interested a comparatively small number of pioneer enthusiasts who kept abreast of television during its early stages of development. Suddenly, and with dramatic force, the realization was brought to virtually every citizen that television is not just a scientist's dream but rather an actuality and that the only problems involved are related with the methods of how to launch it in the best interests of the public.

It was difficult to avoid political implications in the charges and allegations that flew back and forth before, during and after the Washington hearings. "Bureaucracy" was a word in many editorial writers' lambastic commentaries. There was much fuss and ado over any governmental attempt to retard an industry's launching on the grounds that future improvements could be expected. On the other hand, there were clashing views within the industry itself on the matter of establishing standards and, on the latter point, it seems obvious that all leading makers of television equipment will soon concur on receivers with interchangeable standards—types of sets already advocated by a few firms.

The *DuMont Laboratories* will go on the air from a New York skyscraper later this year on a picture definition standard considerably higher than *RCAS* present 441-line images. *DuMont* will probably use 625 lines, according to present reports. There is likelihood, though, that some truce may be set—possibly by arbitration of the *Radio Manufacturers Association* and the FCC—on a universal picture standard somewhere between the *RCA* and *DuMont* extremes.

Whatever the outcome on definition, the merchandising end of the industry stands to gain out of the tremendous newspaper publicity.

AS these lines are being written, the *NBC-RCA* New York television station, *W2XBS*, is setting out on its second year of regularly-scheduled program presentation. And everyone who followed the initial year's efforts must agree that a swell job was done

by all concerned—engineers, program directors and talent. There were some costly boners but they were worth their weight in experience. Everything points to a bigger and better year of video operations at *Radio City* in the belief that television receiver sales will experience a gigantic boom.

THE slowness of *CBS* in putting its New York television station on the air with a regular schedule of programs is causing some of its own employees to wonder what part the network will really play in the video field.

Everyone there is so close-mouthed about television that even some *CBS* persons holding key positions don't have an inkling of



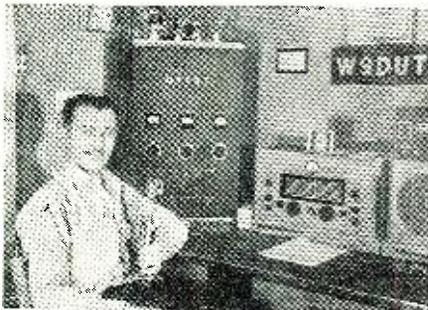
Televising the Opera in N. Y.

what's really going on behind the *CBS* television scenes. Instead of being able to tell the *Video Reporter* what's going on, they ask him to tell them whatever information he may find concerning their own network's plans! They hold the view that it's more logical to pick up facts on their network's vision plans from outside sources than it is right within the organization.

CBS may well know what it's doing, but its long policy of silence on its television plans since the first details for the *Chrysler Building* transmitter and *Grand Central Terminal* studios were announced in the summer of 1937 is not exactly the best course for winning the good-will of pioneer look-and-listeners. When officials do grant interviews on television, they stud them with "Don't quote me" requests on even minor details.

Inasmuch as the *CBS* attitude on television is "Your guess is as good as mine" the *Video Reporter* will make a few guesses. Here they are: (1) The recent acquisition of the phonograph record subsidiary by *CBS* took the full time and attention of key executives originally assigned to television; (2) there is a likelihood that this same record subsidiary will make record-players as well as disks and that, once in the equipment field, may add radio and television receivers to its line, thus emulating its competitor, *RCA-Victor* in more ways than one;

(Continued on page 43)



Hamstation W9DUT es its hamop.



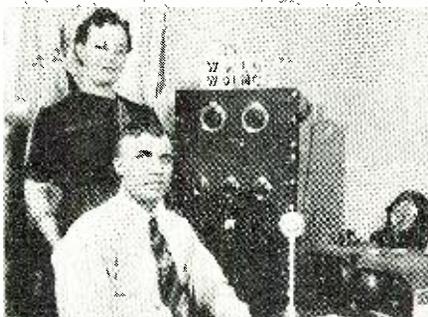
Hamop W9ADJ at the rig in his shack.



SWL Donald F. Christone of Michigan.



Honeymooners W9IYN es W9EPH.



OM W9LMC es his xyl W9LLG.



OM es xyl at hamstation W9OQQ.



Hamop W2IXY es her hamstation.

HAM CHATTER

FLASH! Elsewhere in this issue is a report by the FCC that there are some places where a tax is to be levied against hams for operating. The FCC claims that they have no jurisdiction over such an act, and that such a matter is one wholly of local affair. We hope that the communities which are thinking of taxing the hams will remember the sterling work done by these operators in times of local emergency and the nucleus which the hams form for a government communications network in a time of national emergency. That should be reason enough to obviate the tax. We would appreciate further information on this subject so that we can give the information to all hams; at the same time giving the taxing locality the widest publicity in the hopes that the strong light of reason will serve to deter them from their avowed purpose. Incidentally, has the ARRL heard of this? And if so, what has been done? We'd like to know so that we could report the matter in full.

ONE thing that has piqued (watta word, watta word) us no end, is that most non-hams reading *Hamchatter* think that we're nuts or somepin. They claim that over 90% of the stuff is nothing but pure gibberish. To prove that we amateurs are not the only people who have our own lingo, we have culled (gosh, are we ever hot!) some fb slangage from the very popular musicians rag, "DOWN BEAT." Hold tight, here goes:

Quote. Well balanced, the band was slightly on the *schmaltz side* with a fine rhythm section sparked by little giant Red Jackson on drums. Eddie Peabody takes a *flash spot* on banjo and *trick fiddle* and a *half dozen jibbugs* lay it in the slot. Unquote.

Personally, we think that hamslingo is less gibberish than the china music of the musicians! *Hw abt it nw ob, r we rite or nt? Hi.*

EFFECTIVE July 1, 1940 the FCC will replace the amateur operator license examinations, which have been in use for several years, with new examinations consisting primarily of the multiple choice type of question which has proven so successful during the past year in the commercial radio operators license examination.

The class "A" examination will contain a maximum of forty advanced technical questions dealing mostly with radiotelephony. The class "B" and "C" examinations will contain a maximum of fifty questions, of which approximately thirty will be technical and twenty regulatory and law questions. The code requirements remain unchanged.

The multiple choice type of question is usually answered by the insertion of a number in the space provided and the entire examination can be completed in a very short time. It is believed that this type of examination, in addition to greatly reducing the examination time, will also reduce the elapsed time for grading and issuance of the license and will provide better sampling of the applicant's knowledge by the increased number of questions without making the examination more difficult.

A study guide containing "paraphrased" questions which cover the field of all questions asked in the actual examinations will be released at an early date.

APOLOGY Dept.:

Dear Sir:
In answer to your question on page 60 of the June "Radio News," may I indignantly state that there is nothing the matter with the boys at The City College of the College of the City of New York. They have been on the air since time immemorial with the call W2HJ which you very erroneously assign to New York University.

The *Radio Amateur Call Book Magazine* (to give it its full title) has a listing as follows: W2HJ—Radio Club of the College of the City

of New York, 138th St. and Convent Ave., N.Y. City.

I am surprised at you for not having checked up on those call letters and for confusing New York University (N.Y.U.) with the College of the City of New York (C.C.N.Y.).

I shall forgive you for both errors if you publish a retraction in a special edition of "Radio News" published for this very purpose. If your managing board will not assent to this, I will compromise on a proper display of your contriteness in the next issue. Yours for more accurate reports, Alexander H. Wing, Jr., Instructor.

Herewith a special display of contriteness plus a retraction, plus an apology, sir. With over 14,000 words of Hamchatter monthly, we sometimes do err—this time, unfortunately against a venerable, old institution like C.C.N.Y. Hi. Ed.

IMPROVED reception conditions on both 20 and 40 meter bands have resulted in a considerable enlargement of the Nippon log.

Phones heard last month include J2NF (14.07 meg.), J7CB (14.06 meg.), J5CW (14.08 and 14.15 meg.), J2NQ (14.05 meg.), J2XA (14.025 meg.)—all received with tremendously strong signals. Also J2NG (14.13 meg.), J5CB (14.02 meg.), J8CI (14.035 meg.), J2NJ (14.04 meg.), and J2KC (14.14 meg.)

Japanese CW on 40 meters has been very extensive. Among those reported most often are J2OV (7.075 meg.), J2KN (7.24 and 7.023 meg.), J2KQ (14.385 meg.), J2OP (7.16 meg.), J2KD (7.145 meg.), J8PD (7.16 meg.), J8CL (7.18 meg.), J7CT (7.063 and 7.23 meg.), J6CD (14.380 meg.), J2IX (14.385 meg.), J2IH (7.06 meg.), J6DV (14.325 meg.), J2MH (14.40 meg.), J2XC (7.035 meg.), J2PK (7.143 meg.), J2NF (7.19 meg.), J4DC (7.125 meg.), J2IX 14.385 meg.)

Even 10 meters has produced a few Nipponese signals during the past 30 days. J3PJ (28.48 meg.) and J3FZ (28.48 meg.) are the only ones which carry the "confirmed" mark in our log but several others have been reported from time to time.

Phones, speaking only Japanese, still appear occasionally in the 40 meter band, and a few of them are surprisingly strong and clear despite the surrounding CW stations. Listen for these between 3 and 5 A.M.. PST.

Tibet has been reported several times this month. AC4YN is back on 14.265 meg. and is usually heard near 5 A.M. Mr. Fox is evidently having some trouble with his equipment. AC4JS is again being worked by several American hams. It is still in doubt whether or not this one is located in Tibet. Although beyond the Chinese Postal Service and inhabited almost 100% by natives of Tibet, the Chinese Government insists that this territory is part of China.

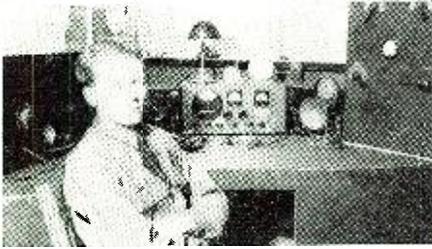
Reports on Chinese hams are few and far between. XU8AM (14.05 meg.), XUL4 (14.10 meg.) and XULB (14.10 meg.) are the only ones still being received consistently, although an occasional report indicates that XU8MA, XUSBA, XUSIA, and XUSRJ (14.12 meg.) are still active though irregular. We understand XU8MA has a 79th birthday coming up pretty soon.

Strangely enough, XU8RB, one of the most active Chinese hams for many months, was unreported during the past 30 days. We sincerely hope nothing has happened to this one, as he has long been one of the old stand-bys.

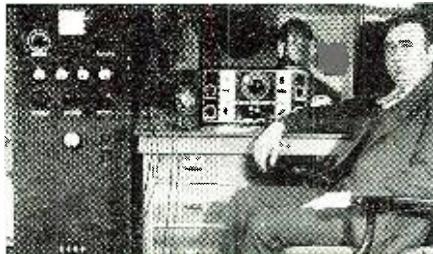
XU8MI (7.055 and 7.15 meg.) and XU6HW (7.03 meg.) have been received quite frequently on 40 meter CW.

Sumatra's PK4DA has evidently increased his power and has been reported on 14.18 and 14.26 meg. several times lately.

Several newcomers from the East Indies make their appearance this month. PK1XZ (14.375 meg.) and PK4BA (14.17 meg.) are two of the most reliable. PK1OG, PK3JD, and PK4DR



Hamstation W7HGX of CCC Camp, Mont.



Hamop and station of W9USJ, Illinois.



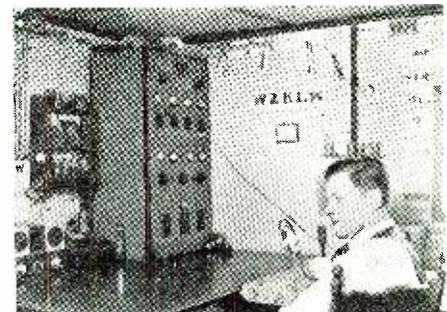
Hamop and station of W9AEZ, Missouri.



The Ouachita Valley ARC turns out.



Two very interesting shots of W5WK. The upper photo was taken in 1908, while the lower was made late 1939. Had quite the latest rig back in '08.



Hamop W2K1W wid 280 w.i.p. all bands.

have appeared once or twice, but are extremely weak.
PK3BD (14.07 meg.) and PK1RI (14.03 meg.) are again reported from Honolulu, but have evidently not been able to reach America.
KAUC, the "Snow Cruiser," has been on the air at all hours of the day and night, and has been worked by innumerable American hams. Frequencies reported for KAUC include 14.37, 14.33, 14.16, and 7.00 meg.

Porto Rico is well-represented on 20 meters through K4FKC (14.11 meg.) and K4JFC (14.281 meg.), both of which may be heard in the late afternoon or early evening. K4FKC also is reported on 28.50 meg. when using the 10 meter band.

K4KD is still maintaining a schedule every Sunday at 10 P.M. on 3.5935 meg., and usually comes in with excellent volume.

CW fans note that only three KA stations have found their way into the 40 meter log this month. They are KA1HR (7.10 meg.), KA1HQ (7.09 meg.), and KA9CG (7.09 meg.). That KA9, by the way, is a mighty good catch since there are only three KA9's in existence. KA1HR has a daily schedule with 6LUJ at 2:30 A.M.

Up on 10 meters, KA1GC (28.30 meg.) has been heard several times, but signals are much weaker than those of KA1LZ or KA1ME.

20 meters is still overrun with Philippine hams and the list this month has become far too long to include in its entirety. The following are the most important and most regular visitors to this country: KA1ME (14.14 meg.), KA1CS (14.11 meg.), KA7EP (14.26 meg.), KA4RP (14.145 meg.), KA1ZL (14.11 meg.), KA1LB (14.14 meg.), KA1DZ (14.145 meg.), KA1BB (14.275 meg.), KA1JH (14.04 meg.), KA1RP (14.08 meg.), KA1FH (14.12 meg. and 14.145 meg.), KA1CW (14.12 meg.), KA1AA (14.17 meg.), KA3KK (14.29 meg.), KA1AF (14.26 meg.), KA1EM (14.08 meg.), KA1LZ (14.17 meg.), KA1MM (14.125 meg.), KA1HR (14.06 meg.), KA1SH (14.09 meg.), KA1LH (14.13 meg.), KA1GC (14.13 meg.) and KA1PI (14.14 meg.).

The Virgin Islands are represented twice this month—once on 20 meters and once on 40 CW. KB4FTU (14.152 meg.) has been on phone quite frequently and maintains a fairly good signal. KB4AAN is on 7.298 CW irregularly. KB6RWZ (14.38 meg.), KB6RVN (14.38 meg.), and KB6ILT (14.16 meg.) have all been on the air for the past few weeks, and have been heard by a great many fans in this country.

Henry Lee's KP6JEG is extremely active at the present time. The station has been operating on 14.35, 14.20, and 14.173 meg. and has been equally strong on all frequencies.

KP6ROV has been received irregularly on 7.15 meg. in the 40 meter band, using CW. This one maintains a schedule with 6LUJ at 8 P.M. every Monday.

From Honolulu comes the report that US1B, located in Tashkent, U.S.S.R., is again active. No reports of this one in America. Has anyone heard it recently?

Hawaiian stations have swarmed over the ten meter band between 4 and 6 P.M. and as many as ten or fifteen may be heard almost any afternoon. Among the most reliable are: K6PUL (28.60 meg.), K6MUV (28.80 meg.), K6NYD (28.52 meg.), K6RVG (28.98 meg.), K6PIT (28.64 meg.), K6PTW (28.67 meg.), K6QQM (29.00 meg.), K6SNL (28.70 meg.), and K6SGJ (28.69 meg.).

20 meters likewise is still overrun with K6's. Those reported most frequently are K6PTW (14.33 meg.), K6PHD (14.22 meg.), K6OJI (14.27 meg.), K6LCV (14.25 meg.), K6LEJ (14.17 meg.), K6BNR (14.25 meg.), K6KRG (14.22 meg.), K6LTV (14.34 meg.), K6NYD, K6OQE, K6PAD, K6KGA, and K6PUL.

FOR sheer, unadulterated excitement, read the following entries from a radiop's log made in the War Zone, and sent in by Bill Schuss, ex-Chief Radiop of the SS City of Flint, Whew!!!

11 AM—Jevington Court, AAA. Being gunned and bombed from all sides by planes.
11:30 AM—(Same Ship) Attacks stopped. Compass broken, also pumps, drifting off Bell Rock.

1:00 PM—Floating mine reported. Lat. 51 27 N. 1 56 East.

2:00 PM—Tennis Chandres reports being chased. Ran ashore off Shetland Isle. Fear tank and engine room leaking.

4:00 AM—Bahia Blanca. Position 66 09 N. 26 20 West, sinking on account of ice. Our position now 66 30N. 3 30 West.

4:30 AM—Large amount of burning oil reported in Position 49.54 N. 4.34 West. Vessels in vicinity please keep lookout for life boats.

3:00 PM—Floating mine, in 57 54 N. 9 43 East.

3:30 PM—Notice to all ships: please keep a sharp lookout for seven men from mined Norwegian ship, Manx, probably drifting northward on a raft. Position when ship was mined, 58 30 N. 1 33 West, Midnight Jan 9th. Please make every effort. Crew suffering from cold.

4:30 PM—Unknown ship, 20 miles south of Flambe Head, attacked by German Plane, being bombed and machine gunned.

5:00 PM—Floating mine 57 49 N. 9 50 East, floating Horn Mine, 57 08 N. 7 08 East.

6:30 PM—SS El Osc blown up, apparently by German mine off west coast of England. Three crew believed drowned out of 36. 8 others seriously injured.

4:30 PM—Floating Mine, Position 48 10 N. 1 10 West.

6:00 AM—SS Highland Prince being gunned by submarine. Position 29 12 N 15 00 West.

10:00 PM—Drifting mine—28 49 N. 51 30 West.

FINAL—It is with deepest regret that we wish to report the death of Walter H. Chandler. Not only did Walt Chandler devise and teach the now famous Chandler Code System which made many a World Code Champion, but he had the interest of the operators at heart and always tried to make their lot a happier and easier one. He was well loved by the fraternity, and his passing left a void that will be hard to fill. His widow, for many years associated with him in his work, will continue his courses, and will personally assume all Walt's obligations and guarantees. For this Mrs. Chandler is well qualified, and it is the hope of the *Banochter Editor* that all who can, will give Walt's widow the lift up she deserves. Certainly the students will obtain the same instruction; and they should be proud that they will be those on whose shoulders will fall the responsibility of seeing that Walter Chandler's fine work will not have been in vain. So long, Walt.

BOSTON, MASS., Sunday, April 21, 1940. This historic old town today experienced its first combination wedding and gathering of radio amateurs, and as this is going to press many of us are not yet over its effects.

Nathan Garber, W1MIG (Monkey in Goo) was the luck man and Beulah Himelfarb the lucky (?) girl. Nickie (MIG), who is the President of the well-known "Screwball Network" which meets nightly on the 10 meter band, sent out a general invitation to all members to be in attendance, and the gang really did turn out. The nite before the big event, the radio station of the *Mass. Institute of Technology*, W1MX, was worked and some 60 amateurs, who attend the *Institute*, were also invited. Among those in attendance were W1AHD, W1GEJ, W1BDM, and xyl Ida, W1MME and xyl Doris, W1IDK, W1IPA, and xyl Dot, W1JOM and 2cd op, numerous other amateurs, S.W.L.'s (who came uninvited to see the Pres. of the Screwball Net), and future amateurs. After the ceremony, Nick and Beulah called the network to order and an informal meeting was held with all the firm's. The happy couple went, of all places, to the Metropolitan theatre to hold hands and then left for a honeymoon in New York City. Confidentially, we'd have a score of other calls of those present, but the old ole embalming fluid took effect a little too fast. Congratulations Nick and Beulah (better known as Honeychild) and lots of luck from the 10 meter "Screwball Network."

LAST A.R.R.L. copying bee resulted in only five perfect copies. Top men were W5IAC, W3EEN, and three second district boys, W2HQQ, W2BWR, and W2HSZ. W5EGA and his brother bought a flour mill near Oklahoma City and are going into competition with General Mills.

RN's long range predictions on the SS contest proved almost 100% accurate with the official reports just released. In order predicated, W2-IOP, W9ES, W3BES and W5OFN, W3DUK all rang the bell. W2GSA's 92,720 points earned him fifth place as W3BES and W5OFN tied with 96,798 points. (626 stations, 62 sections.)

RN didn't do so well in the phone department because we plumb forgot W6TTH, who led the crowd. W6OCH, W9RBI, W6QEU, W9USH and W3DQ followed in that order. While we are crowing over our guessing it looks like the results of the DX contest are also following the predictions made in this column last month.

W2KIK has finished rebuilding with a pair of T55's in the final. Bernie is now erecting a rotary for 20 meter DX (2). W2IQP has also finished rebuilding. Larry has a new job and will probably no longer be active in the second district, although he expects to tote the new outfit wherever he goes.



"THE ETERNAL TRI-ANGLE"



Hamop T13AV.

W6PMA out Los Angeles way is using a beam on 40 meters.

W6QQJ is back at Boulder City in Nevada to make all the lads and lassies happy. George has moved the shack onto the porch to avoid the summer heat.

W9JSJ was a recent visitor at W6QQJ. Sam is installing new transmitting equipment at the airport.

W3GBW in the Nation's Capitol runs a pair of 809's in the final.

W9NJO, a Kentucky Colonel on 14MC, phone runs 275 watts into an HY51 modulated by a pair of TZ40's. Bill has a real long wire for his antenna in the form of 8 half waves.

W9VKW amidst the tall corn of Iowa has a FB set up using

a Meissner Signal Shifter and a pair of HK54's. Receiver is an SX25 and a rotary tops off the station. Vernon's newly acquired XYL, Joanna, wants it known that she is only clearing her throat when talking on the mike, that it isn't nervousness. And all OM's are inclined to believe her—no YL, XYL, or OW was ever caught short of words.

W4EVX of Lawrenceburg, Tenn., is checking up on other RN correspondents. We found out Howard has 70 confirmed countries and W4AEG also of Lawrenceburg has an equally strong signal on the East Coast anyway.

W9YLU, with Betty at the key is active on 7MC in the mornings.

W8IOH is rebuilding using a Meissner into an 814.

W2GIJ in Brooklyn gets out with 70 watts into X6, KB, and other assorted DX points.

W8TVA is in White Valley, Pa. Should have been Tennessee Valley.

W6MKL in La. has a semi-portable with a pair of 35T's in the final.

W4IF in Marion, S. C., is using a small V beam with 1 1/2 wave lengths on each leg. It really works because "G's" 70 watts does pound out.

W5DAN/5 at Macomb, Mississippi, has a "V" beam on LA, but it has some wicked lobes on the East Coast.

W9UFU in Chicago is also using a small "V" beam. We don't know where Doc found room, but he did.

W2JDG of the radio family may be found on 20 meter phone after years of 75.

W2LJJ and W2JZX are using a 6L6 rig for CW.

W20T is spending most of his operating time on 20, as is W2TC, W2EJC, W2EGR, and other of the locals.

W2HNS spends most of his time with his recording equipment.

W2EGR has a very nifty three element rotary on top of a 70 foot steel tower.

W2AZV, SCM of NYC and LI has been making QSL cuts for the boys in his spare time.

W2GT, DX'er par-excellance, is QRT due to the freak ice storm that hit the East Coast in the early part of the month. Ed lost three elements in his rotary.

W3GTZ worked AC4YN, as did W6GRL.

Here is one for the books that really looks good. W4ECI was working KC4USB on 20 meter phone and W4EPP on 160 overheard the contact. Just for the idea of trying it W4ECI asked KC4USB to listen for W4EPP on 160 and, believe it or not, KC4USB heard W4EPP. We don't have reports, but several of the locals verify the contact. W4EPP is running about 400 watts into a pair of TZ40's and uses an extended Zepp for transmitting. The QTH is Newcastle, Alabama.

W2AV may be heard on 20 meter phone after years of faithful CW operation.

W2ICX expects to have his



Hamop W2LBB es his hamshack.

PP250TL's going by the fall of 1940.

W2MNR is also rebuilding, with the assistance of W2HAP.

W2EKC in Hewlett has gone in for the manufacture of ship radio telephones.

First employee is W2LJU, and the old shack has been converted to HQ.

W2IYA is now Ass't Foreman in a radio manufacturing plant.

W2IFS has left the second call area to engineer for the army in Ohio.

Those of you who listen to Club Matinee from 4 to 5 over a well known commercial net work have heard Rex Maupin, the music master. Rex is W9VNW and has a 325 watt CW rig, 135 watt phone on 40 and 20.

The Association of Technical Employees' amateur edition of the *ATE Journal* contains two gems of literature that all hams should read. *All About Amateur Radio* or, *How to Be a Ham in One Easy Lesson* by Tom Gootee of Chicago, and *Srides in Amateur Radio* by Hogsanworth, McGillbane, and Sands. Both articles are a good natured lampooning of ham radio that really hit the bell. For example, Tom explains that two hams can talk about: (a) their own transmitters, (b) the weather, (c) their own transmitters, (d) quality of reception, (e) their own transmitters, or (f) impersonal messages. He also defines High-Fidelity as "A quality similar to Infinity; approached, but never reached," tells us CQ is derived from the Latin, meaning "Won't somebody PLEASE answer me?," and generally enlightens all radio fans. Do your darndest to see the March issue of the *ATE Journal*.

W2GWE is off the air because of business pressure.

W2AVG is running a KW on 75 meter phone. W2ICX lifted a story that originated in the portals of W2IOP for his *ATE* column. Maybe it's worth repeating and maybe it isn't, but here it is: in the original form. Local W2

was awing an SWL with his tale of just working AC4YN. The revering SWL timidly asked the OM what the first immortal words of AC4YN were. Majestically W2—repeated "Have you heard the latest Confucius saying?"

Back to something intelligent—DX. Best bet in a lean month has been the Byrd Expedition —KC4USA; KC4USB; and KC4USC. 7MC has produced HK5EJ; HK5EE; PY2AL; K6PIT; K7GOR; K7GTB; KA1HQ; J2OP; XU8MI; K6QUJ; K6PDQ; and J2IH. On 20 it's such stuff as KA1AC; PK1KM; PK1OG; LY1AA; US1B; KB6RWZ; AC4YN; AC4JS; and such.

W2CFT is on ten meter phone and plans on the 2 1/2 descent shortly.

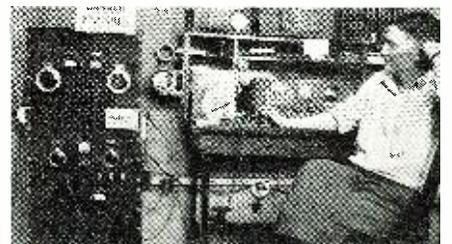
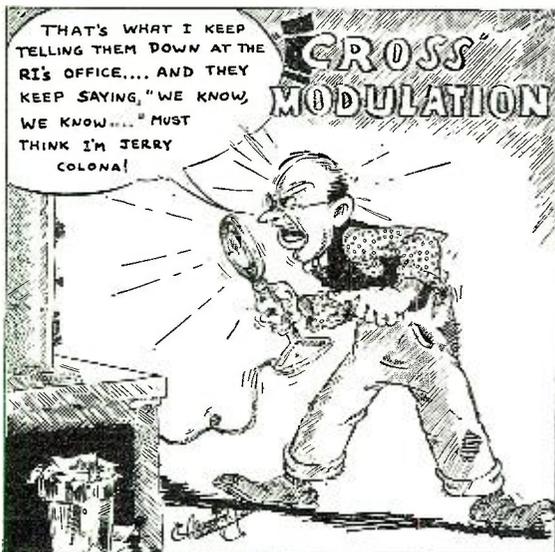
Ditto W2MIN.

W4FPK is with *Eastern Airlines* in Atlanta. W9KJM is still tearing around the second district with his portable mobile ten meter job.

W2CXN, *Brooklyn Tech*, may be heard al-



Hamop W3CZN es his fb layout.



Hamop W7HOV es his shack at Boise.



Western Slope Radio Club, Colorado.

most any hour of the school day on 20 and 40 CW. The boys are putting in a modulator soon.

Some time ago this column mentioned that FBSAB had sent some money to a well known W8 for radio parts and never received them in return. *RN* offered to follow up the matter if proof could be secured and a special delivery-air mail letter was sent to FBSAB (Postage 91c). No answer was received, or has been to this date and unless the letter failed to arrive, ample time has elapsed. However, several East Coast amateurs now know who the W8 is, from previous correspondence with FBSAB, and intend turning their evidence over to either *RN* or the proper gov't authorities. It also seems that some other prominent amateurs know of the case, but either refuse to believe it, or intend to ignore the charges because of personal friendships. [Ed. Note: *RN* is on the job, es still willing. Got sum dope for another W8 abt this es am waiting for more info. When es if we get it, will do the necessary.]

W3RWV must be agin' the utilities. Heard on 40 running 3 watts to a 30 xtal oscillator. After all!!

Besides ragchewing on 10, **W3GIF** is struggling with a P.A. system with which he hopes to achieve monetary success. Funny how many people have the same ideas!

W3QY has a very directional rhombic. In fact, it is highly efficient in all directions, working off the sides about as well as the ends. Or has that KW anything to do with it??

Presenting a talk to the *York Road Radio Club* on frequency measurement, **W3DPU** and **W3EEW** were surprised to hear the whole thing played back on a recording cut by **W3BYS**. Ernie delights in taking fone qso's from the air and playing them back to the fellows via telephone without revealing his own identity, hi! And are they puzzled!

Frequency modulation on 2 1/2 meters is the subject of much experimentation at the shack of **W3HFE**. Many tests and demonstrations with the local uhf boys are planned this Spring.

W3FZI/3 in Baltimore complains of poor success in getting a 70 foot antenna to work on 40. On the other hand **W5FSD/3** in Wyncoote, Pa., claims fine results on a 15 watt, 15 dollar, 15 pound rig using a 15 foot antenna! And he likes 15 wpm on cw, hi!

W3GKO and **W3FEW** are working on 2 1/2 meter rigs for traffic handling and ragchewing purposes. It is rumored that a few games of tidly-winks will also be tried via radio! What next, boys?

W3RR runs about 150 watts, but likes 300 watts so well that he is putting in pp 812's at 500 watts! Just watch that meter go around, my friend!

Fran Rice, **W3AKB**, conducted a highly unsuccessful search for "xtal cement" recently upon the expiration of an overworked slab of quartz.

What with a new **XC101x** and eco, **W3HRD** is all set for traffic and plenty of it.

They say that Dan, **W3HLZ**, key station for FTS in Phila., has his eye on a vl or two, thus accounting for his absence from 40 on occasions.

From the looks of traffic going through Phila., **W2PL** is headed for BPL via the originated messages method! His members look more like



W5ADJ, CXO, DAN, GUX have hamfest.



Receiving position of KL5MO.

the price of a new car than msg nr! On skeds with **W3EEW**, **W4FRZ** takes a little ribbing about his QTH—Hollywood, Florida. How could they! Fla. Chamber of Commerce take note.

Two sets of checker playing hams unwisely chose the same frequency on 40 for their Sunday matches, with disastrous and somewhat amazing results. Nobody has figured out who won the affair yet!!

Contest hounds in Pa. and elsewhere wish **W3EES** would retire to 160 phone, or sumpn. Latest results are discouraging as ever.

Several cases of communication via "wireless" record players have been noted. Those concerned should heed FCC warnings, and remove the antennas—or else. . . .

W4ARX buzzes in wd: **W4GDK**, Dothan, Ala., has nice new fone rig on 160.

W4FLS, Wilson Dam, Ala., is also on 160 with FB sigs.

W4FEI, formerly of St. Augustine, Fla., has moved himself to Daytona Beach and his agin on the air with his usual FB signal.

W4DND, Athens, Ga., has a nice phone signal on 160 and reports that he likes that band very much.

W4DAL, Nashville, Tenn., has a very nice 75 meter job and is very active on that band.

W4FQK, another Nashville ham, is also on 75. Seems that the Tenn. boys like 75 the best Hi.

W4CUY, Monroe, Ala., is on one sise phone. **W4GLB** of Albany, Ga., has rebuilt his 160 rig and has at least 75 watts and it really sounds FB.

W4GHU and his XYL Martha of Albany recently visited your scribe and Johnny tells us that he has bought a FB 150 watter from **W4EZU**, Evans, Ga. **W4EZX** has recently married and that explains the selling of the rig Hi.

W4GJT, Jacksonville, Fla., is a newcomer on 160. Is son of **W4FPU** there and is chip off the old block.

W4DSB, Americus, Ga., says that he has moved back into town and that the country air didn't agree with him.

W4AUO of Montezuma, after being a confirmed bachelor for lo these many years has capitulated to ole Cupid and is getting married shortly. With that and ham radio OM, you will be very busy I am afraid.

Hubert Batey, a ham formerly of Albany, Ga., has accepted a position with WSB, Atlanta Broadcast station. A new broadcast xmitter is being constructed at Valdosta, Ga., according to the gang there. (Note to circulation Dept.—they can get *RN* on newsstands there. I checked it.)

W4CCV of Macon, Ga., is again active on 160.

W4BED, Augusta, Ga., has a very nice signal on 75 meter phone and is very active at this time.

W4DVZ, Bessemer City, N. C., is active on 160 phone.

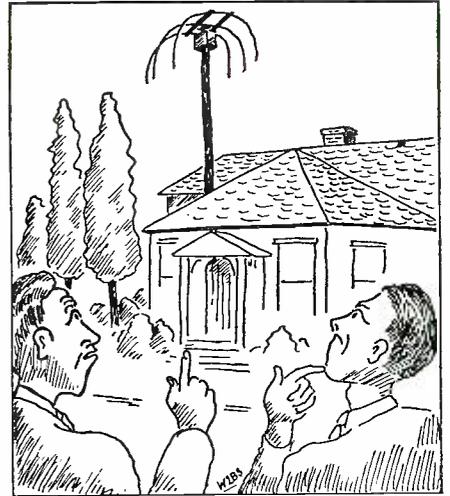
W4GLX has a FB phone rig on 160 at Graniteville, S. C.

W4DIA, Albany, Georgia, advises us that he will shortly move to Augusta and we hope that the Augusta gang will give him a cordial welcome to that city.

W4GXB is new ham at Decatur, Ga., and has built FB phone rig for 160 meter band. Carl says that HAM radio is FB and that he enjoys Hamchatter. (Who says we ain't got a reader?)

W4GHB is a new ham also of Decatur and reports that he is mostly active on 160 phone.

Tnx to **W4FSE**, James W. Harrison for a copy of ARC. It was FB, fellow, and you are doing great work in and around Asheville, N. C. OM. We take liberty of gleaming a few items from



"Funny thing, it did that with 1 KW!"

the vy same Jimmie.

W4ABT (gosh, it's bin a long time since we heard from you, OM) is on ten at Winston-Salem.

W4AXZ, a ole timer is reported as being on ten meter phone. **W4CTP** is Vice President of Winston-Salem Radio club.

W4ATC is on various bands and we can't keep up with his changes Hi.

W9AGS — A gud sig — Omaha is "heard'd hr" on 75 F tho on 20F I can hear others call him, es once wid "short skip" heard him on 20!

W9BVD — The "un-awares" stn — at Marquette wid op Harry 160F.

W9DHO experimenting as usual. VF xtal holders R Harlan's "latest" brainstrom. Keeps a Wed newn sked wid AMY wen he isn't out amongst the jump es liver tootin' his hawn 4 'em.

(Psc QSY page 58)



"Freda," XYL of W9AEZ. Nice, Huh?



Hamop W9DIZ.



Easy Antenna Control

By Clarence H. Maihori, W9YPT.

Minneapolis, Minnesota

A quick-acting changeover relay for the hamshack is almost a necessity. This one using a solenoid is unusually simple.

A SIMPLE and effective method of antenna switching is an ideal setup in a station where only one antenna is available for receiving and transmitting. Many amateurs realize this need but continue using the old method of switching with a d.p.d.t. knife switch or a complicated haywire, or else have given up trying to switch the antenna. They just hook a piece of wire to the receiver for the antenna and let it go at that.

The situation was somewhat the same at W9ITQ until a new type of solenoid was made available on the market that gave way to an attempt at a different method for antenna switching.

The resulting arrangement to be described has been in use at W9ITQ for many months now and has proven to be so satisfactory and simple method that any ham having trouble with antenna control will profit by giving the system a try. It is inexpensive to construct and has the advantage of changing the antenna from transmitter to receiver or vice versa quicker than the other fellow can sing out "K!"

This system consists simply of a solenoid-operated antenna relay coupled to be operated from one switch located in a convenient place from the operating position. The switch, a single pole three position, in the first position throws the antenna to the receiver, in the second position the antenna to the transmitter, and in the third throws the final amplifier on. The same procedure is used in reverse order to receive.

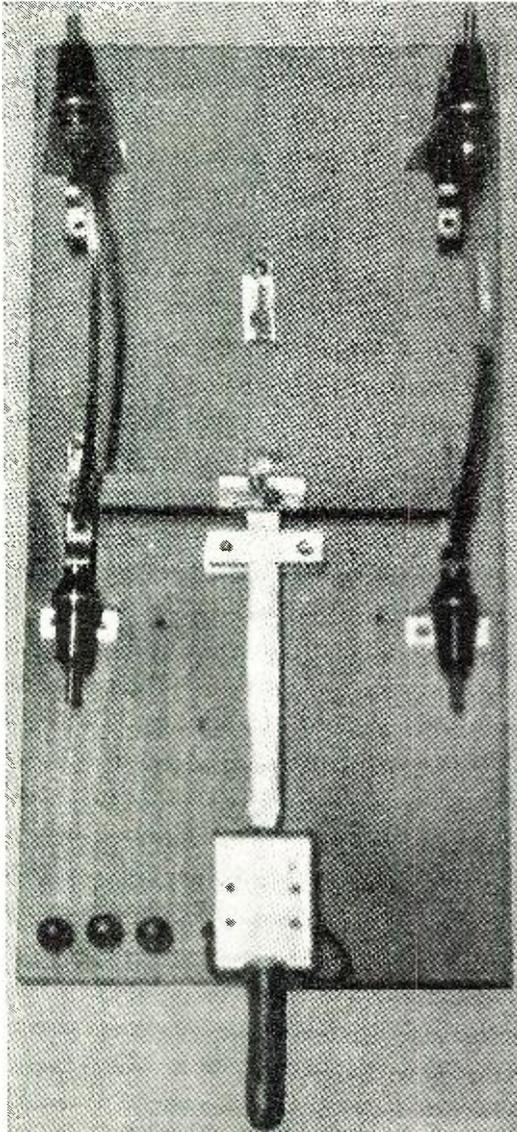
This solenoid type of relay has proven itself to be so much better than the old type of relay that it is surprising that more are not in use at this time. There are no springs to get out of order because the solenoid actuates the switch both ways. The contacts are self wiping and the relay operates with lightning speed. Another advantage of it is the contacts may be any distance apart—and that is something when you are using zepp feeders.

These are tremendous advantages over the old type of constant current relay with its crude spring arrangement, and ever corroded contacts. Once the solenoid type of relay has been used these superior advantages will be more readily realized.

The complete relay unit is built around a *Guardian* Type 4 solenoid which sells at a nominal amount. The entire cost of the completed relay to the builder should not be much more than \$3.00 and will undoubtedly turn out to be much less.

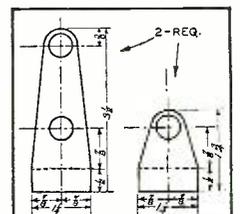
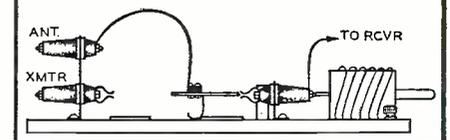
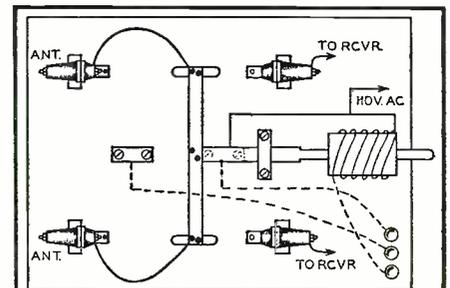
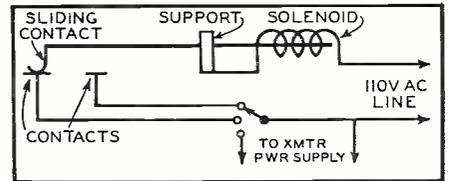
This little solenoid has a powerful pull (12 ounces) and is strong enough for any arrangement desired. It has been suggested that several contacts of the same type might be mounted in series with the other contacts. However, there is no need for such an arrangement in the average ham station, but there is no doubt that it could be done if such type of relay might be

(Continued on page 54)



Spacing between poles should match that between the wires of the feed-lines.

Picturing the relay in operation at W9ITQ where it was first tried out.



Diagrams and a pictorial view of the solenoid changeover antenna relay.

\$ Service Men's Money Page \$

A NEW SERVICE TO READERS

SERVICEMEN! Did you know that band P.A. work is one of the most remunerative fields? As a special service to our readers, and through the cooperation of the Musician's Bible, DOWN BEAT magazine, the Editors present here, for the first time, a list of popular bands and the places where they are playing. The list is not complete, and it may have substantially changed by the time that this gets to you, but the business is there regardless of whose band is playing at the locations noted.

Every band has generally one or more P.A. systems; some for the electric guitars, some for the singers, and others just to reinforce the band as a whole. In the "one-night" stand routes, these amplifiers take a terrific beating, and more often than not, something is out of kilter. Sometimes they need tube replacements, and sometimes they are just noisy and need general cleaning.

By using this list, the serviceman can tell where the bands are playing, and the name of the band. Solicit these accounts for repair work. It is important to remember, however, **THAT YOU SHOULD ASK FOR THE BAND MANAGER OR THE MANAGER OF THE LOCATION ITSELF.** Do NOT go there during business hours—that is, when the band is playing—but try either a couple of hours BEFORE the place opens, or right AFTER the place closes.

The Editors would like to know what you think of this new department, and to that end, offer a prize of \$5 for the best letter from those liking it, and another prize of \$5 for those disliking it. To qualify, you must give your reasons either way. Be concise, and you can take only one side of the paper. Duplicate prizes to duplicate winners. A third prize of \$5 will be awarded to the writer of that letter which has the best suggestion, in the opinion

of the Editors, for improving this department. Letters must be received by July 10, 1940, to qualify. No entries returned; decision of the judges (who are the Editors of RADIO NEWS) is final and binding; and no entries from employees of Ziff-Davis Publishing Co. or their families accepted; address Money Page Letter Contest, care Radio News, 608 S. Dearborn St., Chicago, Ill. Well, gang, what say?—The Editors.

CODE: nc, night club; h, hotel; b, ballroom; r, restaurant; cc, country club; t, theatre.

The first name under the city or town, is that of the location where the band is playing, the second the name of the band-leader. This is NOT the person to ask for. Inquire for the band manager. If the band listed, is not playing, ask for the manager of the band that is playing. Sometimes you will have to ask for the manager of the place itself. Note: Most bands have a rehearsal night or afternoon. That is the best time to repair the P.A. and test it. Ask the manager when the band has this rehearsal. Always leave your card.

ALABAMA

Birmingham
Thomas Jefferson, h
Jerry Gilbert
Jefferson, h
Congo Miller
Club Rev, nc
Paul Smith
Tutwiler, h
Johnny Strangé
Dothan
Boe Line Cl.
Cecil Kristal
Fairhope
American Legion, no
Marshall VanPool
Mobile
Cawthon, h
Four Aces

ARIZONA

Phoenix
Riverside, r
Johnny Walker
Tucson
Santa Rita, h
Ray Merrill

ARKANSAS

Little Rock
Westwood, nc
Kaye Jones

CALIFORNIA

Culver City
Casa Manana, nc
Tony Pastor
Beverly Hills
Victor Hugo, r
Jacques Renard
Hollywood
El Gate, nc
Louis Chico
Mark Twain, h
Johnny Gattile
Florentine Gardens cc
Billy MacDonald
Duck Inn, nc
Ceo Poe Johnson
Radio Inn, nc
King Cole Trio
Trocadero, r
Phil Orlunan
Club Cercle, nc
Sally Santogella
Trocadero, nc
Ivan Scott
Sloppy Maxie's, r
Red Stanley
Earl Carroll's, r
Manny Strand
Long Beach
Majestic, b
Bob Hamilton
Hilton, h
Bill Roberts
Los Angeles
Wilshire Bowl, nc
Phil Harris
Paramount, t
Best Lynn
Biltmore Bowl, nc
Laurie Kent
Lamaze, nc
Ray Light
Torch Club, nc
Jimmy McPherson
Beverly-Wilshire, h
Matty Malneck
Little Hungary, nc
Rayhael
Ambassador, h
Joe Reichman
Club 17, nc
Ted Willis
Ace Cain's, nc
Neal Wood
San Clements, nc
Shelving Young
Monterey
Club 26, nc
Three Men of Note
Oakland
Athens Athletic Club, nc
Tom Muller
McFadden's, b
Lucky Lotter

Ocean Beach
Casino Gardens
Ray Pearl
Palm Springs
Raquet Cl. cc
Max Fidler
Piedmont
Community Center, nc
Ed Kushans
Sacramento
Donovan's Cafe, nc
Dude Vance
San Diego
Sherman's Gate, nc
Ivory Aaronson
San Francisco
Golden Gate, t
Jay Brower
Sir Francis Drake, h
Nick Draper
Mark Hopkins, h
Chuck Foster
Bel Tabarin, nc
Tom Gerun
El Patio, b
Leon Mojica
Bel Tabarin
Gary Nottingham
Palace, h
Roy Noble
Cliff, h
Herb Samon
St. Francis, h
Shep Fields
Vallejo
El Nido, nc
Tommy King

COLORADO

Denver
Cl. Cinderella, nc
Kenny "Sticks" McVey
Chez Paree, nc
Three Fiddlers
Rainbow, b
Jimmy Walsh
Pueblo
Silver Moon, nc
Carl Colebatch

CONNECTICUT

Bridgeport
New Hollywood, nc
Peter Marciano
Hartford
Allyn House, b
Frank Pakenas
Capital Casino, nc
Claude Thornhill
East Hartford
Church Corners Inn, nc
Keith Ball
Kent
Country Club, cc
John Church
Lakeville
Hotchkiss, cc
Society Syncopators
Milford
Seven Gables, nc
Pat Hoke
New Haven
Tall, h
Joe Miller
New London
Rendezvous, r
Frank Foley
Wallingford
Three Cups, nc
Mort Dennis' Continentals

DELAWARE

Wilmington
Joe's Casino
Milton Mann
Darling, h
Milt Herth

FLORIDA

Coral Gables
Country Club, cc
Horn Olson
 Ft. Lauderdale
Club Alamo, nc
Musical Millionaires
Miami
Kit Kat Club, nc
Hal Lane

GEORGIA

Atlanta
Capital City Cl. nc
Jack Slight
Wisteria Gardens, r
Tommy Brown
Henry Grady, h
Eddy Rogers
Anisley, h
Carol Lafner
Augusta
Bon Air, h
Charles Fulcher

IDAHO

Payette
Gay Way, b
George Shurtlett

ILLINOIS

Aurora
Madison Room, nc
O'Brien & Evans
Calumet City
Derby City, nc
Jimmie Floyd
Paddock City, h
Frank Mattozo
Saratoga, nc
Joe Ferrara
Chicago
Pump Rm.—Ambassador, h
Folben Andre
885 Club, nc
Don Ramon Arida
L'Aiglon, r
Enio Bolognini
Chez Paree, nc
Lou Biese
Merry Garden, b
Freddie Daw
Harry's New Yorker, nc
Mel Cole
Monte Cristo, r
The Continentals
Blackhawk, nc
Bue Barron
Edgewater Beach, h
Betnie Cummins
Guy Nineties, nc
Bobby Danders
Paddock Club, nc
Leon Dos Camps
Palmer House, h
Low Diamond
9750 Club, nc
Johnny Dodds
Adolph's, r
Anthony Dongarra
Palmer House, h
Phil Dooley
Club Minuet, nc
Art Fisher
Nappa Gardens, nc
Mark Fisher
Paradise, b
Emil Flindt
Sherman Panther Room, h
Bud Freeman
Silver Cloud, nc
Sammy Frisco
Hack Wilson's Home Run, nc
Bob Garry
Agnes' Club Era, nc
Jimmy Hall
Club Silhouette, nc
Oliver Harris
Old Heidelberg, r
Heidelburg Ensemble
5100 Club, nc
Horace Henderson
885 Club, nc
Johnny Honnert
Chinatown Bowery, nc
Curley Jackson
Aragon, b
Dick Jaregns
Bismarck, h
Art Kassel
Palmer House, h
Hal Kouss
Vine Gardens, nc
Joe Kich

Ivanhoe, nc
Kit Kat Four
Bier Stube—Bismarck, h
Hans Kullback
606 Club, nc
St. Lake
Hi Hat, nc
S. d. Long
Blondie's, nc
Bert Lawrence
Swingland, nc
Johnny Leary
Panther Room, Sherman, h
Stuff Smith
Merry Garden, b
Joe Mangames
Glass Hat—Congress, h
Melody Masters
Colony Club, nc
Carlos Molina
Graemere, h
Hal Muntio
L. & L. Cafe, nc
Pat Natar
Casino Moderne, b
Eddie Noubour
Villa Moderne, nc
Tony Cabot
Cabin Inn, nc
Jimmy Noone
Monte Cristo, r
Juan Pineda
Panther Rm.—Sherman, h
Bob Strong
Colosimos, nc
Frankie Quartel
L'Aiglon, r
Don Quixote
Melody Mill, b
Chet Noble
Alabam, nc
Eddie Ruhl
LePetit Gourmet, r
Royal Troubadours
Deluxe, nc
Fred Saunders
Green Mill, nc
Frank Snyder
El Dumpo, nc
Ray Steuber
Chez Paree, nc
Marty Stern
Edgewater Beach, h
Bernie Cummins
N. Capital Lounge, nc
Three Bits of Rhythm
Frankie's Casino, nc
Bob Tinsley
Ivanhoe, nc
Al Trace
606 Club, nc
Tripoli Trio
Oriental Gardens, nc
Al Turk
Alabam, nc
Dave Unell
Italian Village, r
Vento Bros.
McGovern's Lib. Inn, nc
Earl Wiley
Stevens, h
Grit William
Gibby's, nc
Sammy Williams
Koo Koo Club, nc
Earl Willis

Yard
Dora Wittich
Peoria
Jefferson, h
Ozzie Osborne
Ingleterra, b
Charlie Cartwright
Riverside
Melody Mill, b
Glenn Carr
St. Charles
Baker, h
Eddie Conti
Monteleone, b
Hal Jordan
St. Charles, h
Rusa Varea
Quartette
Roosevelt, h
Richard Humber
Vanity Cl., nc
Abbie Brunos

INDIANA

Bloomington
Jordan Grill, r
Paul DeVine
Evansville
Beckerlies, nc
Allan Underwood
 Ft. Wayne
Berghoff Gardens, nc
Wally Long
French Lick
French Lick Springs, h
Ken Harris
Indianapolis
Washington, h
Biltmore Boys
Wharf House, nc
Jimmy Boyer
Indiana, b
Harold Gark
I. A. C., nc
Laurie Lowe
Della
Amos Otstot
Cat & Fiddle, nc
Gene Weitland
South Bend
Dino's Grove, nc
Jack Connors
Palais Royale, nc
Bill Fryar
Club Lido, nc
Al Kollat
Avalon, b
Marty Ross
Terre Haute
Terre Haute House, h
Wayne McIntyre

KANSAS

Dodge City
Moore, nc
Bob Herron
Alabam, nc
Wichita
Green Tree Inn, nc
Herbie Maul

KENTUCKY

Covington
Lookout House, nc
Ronnae Kingsbury
Frankfort
Lexington, cc
Bernard Crutcher
Louisville
Club Flamingo, nc
Wilbur Ball
Iroquois Gardens, nc
Orville Haines
River Road Inn, nc
Bob McCarty
Bilt, nc
Harry Robertson
Kentucky, h
Jack Saratt
Brown, h
George Wald
Newport
Beverly Hills, cc
Clyde McCoy
Beverly Hills, cc
Sidell Trio

LOUISIANA

Opelousas
Cedar Lane, nc
Al Vinn
Alexandria
Silver Moon, nc
Joe Ruet
Tallulah
Club Madison, nc
Herb Cook's Swinghearts
New Orleans
Marty Burke's, nc
Eddie Conti
Monteleone, b
Hal Jordan
St. Charles, h
Rusa Varea
Quartette
Roosevelt, h
Richard Humber
Vanity Cl., nc
Abbie Brunos

Moulin Rouge, nc
Sharkey Bonano
Puppy House, nc
Anno Belius
Flynn's, nc
Jack Norman

MAINE

Poland Springs, h
Mac Jaffee
Portland
Falmouth, h
Low Lennan
Lafayette, h
Graue & Scotty

MARYLAND

Baltimore
El Patio, nc
Kiki Garcia
Mont Royal, h
Gypsy Four
Blue Mirror, nc
Jack Herold
Club Esquire, nc
Kalker Bros.
Belvidere, h
Wally Steiffler

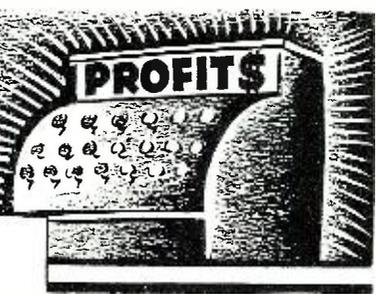
MASSACHUSETTS

North Attleboro
Horseshoe Club, nc
Jimmy Andrews
Boston
Cocoanut Cr., nc
Mickey Albert
Southland, b
Cala Galloway
Kitty Brandos, nc
Joe Candelio
Moylair, nc
Johnny Cole
Cafe de Paris, r
Carl Das
Hi Hat, nc
Peter Herman
Westminster, h
Jimmy Michals
Brown Derby, nc
Earl Lean
Casa Manana, nc
Herbert Marsh
Fitchburg
Hi-Hatters Club, nc
Bob Leeger
Holyoke
Shea's, t
Speed Provost
O'Brien's, nc
Jack Raiston
Roxbury
Roxbury, h
Royal Rhythm Boys
Springfield
Oide Tavern, nc
Ralph Barlow
Topsfield
Lakeside Outing Club, nc
Dai Mitchell

MICHIGAN

Iron River
Riverside, b
Charlie Armond
Jackson
Club Lido
Dixiel Lamb
Pontiac
Sandy Beach, nc
Friedie Blake
Avon Inn, nc
Carl Corson
St. Joseph
Ray-Tee, nc
Melody Men
Green Cottage Inn, nc
Doc Price Trio
Shadow, b
Ray Winters
Frolic, Revere Bch.
Louis Prima
(Continued on page 60)

Ring the Bell



The tube situation again, and what it means to the serviceman in \$ & c.

by **SAMUEL C. MILBOURNE**
Expert Serviceman, Greenwood, Miss.

THIS month we will study the present tube situation and how it affects you in your service business.

When tube list prices are lowered or raised do you tear your hair or shout with joy? If you are like most radio servicemen and dealers, you view the change with utmost calm—downright indifference would probably express it better.

Yet, every time the tube manufacturer chops 20% off the list price of a tube, it means that you must sell 25% more tubes (1 extra for every 4 you now sell) to realize the same gross profit. You think not?

Let us take the April 1, 1939 and February 2, 1940 tube lists as our basis of discussion. A 6C6 listed at \$1.00 on the April 1939 list. On the Feb. 1940 list it sold for \$0.80 or 20% less. The tube first cost you 50 cents and when the reduction went into effect it then cost you 40 cents. (Round figures.) This means that in either case you doubled your money so, on the face of it, you didn't lose anything.

However, it also means that early in 1939 you originally made 50 cents and in 1940 you could make only 40 cents on the sale. Actually, you lose 10 cents that you originally made on the sale of every 6C6. It also means that you must sell 5 instead of 4, 6C6's to make the same profit. According to the older list 4—6C6's at 50 cents profit each gross \$2.00. At the newer list 5—6C6's at 40 cents profit each also gross \$2.00—but you must sell 25% more tubes!

Now every serviceman knows that it is impossible to sell 5 tubes where only 4 are needed. It takes 25% more time to test them and "turn them over." What is the benefit then of lowered tube prices? Well, the popular answer is that it will result in more tube sales. Baloney! Tubes are bought when they are needed—not before. There isn't one case in 50 where the difference of 20% in the cost of tubes deterred a customer from buying them when his set needed them. Every practicing serviceman knows also that he can get \$1.00 for a tube just as easily as he can get \$0.80 provided the correct list

Editor's Note: For the past few months, Mr. Milbourne has been extremely busy gathering more information for this, his very interesting feature. Many of our readers were wondering what had happened to "Ring the Bell." He was much too engaged in gathering material to have been able to write. Now that he has the information, we know that his department will prove more interesting than ever. Welcome back, Mr. Milbourne!

price is \$1.00.

All right, let's look at answer number two. It allows the serviceman and dealer to compete in over-the-counter sales with mail order house prices. More baloney! Let's look at tube prices in a 1940 issue of a popular mail

order house catalog. A 6C6 tube lists at \$0.80 but is offered for sale for \$0.49 cents to the general public! Now this is no diatribe against the mail order house. Servicemen must accept the fact that the mail order house as well as the automobile and electric light are here to stay. But once and for all, get out of your minds the idea that you as a serviceman or dealer can compete on a price basis with them. Lowered tube prices won't do it, because if the list on a 6C6 were lowered to \$0.60, the mail order houses will sell them for \$0.27. (The price they now quote on an 80 type tube which lists at 60 cents.)

Now, if lowered tube prices won't stimulate sales and it will not allow competition with the mail order houses, why—why—why the lowered lists?

It may be fairly argued that due to new manufacturing methods, lessened costs of material, increased replacement sales of certain types, completed amortization of original design and development costs, etc., tubes cost less to build, thus the saving is passed on to the consumer.

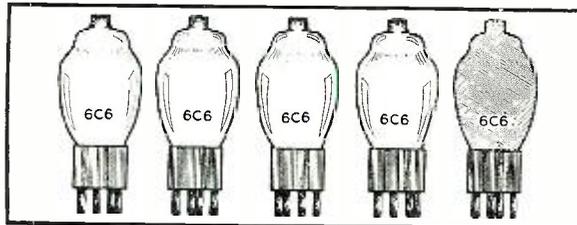
That's fine—very stirring and thoroughly commendable, except for one thing. The serviceman's and dealer's cost of selling that tube hasn't gone down and they can't make it up in increased tube sales.

Remember that only one type of tube and one discount has been mentioned so far.

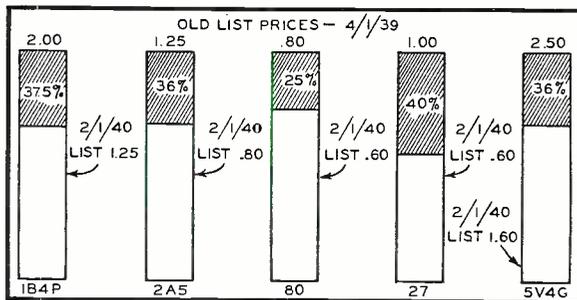
There are dozens of others which show that the actual average reduction is probably closer to 30% than 20%. To say that such a reduction will materially "up" total tube sales sufficiently to off-set the loss of dealer and serviceman gross profit is a fallacy. And let's not compare total tube sales

under the older list with those under the newer list because the war was a dozen times more potent a selling aid than were lowered tube prices.

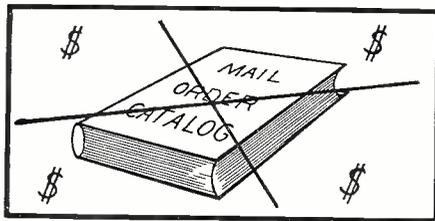
All right, what's the answer? "Up" the list to the old figures? Yes and no. No one can prove to me, as a practical business man that a 60 cent tube sale can be very profitable. On the other hand, I can quickly understand that a tube listing for \$3.00 is a lot



When list prices are lowered 20%, you must sell 5 tubes instead of only 4 to make same gross profit.



Shaded portions represent percentage drop in tube list prices from April, 1939, to February, 1940. One-half this difference is the gross profit you lose.



You cannot compete with mail-order houses on a strictly price basis.

tougher to sell than the 60 cent item. However, on the first I made 30 cents gross profit. On the second, I made \$1.50 gross profit. I spend *practically* the same time testing, handling, wrapping and selling either. I believe that servicemen and dealers should make themselves heard to the tube manufacturers and respectfully request that a "bottom" be placed on tube list prices. My personal opinion is that no tube should list for less than \$1.00. It is worth 50 cents gross profit for a serviceman or dealer to stock, handle and sell *any* tube. It would be well worth while if the tube manufacturer would increase abnormally low tube prices to this level and at the same time, if possible, decrease abnormally high tube prices. This increase would affect about 50 tube types—the bulk of the replacement market.

Tube Price Comparison

Look at the following:

Type	4-1-39 List	2-1-40 List	% Reduction
1B4P	\$2.00	\$1.25	37.5 %
2A5	1.25	.80	36.0 %
80	.80	.60	25.0 %
27	1.00	.60	40.0 %
5V4G	2.50	1.60	36.0 %

How many times have you placed two tubes side by side and wondered with your customer why one tube should cost three times the other? Let's say an 80 type tube at \$0.60 and a 70L7GT at \$2.10. It is true that the law of supply and demand enters the picture strongly at this point. It is true that possibly a thousand 80 type tubes are sold for one 70L7GT. But that still doesn't help the serviceman who makes 30 cents on one and \$1.05 on the other.

Now, before we get any further, please be assured that I'm not "gunning" for the tube manufacturers. Matter of fact is that my Daisy is in hock and my sling-shot sprung a rubber band. The tube manufacturers can be credited with much of the scientific progress in radio receivers and much of the sound, constructive educational work done in the service industry. As a matter of fact, by putting a "bottom" under tube lists (and raising that "bottom") they, themselves, stand to profit by the move. On any upward movement of tube prices they should share equally in the added profit. This would allow them to lower abnormally high tube prices, if they so desired; or they could use the money for additional engineering and research if they felt too ashamed to take it as a legitimate profit.

There is no effort on my part to suggest a longer discount. The present discount schedule is ample.

No sir! I'm one hundred percent for the tube manufacturers, but I'm also looking at it from the dealer's and serviceman's angle.

An over-all increase of even 20% in tube gross profit isn't chicken feed to any serviceman or dealer because it

means that he has \$6.00 gross profit where he had but \$5.00 before.

As a final clincher, ask yourself honestly whether you have sold at least 25% more tubes because of the price reduction. Then ask yourself if you would lose one out of twenty-five tube sales because the tube listed for \$1.00 instead of 60, 70 or 80 cents. Next, talk it over with your local organization with a view toward doing something about it.

If the service industry could convince the tube industry of the wisdom of this move, it would be another way to "Ring the Bell" in your own business.

So much for that.

Now, let's take up the hard-to-get tube type.

You fellows who have your shop within easy distance of several jobbers have no idea what a thorough pain in the neck the hard-to-get tube type can be.

Those of us who ply our trade under the village chestnut tree sometimes feel like climbing the said tree when request for a hard-to-get tube type hoves into view.

Almost every serviceman sells one certain brand of tubes, yet no tube manufacturer makes all tube types. Thus, you are placed in a very difficult situation when a customer trots into the shop brandishing a hard-to-get tube in one hand and a handful of government lettuce in the other. You look at the type, run your finger down the tube list and regretfully shake your head.

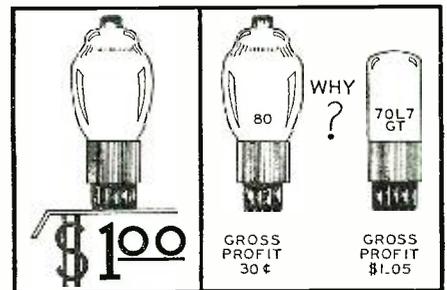
"Sorry, old man", you say with a winning smile, "*the Huppa-Duppa Tube Co.* doesn't make that type but I can order it for you—I hope, I hope, I hope". The last in a vague mumble.

"Well, I'll be back", your was-to-have-been customer quips and out he goes to try the next serviceman. The odds are that he will finally wind up by ordering it himself or letting an-

other serviceman order it. In any case, it's a lot of grief all around because it is often hard to establish a source of supply for the one tube.

Now, let's see what the trouble is. Hard-to-get tubes are divided into two classifications. First, those which are definitely obsolete—like the 00A, the WD11, etc. Second, tubes which are considered "live" by possibly only one tube manufacturer, but which cannot be included as among those making up 95% of the total replacement market.

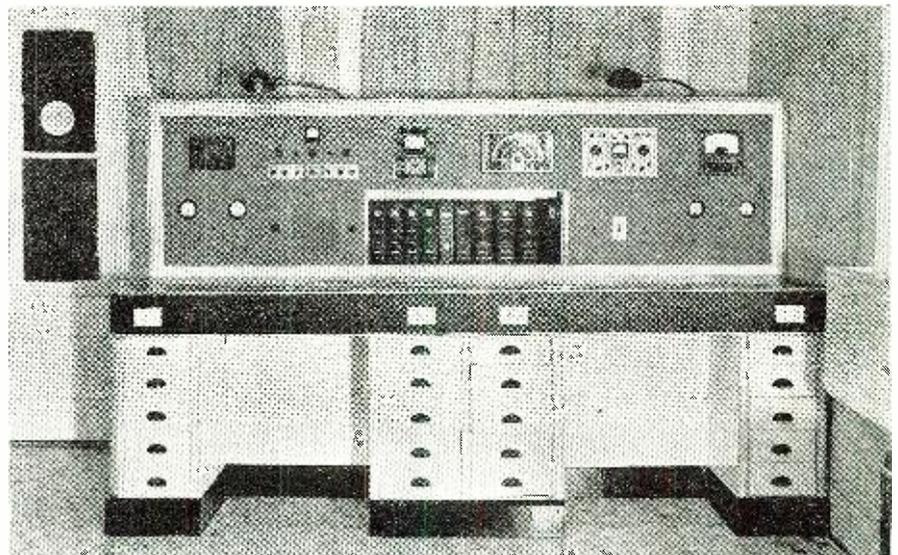
An effort was made a couple of years ago to "farm out" this unprofitable tube market among tube manufacturers, each taking his share of the various types. As the tubes were boxed and labelled with the original manufacturer's name, and sold only through that manufacturer's jobbers, it was a mad scramble (and is still) by



Why not put a \$1.00 "bottom" under tube list prices? It is worth 50c gross profit to sell a radio tube.

radio servicemen to keep up with which tube types were made by what tube manufacturers. Then there was (according to hear-say) considerable persuasion exercised upon tube jobbers to take on the regular line of tubes of a rival tube manufacturer for the privilege of obtaining the hard-to-get types.

From the serviceman's and dealer's
(Continued on page 53)



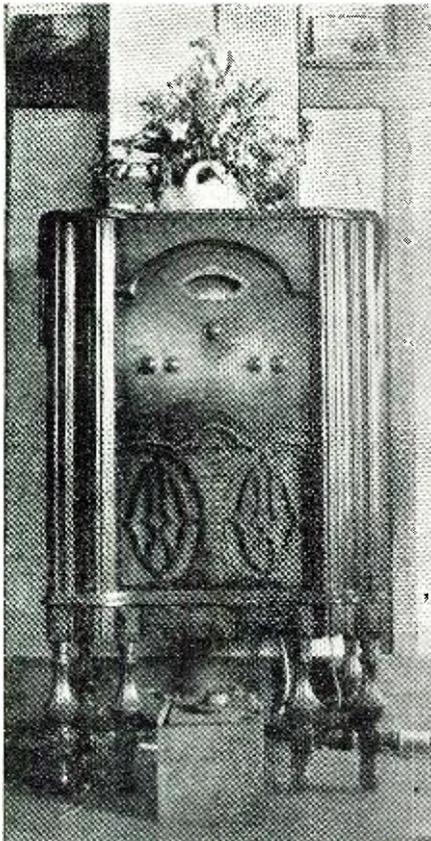
The bench of Louis K. Sandor, Piqua, Ohio, certainly does "Ring the Bell."

DEAFENING THE POWER LINES

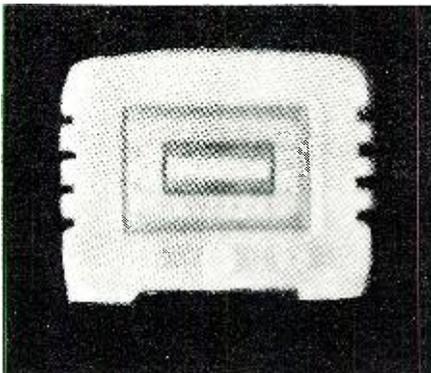
by **WALTER E. KEEVER**
 Detroit, Michigan

Good reception is not accidental; you can have it by following the author's points.

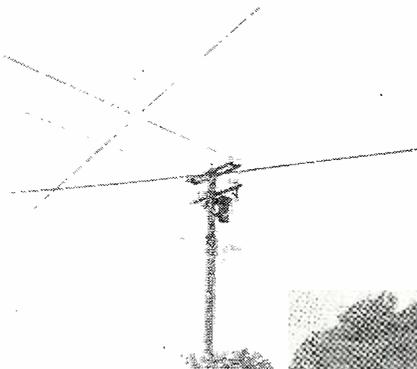
Part I



If your set is of this vintage, it can still be made to receive well.



The midget set can also be made to give very fine results in reception.



Stringing antennae near power transformers results in plenty of AC hum.

BATTERY-operated receivers become unstable, and critical to body capacity when the ground connection is removed. Receivers powered from the service lines may not be appreciably affected. The fact is, power lines themselves constitute a rather indefinite but usually effective ground. (a.c.-d.c. receivers depend entirely upon the line for a ground.) One side of the line is grounded directly, and the other—the “hot” side—through whatever appliances are at the moment connected across the line. Represented by L and R in Fig. 1. Never entirely absent, their number and location constantly vary.

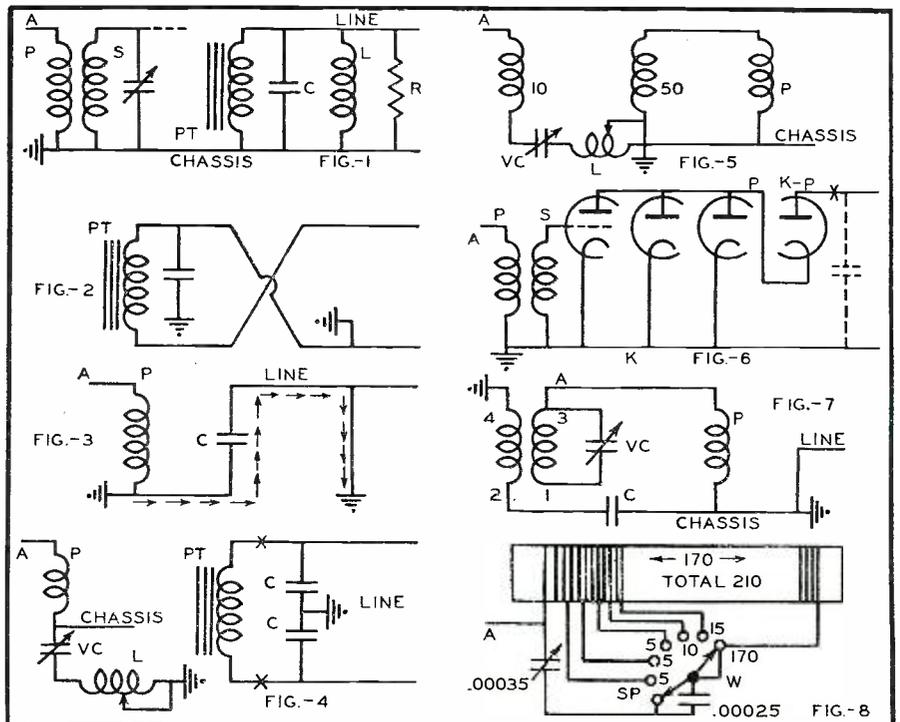
The fact that the line is carrying 110-volt a.c. does not prevent it from being a collector of radio-frequency oscillations. Whenever the r.f. impedance through appliances to the nearest ground exceeds that through the primary of the power transformer (PT, Fig. 1), radio-frequency oscillations pass through the latter and down the other side of the line to ground. At other times the line acts as a two-wire antenna, grounded at the far end, with the receiver on the open end.

Figure 1 shows the usual connection of the power cord. Condenser C, commonly called a “buffer” condenser, is intended as a line filter, but has the pernicious effect of connecting the power line to the antenna circuit. It shorts r.f. currents from the “hot” side to the chassis, thence to ground through the receiver ground wire. The other side of the line usually is neglected, as being already grounded—somewhere.

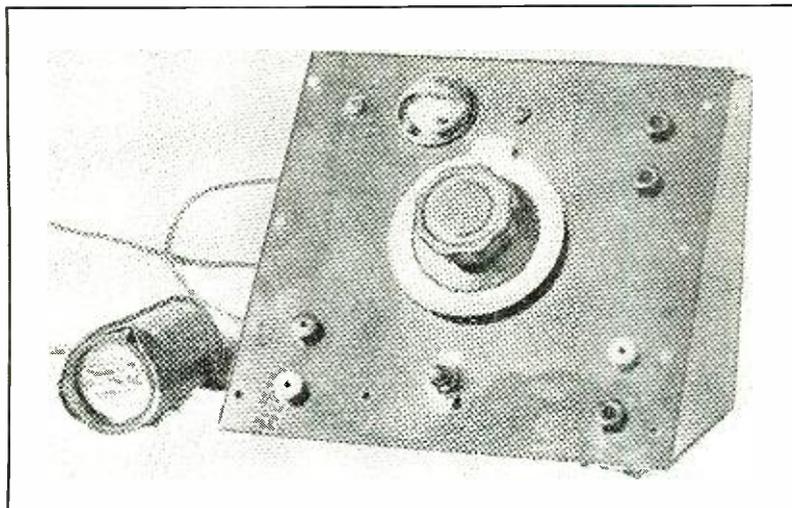
Many believe the purpose of the “buffer” condenser is to reduce hum. On the contrary, it feeds raw a.c. right into the chassis. Every circuit in the receiver directly or indirectly returns to chassis, which should be a “quiet pool,” electrically speaking. Disconnect the ground wire and scrape its end across the ground post. A shower of fine sparks, visible in dim light, indicates a connection as in Fig. 1.

“Reversing the power plug decreases hum.” This is a dead give-away. Fig. 2 shows what happens. The “buffer” condenser now connects the grounded side to chassis. No 60-cycle a.c. now flows through the chassis, as there is no difference of potential between it

(Continued on page 48)



Figures 1 through 8 discussed by the author.



The "Test-All" with its slanting front looks commercial.

Build the "TEST-ALL"

by **MERWYN BLY, W3FPL**

Leesburg, Virginia

This simple instrument, which every experimenter or serviceman can build, is a sensitive vacuum tube voltmeter capable of reading even bias cells.

THIS simple old "Test-All" circuit, can, with a few changes, and - - at an exceedingly low cost, be built up into one of the most useful instruments around the shack.

As a Vacuum Tube Voltmeter it draws so little current that Grid Bias Cells can be checked accurately. Although it takes 5 volts to fully close the eye, a fresh 1½ volt flashlight cell will give a healthy indication and furnish a calibration mark for checking grid bias cells. To secure the accuracy necessary for working out inductance formulas, etc., with the VTVM it is necessary to secure a small magnifying glass and mount it in a convenient tube slightly shorter than the focal length of the glass.

This can be seen to the left of the instrument in the front view photo. The glass and tube not only make it easier to see the shadow but it also brings out the more prominent "notches" on the edges of the shadow. By choosing a prominent "notch" for closing it is possible to return to the same reading with considerable accuracy.

The writer plotted his curve of voltage against dial readings of the potentiometer (R-3) by using various combinations of "B" batteries (they must

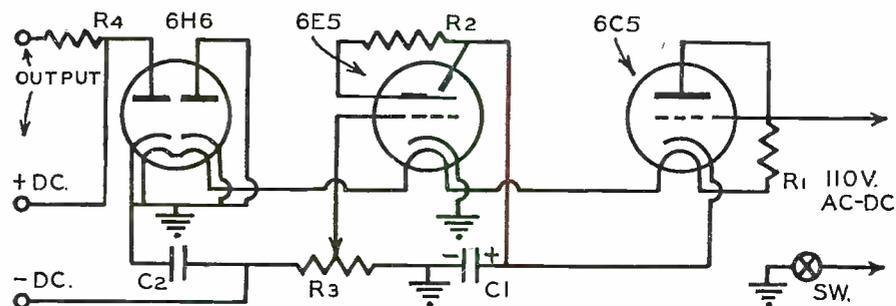
be fresh) and the a.c. readings based on them were satisfactory.

In the front view, the two upper pin jacks are to be disregarded as they are not used in this set-up. The two pin jacks on the bottom right are common to each other for convenience (one would be sufficient), and are for the *plus* connection in reading d.c. The top pin jack on the bottom left

is the *minus* d.c. connection—reversing polarity will result in no reading.

Output readings are taken across either of the right hand jacks and the bottom pin jack on the left. Be sure the receiver has an output filter, or better yet, play safe and use a .1 mfd. 250 volt condenser in series for output readings as this instrument is a.c.-d.c.

(Continued on page 53)



R₁—350 ohm line cord resistor, Ohmite
 R₂—1 meg., 2 w., (included in RCA kit)
 R₃—75,000 ohms pot., Mallory
 R₄—0.1 meg., 2 w., IRC
 C₁—8 mfd., 500 v. (preferably paper), Solar
 C₂—.1 mfd., paper, 200 v., Solar
 SW—SPST toggle sw., Arrow
 3 pin jacks, Yaxley
 2 octal type wafer sockets, Amphenol
 1 RCA Magic Eye Kit (includes socket, coded wires, escutcheon, 1 meg. resistor, spacers and hdw.)

1 vernier type instrument dial, Crowe
 1 bakelite front panel 7" x 7"
 1 bakelite top piece, 2½" x 7"
 2 half-inch soft pine side pieces 6" x 5¾" x 6½" cut on slant of about 55°
 1 flat aluminum chassis, approx. 4" x 6"
 4 half-inch blocks ⅞" high to support chassis
 Hook-up wire—wood screws—bolts and taps
 1—6C5 RCA
 1—6E5 RCA
 1—6H6 RCA
 1 small magnifying glass and bakelite tube.

SERVICEMEN'S CASE HISTORIES

by ALFRED A. GHIRARDI, B.S., E.E.

Author of "The Radio Physics Course," "Modern Radio Servicing"; member Radio Servicemen of America, New York Electrical Society, Institute of Radio Engineers.

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FADA 41

- Inoperative, . . . 1) 0.01-mfd. audio coupling cond. "shorted"
- Intermittent reception, 1) open-circuiting r-f secondary windings (leads snapped at lug)
- Fading, 2) 0.01-mfd. audio coupling cond. "open"
- Hum, 1) open-circuited 0.5-mfd. detector amplifier cathode by-pass condenser
- 2) poor cathode-heater insulation of type '27 tubes
- Distorted, 1) leaky 0.01-mfd. audio coupling condenser
- Weak reception

FADA 42

- Weak insens. . . 1) if detector plate voltage is slightly lower than normal value, replace the 50,000-ohm resistor in the plate circuit with one of lower resistance (about 40,000 ohms). Replacing detector tube may also help
- Intermittent . . . 1) replace both 0.01-mfd. coupling condensers
- Fading, 2) faulty r-f plate by-pass condenser (located in the gang-condenser housing—the one with the red lead going to the r-f coil is usually the faulty one)
- 3) check both the phono switch and the local-distance switch contacts
- Flicker in, 1) clean the contacts of the spring switch located behind the small panel and below the tuning dial
- Oscillation, . . . 1) connect a 0.01-mfd. condenser between one side of the 110-v. line and the chassis. (Try each side of line, in turn)
- Motorboating

FADA 43

Same Case Histories as those listed for Fada 41 and 761 receivers

FADA 44, 46, 47

Same Case Histories as those listed for Fada 41 receiver

FADA 48

- Low volume, . . . 1) poor contact between resistance element and movable arm on volume control, causing an increase in the value of the AVC circuit resistance, thus making it over-effective and causing a decrease in volume. Adjust the arm so it will make good contact
- Oscillation, . . . 1) "leaky" by-pass condensers. Test for, and replace, all faulty units
- Howling, Fading
- Flashograph, . . 1) shunt the 1-mfd. condenser from the one side of the Flashograph, and turn the control to the end
- Aligning the, . . . 1) the four i-f tuning condensers are located at the rear of the chassis, while the oscillator trimmer is located between the '47 output and the 35 tubes in the main shield housing

FADA 49

- Low volume, . . . 1) poor contact between resistance element and movable arm on volume control, causing an increase in the value of the AVC circuit resistance, thus making it over-effective and causing a decrease in volume. Adjust arm for good contact
- Fading, 1) replace "open" or "leaky" first-detector cathode by-pass condenser. Check all other by-pass condensers
- Oscillation
- Fading accom- 1) replace push-pull input panied by transformer
- "frying" noise
- Aligning the, . . . 1) the four i-f tuning condensers are located at the rear of the chassis, while the oscillator trimmer is located between the '47 output tube and the 35 tubes in the main shield housing

FADA 50

Same Case Histories as those listed for Fada 70, 71, 72 receivers

FADA 66

- Oscillation on, . . 1) connect a 300-ohm, non-inductive resistor in series with the control-grid lead of the type '24A first detector-oscillator tube
- Distortion, 1) "leaky" blocking condenser or coupling condenser between the first audio stage and the output
- 2) defective tinsel speaker cord
- 3) corroded contact arms of double volume control
- 4) poor connection of speaker tinsel cord to phone tips
- Oscillation, 1) open-circuiting r-f cathode or plate by-pass condenser
- Hum, 1) open-circuited filter condenser (possibly caused by loosened nut which holds the common condenser terminal)
- 2) poor grounding of condenser block
- 3) short-circuited filter condenser block leads—rubber insulation cracked

GENERAL ELECTRIC A-67

See also Case Histories listed for General Electric A-64 receiver

- Inoperative, . . . 1) "shorted" condenser shunting the Candohm resistor
- Intermittent . . . 1) see Case History for this reception, reception, for this same trouble listed for General Electric A164 receiver
- Fluttering signal.
- Inoperative
- Noisy reception 1) faulty 500,000-ohm grid resistor for '6F6 tube (even though it may test O.K. when set is turned off). Replace
- Poor tone, 1) install a 150,000-ohm output Distortion grid resistor in place of the original 500,000-ohm unit

GENERAL ELECTRIC A-70, A-75

- Weak, 1) this condition results when the second i-f plate by-pass condenser (C-28), either due to vibration or to an accidental pressure, is forced into contact with the plate lug of the second i-f transformer nearest the 6K7 i-f tube. This causes plate potential to be applied to the electrolytic shield of the condenser. Its effect is an approximate decrease in sensitivity of 30%. This may be partially compensated by unscrewing the plate coil trimmer screw as far as it will go. However, before attempting to align the i-f amplifier be sure that the condenser is entirely free from this lug. When this set is aligned at the factory, this condition does not exist and the mere removing of this condenser from actual contact will automatically return the i-f to perfect alignment

2) in the earlier models it will be noted that the diode plate lead (green rubber covered) is soldered to one of the lugs of the second i-f transformer. If for any reason it is necessary to remove or replace this transformer or wire, it is important that the wire be dressed as far as possible toward the front of the chassis to obtain full sensitivity. Sets carrying later serial numbers have this lead tied to the center tap of the coil inside the can. However, it is still necessary to keep it toward the front of the chassis to prevent a feedback between the plate dropping resistor (between the first and second i-f transformers) and the lead itself

Rattling, 1) a loose part in the receiver, (sounding like "speaker rattle")

Howling, 1) inspect the oscillator coil of the "D" band between 10 and 18 mc.)

100-mmfd. condenser C-44, and substitute a 50-mmfd. micamold condenser for it. This will reduce the coupling of the oscillator, with a negligible loss of sensitivity. Now check the alignment of the "D" band, and realign if necessary

GENERAL ELECTRIC A-82

See also Case Histories listed for General Electric A-86 receiver

- Inoperative, . . . 1) "shorted" 6A8 screen by-pass condenser
- Inoperative, . . . 1) "shorted" or "leaky" 0.08-mfd. tone-control condenser. Reception may be obtained with volume control in "bass" position) with "treble" position, but volume control will be exceedingly noisy
- Sensitivity control inoperative 1) check position of the 6A8 bias resistor within the "sentry box". The lead of this carbon resistor (soldered to a lug on the terminal strip) often "grounds" to the case of the long-wave band padding condenser
- Weak, 1) fixed padding condenser (C-16) across secondary of the second i-f transformer should be 65-mmfd. In some cases, this condenser changes value enough to throw the second i-f out of alignment. The trimmer (C-45) will not peak, and the reception will be weak. Replace C-46 by another 65-mmfd. condenser
- Fading, 1) "flash" either of the i-f primary trimmers to chassis with a screwdriver. Trouble is due to internal "shorting" and leakage of the air-tuned i-f trimmer condensers ("Permaliners") employed. Replace these trimmer condensers if necessary

Howling, 1) place washers under feet of chassis so it does not touch cabinet

2) oscillator section of gang condenser vibrates. Place fibre washers between the rubber mounting of the condensers so as to change the vibration period of the gang

3) if shield can on oscillator section of sentry box vibrates, line the inside with "adhesive" or "masking" tape to dampen the vibration and consequent howl

4) try removing the rubber grommets in the escutcheon and tuning controls. If the howl disappears, the escutcheon brass should be realigned

GENERAL ELECTRIC A-85

- Inoperative, . . . 1) check voltage across 3,000-ohm first-audio cathode resistor. If less than 2 or 3 volts, replace the electrolytic condenser by-passing this section. Use a 5 to 10 mfd. 25-volt unit

GENERAL ELECTRIC A-86

- No signals on, . . 1) short-circuited 0.1-mfd. condenser (C-30) in "sentry box" (part No. RC-096)
- Static
- Inoperative on 1) open-circuited 0.0013-mfd. "C" band, condenser (C-21), preventing the receiver from oscillating on that band
- Loss of volume, 1) open-circuited 10,000-ohm resistor section (R-18) or tapped resistor (R-11, R-17, R-18)
- Poor selectivity, (abnormally high screen voltage on '6K7 i-f tube)

GENERAL ELECTRIC A-87

See also the Case Histories listed for General Electric A-82 and A-86 receivers

- Inoperative, . . . 1) "shorted" 0.1-mfd. 200-volt condenser and burned out 10,000-ohm ½-watt resistor—both fastened on the switch assembly in the foremost of the three sentry box by removing side fastening bolts, dial-mechanism nuts and the terminal leads. The band-switch shaft must be removed before box cover can be lifted. When box is removed from chassis, disengage the dial gears and remove shaft by lifting the reduction drive and the dial assembly. This allows switch-shaft gear to pass the dial-scale gear when the shaft is pulled straight out. Replace resistor and condenser, using a 0.1-mfd. 400-volt condenser. When re-mounting the switch and dial mechanism, make sure they are in the correct position—otherwise the calibration of the receiver will be destroyed
- Inoperative, . . . 1) check for "shorted" 0.05-mfd. condenser and charred 2,000-ohm resistor inside second i-f can.

Serviceman's Legal Advice

(Continued from page 25)

that if the goods are not sold, they are to be returned, the property passes presently to the buyer" subject to returning to the seller in accordance with the contract.⁵ Always remember, however, that whatever the parties agree to, that will be what the court will enforce no matter, generally, what the law may state.⁶

Suppose that you attended a sales meeting of a manufacturer, and the sales manager showed you samples of his line, and told you that these were what they were going to put out next year. You became "sold," and placed an order for some of these sets. You have no title in them until they have been actually manufactured and set aside for you.⁷ So the manufacturer cannot hold you for anything on these sets until he has manufactured them.

How about a bill of sale? Well, they are nice things to have, since they are *evidence* that you have title. But they are not absolutely necessary to pass a title to you,⁸ nor do they necessarily pass the *title* to you.

Got all this straight? But, you say, "What if I have the manufacturer ship me the goods?"

Okay. "In general, the delivery of the personal property by the seller to a common carrier (such as the trucking company, the railroad, etc.) to be conveyed to a purchaser, is delivery to the purchaser; and the title to the property vests in the purchaser immediately upon delivery to the carrier.⁹ So you see, that when the company *delivered the radio* to the express company *you actually got title*, and *you own it*, although it may be miles away from you, and you have not seen it. It would make no difference if you bought the radios *f.o.b.* (free on board) or *c.o.d.*, the *title* would still vest in you,¹⁰ unless, your agreement said that you had to pay *before* you acquired title. And remember that delivery by itself, is not essential to pass title to you.¹¹

To sum all this up, remember that you *own* something whenever you have *title*. You *acquire title when you take delivery*, which may be to you personally, or to an express company (and in some cases you get title without taking delivery); you do not acquire title to something which has not yet been manufactured; and if you buy on a return basis, your title is in you only until you return the goods or sell them.

Knowing all these things, take precautions, by insuring against damage in delivering the merchandise to your store. Better yet, make the manufacturer or distributor agree that you do *not* acquire title until actual delivery at your store in an undamaged condition. That will make them take all the risks. It can be done.

Next month we will discuss some of the legal problems incident to running your business.

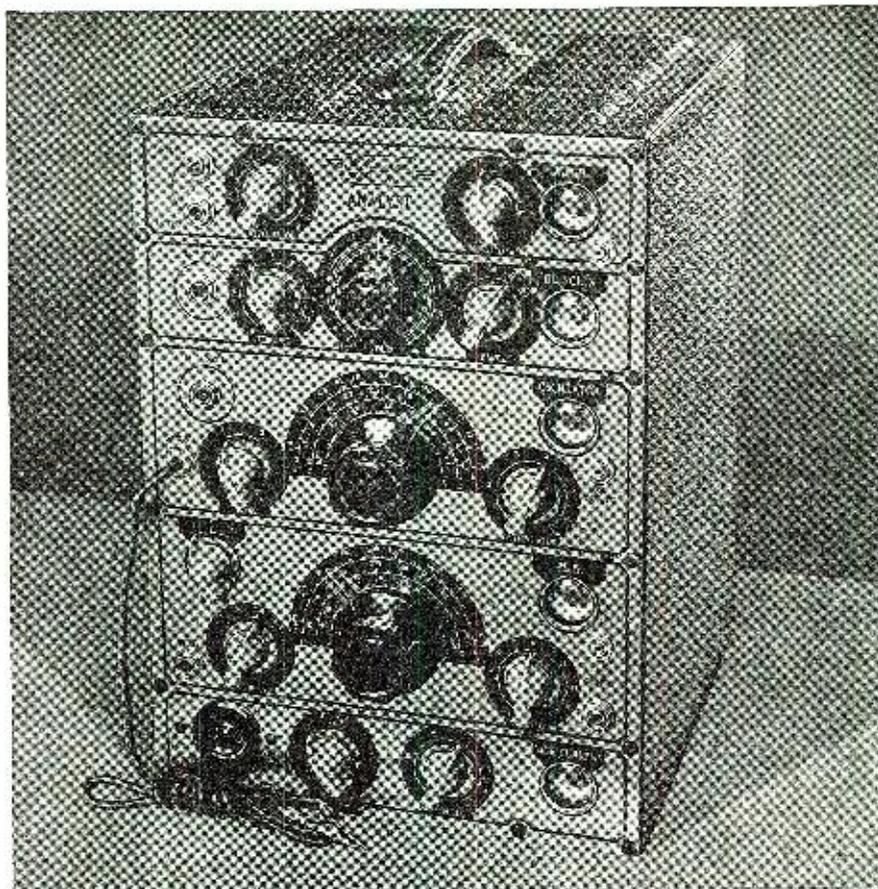
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MANUFACTURERS' LINE-UP

A RADIO NEWS READERS' SERVICE

BROWER ELECTRIC SUPPLY CO., INC. April 1st marked the date that *Brower Electric Supply Company, Incorporated*, issued its 1940 catalog. After months of preparation a 216 page book of radio parts and equipment has been produced which does credit to any jobber in the field. Between the attractive two color cover is detailed listings and prices of the complete lines they handle. Ham organizations, radio part dealers, and radio service men in North Carolina or Southern Virginia who are interested in having a copy of this catalog should get in touch with the Brower Electric Supply Company, Incorporated, 312-314 North Eugene Street, Greensboro, North Carolina. Free. (RADIO NEWS No. 7-100.)

HARVEY-WELLS FOLDER. An attractive and interesting folder on 1940 ship radiotelephone equipment has just been issued by *Harvey-Wells Communications, Inc.*, Southbridge, Mass. This folder describes new 25 watt, 10 watt and portable models which are available for the first time in a choice of two colors—Blue or Maroon. Space in the folder is also devoted to a description of ship-to-shore and ship-to-ship telephone service and includes information on rates, licenses, etc. Write for Bulletin MR-40. (RADIO NEWS, No. 7-101.)

RADIO CITY PRODUCTS NEW CATALOG No. 122. *Radio City Products Company* announces publication of a new test equipment catalog. Noteworthy in this issue (Catalog No. 122) is the addition to the RCP line of several new test instruments. These include a Universal DeLuxe Multitester (Model 414P) whose original and advanced design is said to give this series of RCP Multitesters — “advantages that far outclass other multi-range, multi-purpose meters.”

Also featured in the new catalog is Model 308M (Series D)—Sales Promoter. This is *Radio City Products'* famous Model 308 Dynoptimum Tube Tester with 9-inch Jumbo Meter. Fully up to date, incorporating all the features provided in the smaller Model 308 testers, the Jumbo instrument is further provided with spare sockets for future developments in both the new miniature tubes and the large base tubes.

A foreword to the catalog, the pages of which are printed in orange and black, states that “RCP dependability signifies the most advanced circuit design and maximum protection against obsolescence. Its scope, furthermore, includes the company's policies as well . . . the RCP trademark is just as much

an assurance of confidence on printed sheet as it is on every product.”

RCP'S new Catalog No. 122 featuring 16 models, free on request at *Radio City Products*, 88 Park Place, New York City. Free. (RADIO NEWS No. 7-102.)

RAYTHEON PRODUCTION CORPORATION. The new 13th edition of the *Raytheon Characteristic Data Chart* is now available. This publication has been completely revised and with much new material added now includes information about all receiving tube types available in the *Raytheon* line.

Base connection diagrams have been redrawn and many new ones added and this portion of the chart also is completely up-to-date. A complete set of tube outline drawings is now included to show dimensions and physical characteristics. The table of interchangeable types has been supplemented by many additions and a page of panel lamp data has been included.

This new chart contains 28 pages showing characteristic data for 331 receiving tube types, 56 plug-in resistors, and 16 pilot lamps. It includes 121 basing diagrams, 52 outline drawings, and table of 194 interchangeable types. The publication is free and may be obtained upon application to any of the *Raytheon* Sales offices. Free. (RADIO NEWS, No. 7-103.)

JOHN MECK INDUSTRIES. “*How to Match Speaker Systems*” is a new Booklet offered by *John Meck*.

Have you ever been stumped trying to connect multi-speaker systems to an amplifier? What is the best way of matching five 8-ohm voice coils to a four ohm amplifier output?

These and countless other every day problems in proper layout and connection of speaker systems are solved in simple fashion by this new booklet, prepared by *John Meck Industries*, Randolph at Elizabeth Sts., Chicago, Ill.

A copy will be sent without charge to any radioman interested in sound work. Merely write the publisher, mentioning this publication. Free. (RADIO NEWS, No. 7-104.)

EARL WEBBER BLUE BOOK. Just off the press, is an 8-page booklet, titled the “*Blue-Book of Instrument Values*”—which has been prepared by the *Earl Webber Co.*, of 4358 W. Roosevelt Rd., Chicago, Ill., to give radio-men a better means of judging the value offered by new 1940 radio service instruments. A copy will be sent upon receipt of a letter. Free. (RADIO NEWS, No. 7-105.)

ALLEN B. DU MONT LABS. have printed a new book entitled “*Simplified Cathode-Ray Tube Designations*.” More definitely to specify its many types of cathode-ray tubes, and also to simplify type-number designations, *Du Mont* has just issued a special bulletin covering new tube-type designations. The changes in type-number designations involve no change in mechanical or electrical characteristics of tubes, but have been made solely to facilitate specification. A letter is now contained in the tube type-number, to designate the particular screen required, such as A, Medium-persistence green; B, Long-persistence green; C, Short-persistence blue; and D, Medium-persistence white. A copy of the bulletin may be had by writing *Allen B. Du Mont Laboratories, Inc.*, 2 Main Ave., Passaic, N. J. Free. (RADIO NEWS, No. 7-106.)

HYGRADE SYLVANIA BOOKLET. We know that you readers are conversant with the new Fluorescent lighting and will be interested in reading the booklet entitled, “*You Have Lived To See a Miracle In Lighting*.” It covers a brief history of man's efforts to light up the hours of darkness and then tells the story in layman's language of the development and operation of the new Fluorescent lighting. Free. (RADIO NEWS, No. 7-107.)

NICKEL INFORMATION SERVICE. A general guide to the uses and properties of nickel and high nickel alloys is incorporated in a new illustrated booklet which has just been published by *The International Nickel Company*.

In a sixteen-page, pocket size edition, this new publication, “*Seven Minutes With Seven Metals*,” includes material on Nickel, Monel, Inconel, and associated alloys in both mill and clad forms. Space is also devoted to the properties and uses of the metals in cast form. Altogether, there are three pages devoted to detailed tables on mechanical, chemical, and physical characteristics.

While prepared under technical supervision, the guide was edited for both technical and non-technical readers. It is being distributed without charge by *The International Nickel Company*, 67 Wall Street, New York. Free. (RADIO NEWS, No. 7-108.)

CONTINUING the usual service to RADIO NEWS readers. Each month we have printed short reviews of the leading manufacturers' literature. Under each review will appear a reference number (for instance, the *Meck Cat-*
(Continued on page 53)

Video Reporter

(Continued from page 29)

(3) CBS may make a television tie-up with a major film studio for first video rights to its features, and (4) CBS, generally, is taking a firm opportunistic stand that it is saving a lot of money by not being active in television at the present time and that it can hop aboard the bandwagon on short notice when it comes along.

The CBS video station, W2XAX, has been sending out test patterns and signals for a considerable time. If it presented programs—even of an elementary experimental variety—it would give television a considerable merchandising boost. But, apparently, CBS isn't too eager to enter the field to boost other firm's wares even though it means building a big potential audience for itself. However, with the DuMont station under construction (across the street from New York CBS headquarters), it is likely that CBS will shift into high gear and beat it to the air with regularly scheduled programs.

SPEAKING of CBS television plans brings to mind an amusing incident we witnessed at the network's headquarters building some time back.

An engineer was adjusting a receiver to pick up a transmission of W2XAX's test pattern. The engineer had a bit of difficulty tuning the set to the Chrysler Building transmitter's channel and finally gave a sigh of relief as a sharp image appeared on the receiver screen.

"How's that?" he proudly asked.

"Great!" exclaimed an assistant, "but if you look close, you'll see that it's the NBC test pattern!"

THERE was some pretty fancy name-calling, definitely not of the microphone variety, that went on in New York trade circles when the FCC put a crimp in the television merchandising plans that were launched on a big scale in March.

Feelings were quite bitter and, if anything, they pointed to a future highly-competitive status in the television industry with little chance for the formation of a television monopoly or trust. All of which indicates that the early look-and-listening audience should benefit by low prices for receivers and choicer programs.

HOLLYWOODIANS are agog over the possibilities of coin-in-the-slot sound movies for bars, restaurants and other semi-public spots. The demand for such sight-and-sound entertainment brings to mind the field that exists for coin-in-the-slot television receivers, and it is reported that some firms are already considering such models.

Already, several New York stores, restaurants and theater lobbies have proved that television reception can draw crowds and there is every indication that coin-in-the-slot video entertainment should prove profitable when there are enough program hours on the air to make the venture practical.

RESTRICTIONS placed on feature films by major movie producers have caused NBC to rely on the smaller producers for many of the talkies included in the television schedule of W2XBS. The caliber of television films has gone from bad to worse. Occasionally, excellent foreign language films are utilized, but they haven't as wide an audience appeal as the less artistic celluloid entertainments in English.

As television audiences grow, there is bound to be a big public demand for improved film offerings. The Hollywood movie makers will then learn that some ground will have to be yielded to scientific progress. Of course, the movie makers should have a share in television profits if they provide a share of video program material. But their attitude in the early television days indicates that they would rather cater to the demands of exhibitors who don't want to see a home entertainment medium which may yet prove competitive get such an important break. But they may as well make up—or wake up—their minds to the fact that the

television industry will get film features if they have to make them themselves! As a matter of fact some early experiments along these lines are already under way in New York.

SOME of the early television receiver kits that hit the market during the past two years are being sold at bargain prices. The home-construction television market was curtailed by two things—the drastically reduced prices of complete receivers and the increased demand for large-image sets: the early kits were designed for 5-inch cathode-ray tubes.

WHILE bigger and bigger images on home receivers are constantly made available, there are indications that this year will see the 9-inch image in big demand. The deciding selling point is obviously the lower original cost as well as the less costly replacement charge.

IT'S interesting to note the appointment of Gerald Cock, former British Broad-

casting Corporation television director, as American representative for the BBC with headquarters in New York. Suspension of television programs in London made him available for the new assignment. Also, his being in New York will give him the opportunity to keep abreast of television progress in the city that has undoubtedly assumed claim to the title of World's Television Capital.

IN the campaign to "Save the Metropolitan Opera," NBC recently presented an operatic hour featuring "Met" stars over television station W2XBS. *The Video Reporter* looked in on the telecast to find that while it was meritorious musically, the dramatic action was quite hammy and was, in effect, reminiscent of the old movie days when actors made wild gestures to denote their emotions. Opera-goers may be used to this, but the majority of potential television look-and-listeners would anticipate a performance as acceptable to the eye as it is to the ear.

-30-

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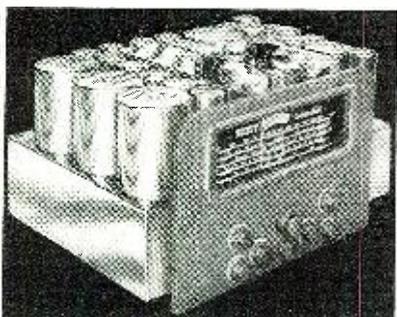


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Within Earshot
(Continued from page 4)

nals without the BC set owner being forced to "do" anything other than to twist a dial or knob. It seems that this should be possible since the "heart" of the FM set is the limiter and discriminator tubes neither or which, we are told will "pass" amplitude modulated signals.

A curb-stone opinion would have it, that one could detect the AM signals in the usual manner, and then re-transmit them *within the receiver itself as FM signals*. Since FM signals are already in that form nothing would have to be "done" to these, and the receiver would handle both types of signals. The selectivity of the AM part of the receiver could be relaxed whenever the band-switch knob would be set over to the FM bands. It's just an idea, but it might work.

* * *

WE rarely comment on our contemporaries, but when one of them makes a statement that can be successfully contradicted, we feel that we should let our readers in on the know. So here it is. An East Coast magazine stated when W9CHD was asked by W2MSC over the ham waves, whether she (W9CHD) would marry him (W2MSC), that she is said to have sent the following code: "*dah dah dah diddahdit.*" We know Lenore well enough to be certain that she has learned her code and would never send "OR" for "OK." How about that? Oh well, we all make the boners sometimes,—even now and then!

* * *

ALL around us we hear talk of the local hams having recently QSO'd the German stations which are reported back on the air. We can appreciate that there is still the thrill of working a "furriner." But wouldn't it be better for those of us who get that urge, to hold it down and refrain from the QSO. The U.S. hams still are on the air. They are that because the great majority of them take our *Neutrality Code* seriously and are seeing to it that they do nothing that might, by any stretch of the imagination, be termed a violation of that neutrality. Why spoil it for them? Remember that the hobby of 55,000 amateurs depends on how *you* run your station. Stay away from the belligerents!

* * *

IN this issue we break some new features. Before mentioning them, perhaps we ought to take time off to welcome some of our old authors back to these pages. Periodically we conduct tests to determine just what the readers like to see in *their RN*. Tops on the list are the returning departments of Mr. John Rider, Mr. Samuel Milbourne and Mr. Samuel Kaufman. The vote of confidence given them was overwhelming; and we are always happy to please our readers by putting out the type of magazine they desire.

The new departments should prove

popular. They are the "Cuttings," "Serviceman's Legal Advice" and "The Money Page."

"Cuttings" is written by an outstanding authority in the field who prefers to remain anonymous to give him greater freedom of the pen. It will concern itself with the recording and associated fields. Each month a commercial recorder will be discussed, and at the same time valuable information on the making of discs will be given. Since the recording field is "red-hot," right now, this department will serve as an information fount on the subject. For the latest dope on audio amplifier-recording, watch "Cuttings."

"Serviceman's Legal Advice" is a department devoted to the dissemination of legal advice which would come in handy in the running of the business. Nothing in the way of personal advice and mail-order law will be attempted. But problems confronting the average radio and serviceman will be set forth and explained. The column is written by an attorney who has had dual experience in radio and law. Your questions will be welcome, and where they are of interest to the majority, they will be answered in the column. In short, this department will be a very sketchy course in business law for the serviceman, and as such should be welcome.

"The Money Page" is something never before tried in any publication, to our knowledge. This month we present the names and addresses of over 100 bands. All of these use P.A. Systems and should be live prospects for the serviceman to solicit.

In future issues we will give other ideas which can readily be turned into money by the serviceman. For actual value, dollar for dollar to you, do not fail to read the "Money Page" every month. Incidentally, this month there is a small contest in regard to this department. Write in your opinions and compete for the prize. That's one way of making some money.

* * *

WE are in receipt of numerous letters complaining that Lee Ward's "Test-it" problem was incorrectly solved by the author, and that the figures given in the April issue of RN could not be right if the answer given in the June issue is correct. Specifically, these persons say that in figuring out the condenser values in the box, Lee forgot to take the 1,000 ohm resistor within the box into consideration. Our "complainers" say that they have cross-checked the author's solution with the values given with the April issue and that they do not jibe.

Of course, they won't jibe. If you work the problem backwards knowing and substituting the values of the condensers and the resistor, the ac milli-ampere check will be different. That is because you then use these known condenser values. Mathematically, if the problem was worked from the April figures you got condenser values of

1.234— and 2.345—microfarads (these are not the exact figures) for the two condensers. As Lee explains this month, there is no such thing as a 1.234 and a 2.345 microfarad condenser, and a good serviceman would use a 1 and a 2 mfd. condenser respectively. That is correct.

But, if you substitute a 1 and a 2 microfarad condenser for the exact 1.234 and the 2.345 microfarad condensers, naturally the a.c. mils. figure of April will not check. In addition to this Lee considered the condenser tolerances to be within 20%, the resistor tolerances at 20% and the meter accuracy within 2% — all sound practical figures. Mathematically these tolerances are discarded for *perfect* conditions — which *never* exist. What happened practically, was that the 1,000 ohm resistor within the box could have been disregarded for all intents and purposes when figuring the values of the condensers. Remember that Lee's problems are all *practical* and not necessarily mathematical.

* * *

AND that about winds up another column. Gosh, what with the Trade Show coming on in two weeks from this writing, and new sets and parts to be announced, we sure will be busy. You can expect a review of the outstanding parts and sets shown at the Trade Show to be reviewed next month. Don't miss it.

In the meantime take advantage of the swell weather we're having . . . and the *Peace*. KAK

-30-

"Diplomatic" Revised (Continued from page 11)

actually touch any part of the stepper. The crystals are arranged in proper order as to frequency, beginning with those used for 28 mc. operation.

Two alternates are available to the operator, either to tune the oscillator tank to 14 mc. and to double to 28 mc. in the HY69, or to tune the oscillator to 28 mc. with 10 meter crystals and operate the amplifier straight-through. The former is used in the model described. The 28 mc. coil is rewound to the same specifications as that of the 14 mc. coil and is done easily.

Note the isolantite padder mounted within the baffle box. This connects between the crystals and ground and is set for optimum output for the 7 mc. crystals. Once adjusted for this frequency, it will be satisfactory for all bands without further re-tuning. Other items located within the baffle include the oscillator tank condensers which may be seen mounted with ceramic button insulators. It was necessary to insulate these on account of the circuit selected for the crystal oscillator.

The 6A4 tube placement is not critical but should be as close to the assembly as convenient. Inasmuch as this tube draws less filament current than does the HY69, a shunt resistor must be placed across the terminals to bring the drain to the same value as the HY69. These are connected in se-

ries as shown across the twelve volt supply. In order to eliminate any coupling for r.f., a suitable by-pass condenser is placed at the junction of the two filaments.

We may install the *Eicor* genemotor in any convenient position as long as it operates with the shaft running at right angles to the length of the car, when installed. This prevents the sudden lurching of the car from jamming the shaft back and forth and makes for an easier running motor. The unit is mounted on four live rubber grommets to take up the shock. Final adjustments of the bolts holding the motor can best be made while the motor is running. A small amount of slack should be left in the leads to the motor to prevent them from breaking off.

The HY 69 modulators may be seen next to the genemotor. Leads must be passed from the plate caps through the chassis. These must be insulated to withstand the plate voltage plus the audio peaks. The modulation transformer is placed next to the stepper assembly where short leads are made to the modulator tubes.

The remainder of the top chassis components all belong to the r.f. amplifier section. The HY69 amplifier tube is carefully shielded to guard against any coupling to the grid circuit. No indication of self-oscillation is present in this transmitter. The two 100 mmf. double-spaced *Bud* condensers are mounted on a piece of metal baffle and placed in the position shown. These tune the two lowest



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frequency tanks where three or four inch leads will not cause any loss. The plate lead to the HY69 is made by a length of No. 14 tinned wire which has been insulated with *Amphenol* polystyrene beads. These make a lo-loss, non-shorting connection.

Under-Chassis Layout

Any effort to get maximum performance from a mobile transmitter is useless if the parts are installed in a hit-or-miss fashion. Every item must be tied down securely so that vibration will not cause any part to be-

come loose. Use heavy gauge wire for all connecting leads and apply plenty of heat to all joints when soldering. It is of particular importance to use heavy connecting leads in the battery circuit to the genemotor. A drop of one volt may drop the output plate by as much as 50 volts.

One control relay serves to apply both filament and plate supply potentials at the same time. Heavy contacts must be used for both sections. Note that the output of the motor generator connects thru one set of contacts. This is required to remove the plate voltage from the tubes at the same instant that the filaments are turned off. If the above precaution were not taken, the tubes would receive plate voltage while the filaments were off due to the momentum of the motor. The relay is made by *Guardian Elect.* and has a 12v. coil (50 ohms).

The filter condenser for the high voltage has a rating of 1000v. and is of the oil-filled kind used in transmitter supplies. The capacity value may be of 2 mf. or more. The 12-volt input to the motor requires a bit of filtering. This is accomplished by winding an A choke of No. 12 enameled wire on a 3/8" bobbin in several layers so that a total of approximately 8' is used. Two No. 12 wires are placed side-by-side, held in a vise, and wound together. This will prevent any voltage drop to the motor. Further filtering is had by the inclusion of the small-capacity oil-filled condensers as indicated on the diagram.

A single filter choke is required and this must be of low resistance for best efficiency. Its inductance may be of any value from 10 to 30 hys. with a current capacity of 200 ma. or more.

A 15 lug socket is installed at one end of the chassis. All connections to the control unit terminate to this socket. Care must be taken when soldering to prevent shorts as the contacts are rather close together. The leads to the *Dialomatic* stepper should be installed first as these can lie flat under the chassis where they will be out of the way.

All of the *Ohmite* vitreous resistors

are mounted on their brackets as shown. These may be soldered to the chassis or held by bolts and hex nuts. The use of several units will permit more accurate settings of the taps. Furthermore they will distribute the heat over a greater surface and thereby increase the life of all resistors besides simplifying the setting of correct operating potentials.

Examination of the illustration will show where cutouts have been made to allow access to the coil assemblies. A piece of aluminum is cut to serve as a baffle shield between the oscillator and amplifier stages. This measures 3" x 9" and is held in place with two spade bolts at the chassis and the top edge inserted into slots that are cut in the flange of the chassis. The coupling condenser is mounted directly on the oscillator plate lead with the stator plates soldered to a lug on a ceramic button insulator. One of the high-frequency plate tank condensers is also mounted on the baffle. This does not need to be insulated from the metal as is done on all of the oscillator condensers. A space is left around each end of the baffle so that the leads may be passed around the ends where they will be out of the way.

A small amount of alteration is required on the two variable condensers. The shafts are cut off close to the bushings and slots are cut out across the ends so that adjustments can be made with a screw driver. The rotor plates on the two condensers may intermesh each other as they are at ground potential. This saves space for other parts.

The antenna loading coil, in use when the photo was taken, is mounted as close to the center of the coil assembly as possible. Details of this coil will be given later. Taps are made every five turns by pulling out the wire slightly so that they may be exposed for easy soldering. The antenna loading method selected differs slightly from the one shown on the complete schematic diagram. This is shown in a separate illustration.

Individual ceramic padder condensers connect to the center taps of all tank coils. These are adjusted when the transmitter is installed in the car for minimum plate current dip of 90 ma. This is proper loading for the HY69 amplifier tube. Although this method leaves much to be desired for efficient loading of a short antenna, it is the simplest method practical without going into separate pi-networks which would require added tank condensers and more space. These may be added if the constructor has room to spare.

The Control Unit

Although each particular automobile will require a different layout of controls, a word about their purpose is needed. First we must find a suitable location for the dial and switch assembly. Most cars have auto-radio plates in the center section of the dash. These may be removed in most cars. The parts can be mounted directly

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onto the plates or a separate piece of metal can be substituted.

The telephone handset may also be mounted in any handy spot where it will be within easy reach of the operator. A satisfactory mounting may be made from two spring broom holders supported on a wood block. This prevents the handset from jumping out of the holder. A four-prong plug is mounted on the control assembly for mike and phone connections. This type handset is manufactured for police communications by *Western Electric* and includes a push-button switch commonly referred to as a "push-to-talk". Sufficient gain may be had by using a special high-ratio mike-to-grid transformer that has a step-up ratio of 1-40. This is sufficient to furnish the required voltage at the push-pull HY69 grids. If a double button microphone is used, another stage will be needed for sufficient gain.

The modulators operate with 400 volts on the plates and 250 volts on the screens. Classification is A1 operation. The modulation transformer is provided with two secondary taps so that some leeway will be allowed for accurate match to the class C load. Audio power is about 32 watts maximum, which is more than ample to completely modulate the R.F. input to the final.

Tuning Adjustments

All plate and screen potentials should be set at the resistor taps before making any installation. It is far better to hook up the complete assembly on a bench for all initial adjustments as this will save much time and effort when the equipment is mounted in the car. The first thing to get going is the *Dialomatic* stepper. The four-gang selector switch is set at proper position by tightening the set screw. Be sure that the stepper stops at the proper positions on the switch.

All of the oscillator tank condensers are tuned next. If more than one crystal per band is used, tune the oscillator tank so that maximum output is had with either one or the other in circuit. After all tanks are tuned properly we may proceed to the amplifier stage and set the tank condensers in the same manner.

These will be slightly off resonance when the antenna is connected but compensation cannot be made until the unit is in the car. A heavy flexible ground connection is made to the car chassis from the transmitter chassis. A small amount of slack is left in this so that no breakage can take place. The chassis should be placed on a line with the car and not crosswise as was explained in earlier paragraphs.

The two 6v. storage batteries are clamped securely in some sort of a cradle so that they will not tip over or move around. We use a *Stancor* dry-disc charger which is permanently mounted in the trunk compartment. The line is plugged in when we put the car in the garage at night so that

a full charge is always available for service. Once again we rely on heavy leads between the batteries and the chassis. The connecting plug and socket are polarized so that proper polarity is had to the transmitter.

Final adjustments are made with the taps on the bleeder resistors to get the following: Oscillator plate-400v., Osc. Screen-250v., Amplifier grid-25v., Amplifier Plate-575v., Amp. Screen-300v., Modulator plates-400v., Modulator Screens-250v. Grid current to the amplifier should be 4 ma. At the above potentials, and with proper loading the transmitter will run at approximately 100 plate mills. This gives us an R.F. input of better than 60 watts after the screen current is

added. This is considerable power for a mobile transmitter and is capable of far more consistent performance than rigs of the usual 10 watt class. Some loss in efficiency is noticeable on the lower frequencies due to the use of such a short antenna and this is largely offset by the amount of power used.

A standard police antenna is used—*Ward De Luxe*—having an extended length of 126". This is equipped with special supporting rods to give added support to the antenna. The transmission is best on a line from the antenna through the car. This may be observed by measurements with a field-strength meter. Reception is also best from the same antenna if used for both transmit and receive. We use

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Receiving Equipment

The problem of selecting a suitable receiver is not an easy one. First we must decide on something that will cover all bands that are used at the transmitter, plus the broadcast band for QRR information. We must also take measurements of the available space within the car for its installation. Most cars have a fairly large glove compartment and this is the ideal spot for the set as it may be kept locked when out of service.

A Howard 438 receiver with a 610 power supply is used in the two installations now in service by W9ETI and W9QEA. These sets are unusually compact and fit easily into the glove compartments of a '38 Chevy and a '39 Pontiac. We must have crystal filter if we are to gain full benefit from our installation and this is included. A Dickert noise-silencer was later installed and proved to be very worth-while for operation on the 28 mc. band.

The vibrator supply mounts on the motor side of the firewall so that some shielding may be afforded between the two units. This will help to reduce any hash that might be set up between the equipment.

May we again point out that amateur mobile operation is permitted only on the bands from 28 mc. and higher. When operation is to be conducted on the lower frequencies the car *must be at rest*. We then operate as a *portable* rig and proper entry must be made in the log book. Further—some cities and towns do not permit reception of police transmissions in an automobile. The operator should first determine from his local police whether this may be included on his receiver before making any installation to be on the safe side.

—30—

Cut Loose From Chaos

(Continued from page 38)

and the grounded side of the line. Radio-frequency impulses in the latter now find relief through the chassis and the receiver ground, but the "hot" side is entirely unguarded, even *encouraged* to act as an antenna feeding through the primary of the power transformer.

Sometimes you will find two condensers in series connected across the line, with center tap grounded to chassis. This is a much better arrangement, as it shorts radio-frequency currents out of the power transformer, and relieves r.f. shocks when the line is acting as a two-wire antenna. However, the center connection—the "drain"—had better lead direct to ground and not through the chassis. While a separate ground wire is to be preferred, it can run to the receiver ground wire below the chassis provided there is no impedance of any kind between this junction and the earth.

Before illustrating how the power line becomes the major part of the antenna circuit, let us consider the electrical properties of a grounded anten-

na. Current (motion) is greatest at the point where the wire enters the earth. Voltage (pressure) is greatest at the free end. Imagine the antenna as a pipe with one end sealed and the other entering a huge tank. Some outside force gives upward motion to the enclosed air. Current will be strongest at the tank connection, gradually diminishing toward the end of the pipe, due to compression; and at the extreme end all motion ceases, while pressure is maximum. In the reverse direction, air can leave the end only as long as the air lower down gets out of the way, and then *vacuum* hinders the start. This half-cycle is a little more difficult to visualize, but here again motion is greatest at the "ground" and voltage greatest at the free end; only, this time it is vacuum instead of pressure. Electrically, a pressure change is called negative, and a "vacuum" is called a positive charge, both being expressed in volts.

Now, an electric current projects electro-magnetic lines of force, which, sweeping through an adjacent circuit *in inductive relation*, induces a current in the latter. Electromagnetic coupling can be controlled by "tuning" the two circuits to accommodate current of the desired frequency only, or it can be prevented by simply placing wires or coils of one circuit at right angles to those of the other. For these reasons, "current feed" is highly desirable in a radio receiver.

Electric charges send out electrostatic lines of force. These have no direction, except outward from a negative charge and inward toward a positive charge. They automatically swing toward any nearby metal, pushing or pulling its electrons and producing displacement charges on the affected object. If the charge is rapidly alternating—positive-negative—energy is fed through the mutual capacity, setting up similar oscillations in any circuit connected to the metal. Electrostatic lines of force, especially at high frequency, ignore tuning, leaping from the side of one coil to the side of another with the care-free abandon of a bolt of lightning. Given sufficient intensity, electrostatic lines of force by simple displacement can reach through a secondary circuit tuned to some other frequency and operate the control grid, itself an electrostatic device.

The simplest way of avoiding these evils is to "cut in on the current" wherever possible. It being impracticable to set the receiver right on the ground, do the next best thing by keeping the ground wire as short as possible. A long ground wire means that you have connected your receiver up toward the middle of the antenna, where current is lower and voltage higher. (In a short-wave antenna, underground and horizontal, oscillations are from end to end, and current is strongest at the middle.)

Speaking of the ground wire, we must include in its length the entire metal connection, from the receiver

chassis to earth. Thus, a five-foot wire clamped near the top of a 10-foot pipe makes a total length of 15 feet in the ground connector. Wherever possible, the ground wire—a No. 14 insulated copper wire—should run all the way down and fasten to the pipe just above the earth or floor of basement. Use insulated wire, as a bare wire rubbing against a grounded pipe or any metal object possessing considerable capacity, will produce rasping noises in a sensitive receiver. It is a good idea to use shielded wire, as the zone of interference known as "man-made static" is most intense near the earth. Ground the lower end of the shielding, but do not let it touch metal anywhere else.

Gas or steam pipes do not make good grounds, owing to corroded, greased, or intentionally insulated joints. Water pipes are much better, ordinary tap water being somewhat conductive. Still, it is best not to depend upon the pipe as a ground lead, but only as a contact with earth, for which purpose it is better than any you could drive in or bury.

A ground clamp of the boring screw type should not be used on lead pipe—it may damage the pipe. Sandpaper a length of four inches just above the basement floor, or earth. Wrap tightly with clean, soft copper wire and bring out a two-inch twist. Solder the ground wire to this twist. Cover the copper winding with tinfoil and wrap with friction tape. The result is a joint that will stay clean for years.

Figure 3 illustrates actual conditions at the average line-powered receiver. True proportions are impossible in the limits of a diagram, but the relative insignificance of antenna A and excessive length of the ground wire are emphasized. Regrettably but oft unavoidable. The power line is represented as an antenna grounded at the far end, connected to the chassis through "buffer" condenser C, on the high voltage end. Connection to earth through the chassis and its ground, somewhat relieves the high r.f. voltages that otherwise would develop—i.e., a larger capacity develops less back pressure for a given movement of electrons. A shorter ground wire would help, but in any case those voltages will be higher in the chassis and its attached circuits than at the earth. A chassis at "high r.f. potential" causes instability, "body capacity" effects, and electrostatic cross-coupling.

Antenna A exerts a "push and pull" that coaxes a large part of the line pickup to oscillate through antenna coil P, coupled to a tuned grid circuit (S, Fig. 1). The line, perhaps miles long, and grounded directly and indirectly at various points, fairly sizzles with a hundred different radio frequencies from far and near, including "man-made static" fed in from house wires. Removing the receiver ground may even result in stronger signals, as more current passes through primary P to condense in the antenna at

A. More often, the ground wire seems to make no difference, on or off.

Complete isolation of the receiver from the line may be impossible, yet so far attainable as to remove serious interference with a good antenna circuit. To a poor antenna circuit, isolation may even be detrimental. Amid so many variable factors, trial alone will determine whether the change is a benefit in any particular location.

First, the "buffer" condenser (C, Fig. 1) should be unsoldered from its chassis connection and joined to the other wire—or the condenser may be removed. The chief purpose is to disconnect both sides of the line from the chassis. Outside the chassis, but preferably close to it, insert a radio-frequency choke (X in Fig. 4) in each wire. These chokes are rather expensive and bulky, as they must safely carry the full power current—about one ampere per 100 watts. They are not absolutely necessary, but of very material aid. Connect two 600-volt, .1 mfd. (one-tenth microfarad) r.f. condensers in series across the line and ground the center tap. (See Fig. 4.) This ground lead may connect with the receiver ground wire two feet or so below the chassis, provided there is no appreciable impedance from there on down. The complete filter can be made up as a plug-in unit if cutting the power cord is objectionable. All slack in the cord should then be bunched up and held

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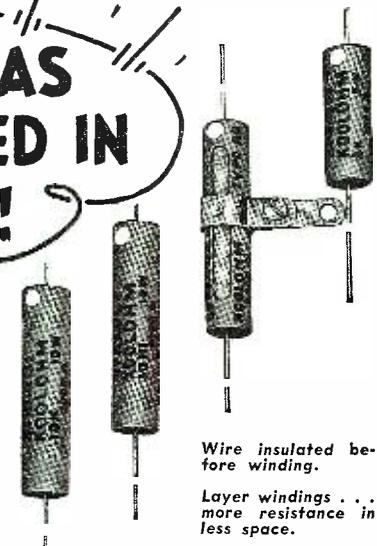
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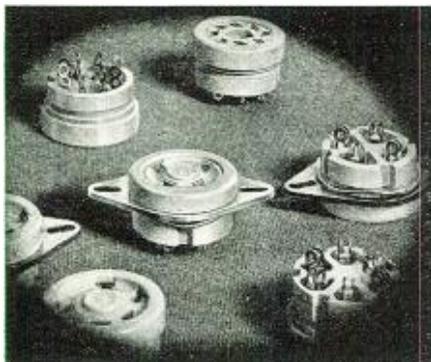
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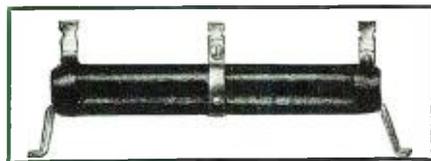
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with a rubber band. Filters of this type can be purchased at \$2.35 to \$4.41.

No attempt should be made to disconnect the line in an a.c.-d.c. receiver, as in these sets one side of the line is necessarily connected to all cathodes, to supply "B" negative.

An electrostatic shield in the power transformer is a good thing—if you have it. This consists of a thin copper tube separating primary and secondary, and grounded through the chassis. A lengthwise cut prevents heavy secondary currents being induced in the shield. Electrostatic lines of force cannot be insulated nor stopped, but they can be diverted. Disregarding the advice given by a certain billionaire, to "do things the hard way," foolish Nature invariably seeks the easiest path.

Now the antenna circuit can be tuned. The usual method is a large variable condenser, .0005 or .001, in the ground lead next to the chassis. A loading coil (L, Fig. 4) will be needed, of sufficient inductance to make the circuit accommodate the longest waves in the broadcast band when coil and condenser are "all in." It should be tapped, as indicated, since the variable condenser's capacity range is made very small by the antenna capacity with which it is in series. With a variometer (variable inductance) in place of the condenser, a loading coil probably would not be necessary. In fact, the first requirement then would be that the antenna plus variometer minimum, should not possess too much inductance for the shortest wave in the broadcast band.

Failure to tune, indicates resistance in the antenna choke generally found in modern single-control receivers, its purpose being to equalize coupling by helping the longer waves and restraining the shorter. (Normal coupling favors the higher frequencies.) A separate r.f. transformer is the solution, its primary in the antenna circuit and its secondary connected to the antenna and ground posts of the receiver. See Fig. 5. Feeding into a high impedance (choke), the transformer must have a step-up ratio that really is a compromise unless the secondary is made adjustable. In deference to the real short waves, the primary or antenna coil should not exceed 10 turns, spread slightly to discourage skipping at high frequencies. The secondary may have about 50 turns of Double Cotton Covered, about No. 26 or 28, wound close, on a one-inch tube of bakelite or waxed pasteboard. The r.f. transformer, variable condenser and loading coil can be boxed in one compact unit, to be set on top of the receiver or on the floor within three feet of the ground and antenna binding posts. Loosely twist the leads that run to these posts.

Any real old-timer will agree that "a good tuned antenna circuit is equal to one stage of radio-frequency amplification." Also, it is much less receptive to interference than an untuned antenna circuit.

-30-

For Immediate Release

(Continued from page 17)

of the frequencies from 41 to 44 megacycles to frequency modulation. While many large rural sections cannot now be served by FM broadcasting, Mr. Sheppard stated that the frequency modulation system would not be revolutionary but gradual and take probably ten years to supplant amplitude broadcasting, avoiding obsolescence and public loss therefrom. Many witnesses for the FM Broadcasters organization, presented by Philip G. Loucks, attorney, told of experiments and field tests, including those of the General Electric Company at Schenectady and Albany. That frequency modulation had been developed so that it is acceptable for a regular service to the public was stated by John V. L. Hogan of New York, Stuart A. Bailey of Washington, and other consulting engineers.

AMATEURS in a certain New Jersey city complained that local authorities charge for the privilege of "ham" operations in that locality. The Commission, which itself exacts no fee for licensing amateurs or other radio operators or stations of any kind, is inquiring as a matter of information but, of course, cannot interfere in such local matters.

EVERY so often the Commission has to point out that small radio frequency devices used as transmitters to distribute programs within buildings are capable of radiating considerable power and consequently can cause interference to radio communication in the immediate vicinity. The Commission has established regulations which permit the operation, without license, of low-powered radio frequency devices for remote control receivers, for connecting record players with receivers, and for similar applications so long as the field radiated does not exceed a predetermined value and no interference results.

-30-

Serviceman's Experiences

(Continued from page 12)

seen him before—called him by name.

"Scrooge & Marley's, I believe," Jessup said, pleased by my partner's recognition. "Have I the pleasure of addressing Mr. Scrooge, or Mr. Marley?"

There were some loose tubes on the counter; I moved them as a precautionary measure. Sure enough, Jessup threw one leg over the corner.

"I," Al replied, imitating Jonathan's phoney phonetics, "am Mr. Scrooge."

"Have a cigarette," Jessup said, glancing at me significantly, "—or are you in a hurry, too?"

"Not at all," Al said, throwing his leg companionably over the other corner of the counter. "By the way—how's Jenkins making out?"

"Very nicely, thanks," Jessup re-

plied. "Here—give this set what it needs. As Emerson said: 'A gentleman makes no noise.' This portable may be gentlemanly, but in its present state, it's not very entertaining!"

"I get it," Al laughed. "Want me to call you after I figure the price?"

"Don't bother," J. J. answered from the door, "unless the repair costs more than the set. *Adios!*"

I turned to Al. "Not bad handling," I was forced to admit. "But how'd you know he was Jessup—and who is this Jenkins?"

"I go to the movies," Al replied, "So I knew he was a character actor. He played the part of a Mr. Jenkins in his last picture. Part of my background to keep posted."

"What about that double talk?" I persisted, swallowing my pride. "What was this 'Scrooge and Marley' business?"

"An old partnership," Al replied, "that you'd know about if you took time off from sleeping to read Dickens' *Christmas Carol*."

"That makes me Marley," I said, catching on. "Who was *he*?"

"Why don't you read your own books?" Al replied. "*Marley was the dead partner!*"

Sometimes even Al goes too far. . . .

Cuttings

(Continued from page 13)

recorded music or voice. When the record is played back there will not be enough difference in volume between the audio tones and the surface noise to offer any contrast and the reproduction will be lacking in detail as to a proper transcription of the original. Watch the volume indicator at all times when recording and keep the meter needle in the range on the scale as set forth by the manufacturer. Watch for excessive audio peaks, especially those of the lower register to avoid jumping the groove, have the performer avoid any sudden crescendos, and if these are required, have him turn slightly from the direction of the microphone. Too bad some manufacturer does not incorporate automatic volume control in an inexpensive portable recorder—the layman could be saved many a record that was spoiled from lack of proper microphone technique.

The Reader Asks

I have a portable recorder. When I cut my records I average about one failure in every three records due to the cutting needle jumping the groove, even on soft musical passages. What causes this condition?

ANSWER: The scrap material from the disc is entangling under the cutting needle as it records. This actually lifts the needle off of the record, leaving a small uncut spot. The remedy is to "lift" the cut material with a small paint brush and guide the scrap over to the center hub of the turntable so that it can wind around the hub and keep clear of the needle. —30—

Experimenter's Oscillator

(Continued from page 21)

turns of wire to a length of 2".

With a type 26 tube, using 250 volts d.c., the plate current was only 40 mils. and the grid current 1.5 mils. This input of 10 watts caused the plate to blush slightly, although one may prolong the life of the tube using 175 to 250 volts with a corresponding drop in r.f. output. On occasions, I have

put 400 volts a.c. on a type 45 tube to get a greater output. When a.c. is used on the plate, the r.f. radiation is modulated with the line frequency. This can be received with an audible detector consisting of a pair of phones connected across a crystal detector and two short lengths of stiff wire for r.f. pickup attached to both terminals of the crystal detector.

These oscillators produce a wavelength of about 3 meters, depending on the diameter of the coil and the inter-electrode capacity of the tube used. The frequency can be checked by tuning this in on a receiver and by zero-beating it with the signal from a signal generator such as used in radio servicing.

An old and equally reliable method is using Lecher wires. Two parallel bare wires about 2" apart and about 12 ft. long are strung taut, and one end is closely coupled to the oscillator by a single loop of wire. A bridge is made by soldering two short lengths of stiff wire to a dial light socket. With a 6.3 dial light in the socket, slide the bridge along the parallel wires. Several spots will be found where the bulb will light up. These spots will be a half wavelength apart. Divide the distance between two nodes by 39.37 inches, multiply by two, and you have the wavelength in meters. —30—

As I See It!

(Continued from page 8)

to school and it seems to us that it is a material improvement. This is not strange in view of the greater knowledge possessed concerning the psychology of teaching, also that times change and forms of education must change with the times.

What we have in mind is of the following order. Take the subject of condensers. The normal mode of instruction starts with the general construction of condensers, charge and discharge series and parallel connections, and variations in reactance with frequency. This is followed by the consideration of reactance in series and parallel resonant circuits. All of this is in order, but it seems to us that it is not enough. There should be much more; the type of information which would embrace first, all of the places where capacity exists and the various possible ways in which a condenser or capacity between two points may be created. Second, as many conceivable applications of capacity as can be thought of.

Concerning the first grouping, the emphasis placed upon the construction of a condenser in the preliminary stages of instruction, that of the capacity between two metal surfaces with solid or air dielectric, without sufficient elaboration upon the existence of capacity between ground and the various components and leads in a receiver, makes difficult the full realization of what phenomena may develop in a present-day receiver—the need for certain forms of lead dress—which is

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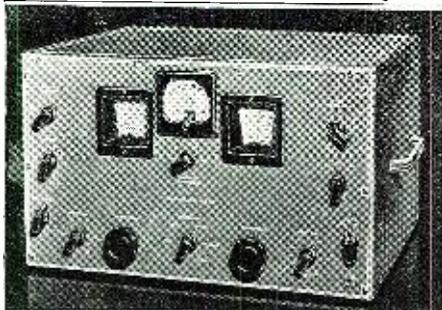
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extremely important in the many sets being sold today wherein a definite amount of regeneration is permitted to exist.

What with the trend towards higher frequencies in normal broadcast operation, f.m. work and television, various distributed capacities present in a receiving system are daily becoming of greater importance, because many of them are used to resonate components and also act as limiting agencies with respect to amplification. Granted that some of these items are discussed when tubes are introduced into the course of study and when amplifying systems are considered; but it seems to us that it is late in the text because by that time certain definite opinions have been formed as a result of what preceded and also because it is sort of sluffed off when discussed in amplifiers and receiver systems. There seems to be a need for more definite correlation between the theoretical and what actually exists and happens in the system where that theoretical item appears as a practical reality.

As to the second grouping, we have in mind first, the subject of bypassing. Now that we have both regeneration and degeneration definitely created in receiver and amplifier systems, the basic study of condensers must elaborate upon the significance of reactance as it relates to other components with which the condenser is employed with the particular idea of conveying the function of the device with respect to signal voltages existing in the circuit. It might seem strange in view of the frequent reference to bypassing action in servicing routine that many men who recognize the symptoms and can correct the defect are not cognizant of just what condition is created when the bypass condenser is omitted and when it is added to the circuit. Perhaps some might feel that since the symptoms are recognized and the corrective measures applied, it is not necessary to comprehend the basic function in the circuit. Such is not the case however, because design developments which call for the omission of such units so as to create certain desired effects, require for comprehension, knowledge concerning the action of the condenser in the circuit and the distribution of signal voltages in the circuit. Much more can be written about what we simply identify as a bypass condenser, but what has been said should suffice to illustrate the point.

The stress placed upon capacity reactance as it functions in a tuned circuit without further elaboration seems to impair understanding the actions which develop in an audio system where a condenser is used and is electrically associated with a resistor or with another condenser. Such combinations are what we call the blocking condenser and the grid leak, various tone control circuits, capacity voltage dividers, etc. True that response curves are shown to illustrate the action of various values of blocking capacity in resistance-capacity coupled

audio amplifiers, but as many can appreciate there is much more to the results developed in the circuit than just the change from one value of capacity to another. The question is "Why does the response drop or rise at certain frequencies? Why does the grid leak influence or limit audio amplification at certain frequencies? Why does a change in the switch position alter the general tone of the receiver output?" And many others!

As we see it, the man who studies radio should be prepared for these and many more applications of capacity when he first studies condensers. Too much, judging by results, seems to be taken for granted in service texts; namely that the basic details which, as we stated, seem too meagre to us, given at the outset of a course of study, will suffice to explain details later. Too much dependence is placed upon the power of interpretation by the student and since it is not generally cultivated, is absent when he needs it.

Incidentally we have had a similar situation prevailing concerning phase relations in a.c. circuits, as we mentioned some time ago in these pages. We have recently learned that one of the correspondence schools agreed with us and that very much greater stress is being placed upon the subject in a newly prepared text and we also heard that one of the resident radio schools is taking special pains to convey this subject to their servicemen students. Perhaps phase relations were not important in the audio amplifiers used in the past, but with television, frequency modulation, phase inversion, inverse feedback and other items already coming through the door, proper understanding of phase relation is being spoken about in many service quarters.

A similar situation exists about many radio subjects and while we have mentioned condensers and capacity only, like things can be said about inductance and vacuum tubes. Without attempting in anyway to compare service students with children who first enroll in grammar school, that is, on an age or intelligence basis, it is significant to note that whereas years ago virtually all schools taught the alphabet, many modern schools teach words by sight first and spelling later. Granted that there is no actual parallel, there is still room for much thought concerning the development of some parallel.

Perhaps it makes sense to visualize instruction wherein all of the items which come within the scope of any one electrical law are covered as a unit; or wherein all possible applications of a device are dealt with as a unit. . . . All of this to be preceded by a single general all-embracing picture of what constitutes a radio communication system. . . . What is to prevent the use of motion pictures for home study use so that a student can actually see instead of visualizing or imagining an action?

Mind you, all that has been said is not intended as criticism of existing

methods. We are looking into the future, with a little radio teaching experience in the distant past as a guide, and an analysis of present teaching methods helping towards coming to a conclusion. We recall, although it was years ago, that those lectures which covered the various radio subjects in the manner we have described were accepted as furnishing a much broader and more complete picture as well as cultivating the power of interpretation. We think that it made for better servicemen. -30-

Build the "Test-All"
(Continued from page 39)

and any direct ground will yield plenty of fireworks.

Percentage-modulation readings are taken by plugging a small pick-up coil into the jacks marked plus and minus (on diagram) and setting the instrument at such a distance from the final tank of the transmitter that the eye just closes on some desired voltage. Now if the transmitter is modulated by a steady note the eye will overlap and it will be necessary to re-set the dial to open it again.

For example, if the dial is set on 10 volts and the instrument adjusted to just close the eye, and then with modulation the scale reads 20 volts to bring it back to the closed position again the percentage modulation is 100%.—15 volts would be 50% and 17½ volts 75%, etc.

As can be seen, construction is very simple. Front view shows placing of pin jack, magic eye, dial and switch. Back view shows the single sheet chassis, method of mounting it on blocks and angle of 6E5 mounting, etc. Never use on external ground. -30-

Mfr's Literature
(Continued from page 42)

alog number this month is, RADIO NEWS No. 7-104). All you have to do is to fill out the coupon at the end of the page indicating by number the catalogs you wish to receive, and we will do the rest. There is no charge, unless the review says that there is, and then that is charged by the manufacturer, not us. Each coupon is good for the time limit stated thereon, and no guarantee is made by us that the manufacturer will send out catalogs.

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Ringing the Bell
(Continued from page 37)

viewpoint, the ideal situation would be for every tube manufacturer to make every tube type—an impossible and impractical situation because the combined yearly sales of, let us say, a WD11 type tube wouldn't be enough to wad a shotgun let alone necessitate every tube manufacturer making his share.

Thus, the next idea might be for all obsolete tube types to be made by one tube manufacturer. Aside from the natural rivalry and petty jealousies which exist between tube manufacturers (and any other group of competitive businesses) it would throw too much of an economic burden upon the one manufacturer as he would have a goodly hunk of his inventory tied up in slow-moving tubes while his competitors had the benefits of a streamlined inventory.

Well, what's the answer? Looking at it from both the tube manufacturer's viewpoint and that of the serviceman and dealer, I should venture the opinion that the original idea will still work with certain changes.

Tube types can be apportioned among tube manufacturers as originally planned. However, the tubes themselves should carry no individual manufacturer's name, merely the tube type, the replacement code and a copyrighted phrase such as "Approved for replacement by the Radio Manufacturers Association." The tubes can then be exchanged between tube manufacturers to be boxed with the name of each tube manufacturer. Or, all participating tube manufacturers' names can be placed on a "Standard Replacement" tube carton. The tubes can then be available to each tube manufacturer's jobber without any danger of "cross-ups". Any tube manufacturer can carry the same tube type in his own line and under his own name if he so desires, but the same tube would be available to all, the total business being so apportioned that a virtual "swap" condition would exist.

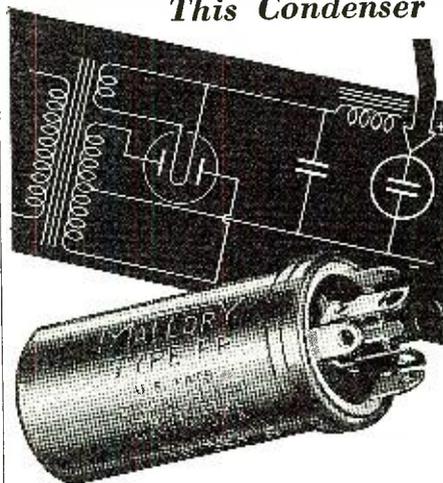
List prices on these tube types should be commensurate with the additional handling costs, but it is felt that the savings afforded by the system would far out-weigh these.

Then, when your customer walks in, you may have the tube on the shelf (for many servicemen and dealers would keep a more complete line if it were available from one source). If you don't have it, your worries are over in any case, because you can assure him that although the tube is a very slow seller, you can obtain it for him immediately from your jobber.

In this way you can save the business and "Ring the Bell" again. Talk this over among your servicemen friends and in your service group meetings. Let this department know your ideas; we welcome them.

-30-

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MONEY BACK GUARANTEE

Easy Antenna Control

(Continued from page 34)

needed. In fact, many modifications could be worked out to fit the individual need as might arise.

It is best to assemble the unit on a wood base for ease in placing the completed relay in any position that is most convenient. Of course, the relay may be placed inside the transmitter or in back of it, but as the completed unit is rather large in itself, the best plan is to use the wood base and to mount it on the ceiling (as we have it here) or on the wall near the transmitter. It may also be mounted in a weather-proof box outside if it is desired, depending upon one's location or taste.

When the size and type of mounting board has been determined the first thing to make is the extension arm. This is a piece of 1/2"x1/8"x7" brass, filed and drilled as shown on the diagram. These holes are drilled with a No. 28 drill to fit the insulating arm and solenoid armature screw holes. This arm is supported by three blocks of 3/8"x3/8"x1 1/4" brass held together by screwing them to the base. A slot is cut through the center of one of them to support the arm and to allow it to be pulled easily back and forth by the solenoid armature.

This slot is made by drilling holes as close together as possible in the block with a small sized drill. The excess material is then sawed and filed away. This support could also be made of sheet brass if desired. The insulating arm is a piece of 1/4"x1/2"x6" bakelite or some such insulating material drilled as shown on the diagram with a No. 28 drill and fastened with 6-32 machine screws to the extension arm.

On the underside of this is the running contact. This is a piece of 1/2"x1 1/2" spring brass bent so as to easily slide onto the contact mounted beneath. These contacts are made of 1/2"x1/8"x1 1/4" brass with holes drilled and countersunk for FH machine screws. They are mounted on the board so that the running contact will come to rest on either one of these depending upon the position of the extension arm.

On the end of the insulating arm are mounted the antenna contacts. These are cut from the switch arm of a d.p.d.t. knife switch (the old one you used to use to switch you antenna with—remember?) and rounded off to give them a neat appearance. The spring contacts of this same switch are used to make the self wiping contacts for the relay. These are mounted on the ends of the thru panel insulators. They should be adjusted slightly so that the movable contacts will slide in easily and stay there.

The adjustments are made by trial-and-error. The thru panel insulators are of the 1 1/4" size. These are mounted upon angles made from 16 gauge aluminum cut to the size shown and drilled with a 1/2" drill to allow the

insulator to pass through. Two of each should be made. The antenna is next attached to the moving arm contacts with flexible wire.

The entire unit is then wired as shown on the diagram. The wires are brought from the terminals under the board to the correct place.

The switch used is a telephone desk type switch, but any type of three position switch will do. If only antenna control is desired a single-pole-double-through toggle switch may be used to advantage. When the whole thing is completed, just hook on antenna, transmitter, and receiver leads and you're ready for the treat of your life with an fb outfit.

Ed. Note—

Reversal of the contact assembly is made possible by the weight and momentum of the armature which can extend out from either end of the coil. This will seek the source of concentrated field and is thus able to travel both ways.

-30-

Technical Review

(Continued from page 20)

America. Subsequently, the author introduced a portion of the text in his lectures on filter behavior to students at R. C. A. Institutes, Inc. These experiences have been of material benefit to him in revising and preparing the text for publication. In his opinion, a familiarity with the methods given here will greatly simplify the filter design problem—particularly, for the critical circuit applications such as occur in facsimile and television systems.

This text does not contain a comprehensive treatment of filter theory. It assumes that the reader has previously acquired a general knowledge of the subject equivalent to that offered in any standard undergraduate course in electrical engineering.

-30-

QRD? de Gy

(Continued from page 20)

CTU-Mardiv also continues to sign agreements, two of which were recently completed: the *Seminole SS Corp.*, a unit of the fleet operated by *C. D. Mallory & Co.*, and the *American South African Lines*. The former agreement begins with a \$135 per month wage on tankers and the latter scale starts at \$130 per month for freighters. They also became the bargaining agents for the *Socony Oil Co.*, *Cities Service Oil Co.*, and the *Isthmian SS Co.*

A HEAVY knitting of the brows of the Executive Board of the *CTU-Mardiv* was caused when an irate marine super circularized his fleet decrying the use of the radio xmtr by a radiopi in the transmission of an illogical msg. Investigation revealed that the radiopi was not involved, that the matter complained of was not sent via radio, but by blinkercode by flashlight and that the msg was sent by a member of the crew in a "playful" mood. It was a serious case inasmuch as the blinking msg was picked up by a warship which recorded and reported the msg. Just a case of two other guys in two other places.

BROTHER G. VAN ECKEN recently reported back to the USA after going thru the Allied and German U-boat blockade around Le Havre. He sez that he kept a

small suitcase packed with his important belongings "just in case." His greatest worry was that his ship might be torpedoed during the night and in foul weather. Rather naive, no?

MEMORIES during these trying times being what they are, we wonder whether the name of Hoyt Haddock, former President of the *ARTA*, is still retained in your ken. Enyho, Hoyt's now the Secretary of the *American Guild of Variety Artists*, an *A F of L* affiliate.

AND so we say au revoir (that's our movie influence) until next issue when we hope to be able to report better visibility on the European front. So with 73 . . . ge . . . GY. -30-

What's New In Radio

(Continued from page 29)

have been specially priced with this channel of distribution in mind.

The batteries are housed in attractive green and black cartons which match the packaging of other *National Union* products including tubes, condensers and panel lamps.

Complete price information and catalog pages are in the hands of *National Union* distributors and initial re-action from the trade indicates a wide acceptance for the new *National Union* battery line.

As a feature of the catalog page on *National Union* batteries a most complete replacement chart is provided listing portable radio models of all leading set manufacturers. Extensive research is being conducted by the *National Union Engineering Department* to assist in leading to standardization which will increase profit possibilities on batteries for the radio parts distributors and the radio service profession.

The *Victor Animatograph Corporation* of Davenport, Iowa, has just announced an amazing new unit in sound equipment that is used in connection with their 16 mm motion picture projector; as well as in the reproduction of recordings, or public address system, or radio transmission. These new amplifiers (Units "O" and "R") contain a new clarity of rich low tones and clear highs as well as perfect reproduction of speech and music from sound track, records, or "mike."

Heretofore, sound reproduction on highs has been sacrificed for the rich deep musical tones, and vice versa. Likewise, full range musical reproduction has been sacrificed at the expense of clear speech.

Now, for the first time in any sound system, *Victor Amplifiers* combine both the highs and the lows with a beauty of tone never before thought possible in any kind of equipment regardless of price. Another remarkable feature is that any choice of tone is easily made possible by the *Victor* system of controls. The amplifier, in addition, has been very beautifully redesigned as evidenced in the accompanying picture. Complete details and information can be secured from the *Victor Animatograph Corporation* at Davenport, Iowa.

The *Joseph H. Kraus Co.*, 123 Liberty St., New York, announce a new electric fountain, that is intended to furnish correct humidity in the room installed. Health authorities agree that the atmosphere in the average home, not equipped with air-conditioning, is much too dry for comfort or health. This results in a drying-up of the mucous membrane in the nasal passages and accounts for many head colds and sore throats. It also causes furniture and furnishings to dry out and crack.

The *Electric Fountain Humidifier* is the newest development of Science for safe-guarding the health of you and your family. Its constant operation will add much healthful moisture so vital to the air in your home. The fountain uses up as much as one pint of water in 24 hours, depending on the temperature and humidity of the room. In that sense it is an automatic air-conditioner and since the water is kept in constant circulation in the fountain, it cannot become stagnant. This is an important improvement over the make-shift pot and pan method sometimes used to compensate for the lack of moisture in dry rooms. The Fountain can also be used as a perfume or essence dispenser. Simply add a few drops of perfume or pine essence and in a moment your room is filled with the pleasant fragrance. Very helpful in dispelling stuffiness or stale smoke laden air. Ideal, too, for the sickroom.

Christened "Millivolt, The First," a plow contraption is the brain-child of the staff of engineers for station *KMBC* of *Kansas City*, who boast that it is the first invention of its kind. It was designed to lay antenna ground wires without destroying the appearance of the landscaping. It has been successfully used to lay the 150 copper wires, seven inches deep at three degree angles, for the ground contact for *KMBC's* new 544-foot Blaw-Knox radiator. By use of the sled-like contraption, the necessity of plowing furrows, laying the wires, and then covering them up, has been eliminated. -30-

Broadcast Superhet

(Continued from page 24)

employ the unit even if the code is not bad enough to be heard above desired signals, as the level of this interference may still be high enough to give you trouble sometime when you're fishing for DX, and it may increase one day to entirely insufferable proportions.

It will be found that for any given set of receiving conditions there will be an adjustment for the sensitivity control and one for the AVC control which will provide for an entirely satisfactory reception of a desired signal. It will likewise be found that for any given program there will be an adjustment of one or both of the response controls which will give that program every inch the life and character you'd expect of it were you seated in the broadcaster's studio and not before your radio. Use all four controls as much as you can so that you will know just what adjustments are necessary at any time to make the set do a top-notch job for you.

One last word of advice: Use a good, large-coned speaker. It needn't be an expensive one. But it should be selected with great care and it should be properly baffled. A flexible, wide-range, high fidelity receiver such as this one won't be worth its weight in sand if the reproducer won't convert into sound the wide band of AF frequencies which get so smoothly through the nine tuned circuits.

1. If permanent magnet type speaker is used, CH2 should be approximately 1000 ohm (800 to 1250) 120 ma. choke. If a choke of this resistance and current-carrying capacity rating cannot be secured, use one with as high a resistance as is available and tap down on the voltage divider for approximately 260 volts potential to the 6V6 output plates and screens. An additional 8 mfd. electrolytic should be connected at the tapping point.

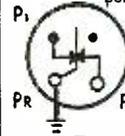
2. If 6L6s are to be substituted for the 6V6s in the output stage for output up to 15 watts *Class A*, increase CH2 to 2500 ohms resistance (50 ma.); connect the 6L6 plates (plates only, screens to remain tied to the output of the complete filter system) to the point of juncture between CH1 and CH2; change the output transformer to one providing proper match to the voice coil with 6L6s (*CLASS A*); and use a power transformer (TR3) which will supply approximately 400 volts at 200 ma. 400 volts less the total-receiver-current voltage drop across CH1 will appear at the beam plates, and beam screens should read 250 volts to ground. 6L6s may be used in this split filter circuit and with the original specified TR3 providing the beam plate voltage is no more than 350 and the beam screen voltage 250 and providing the output stage is not driven hard enough for anything other than strictly *Class A* operation. -30-

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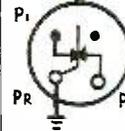
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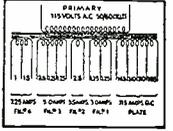
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RADIO PHYSICS COURSE

by Alfred A. Ghirardi

(Continued from June, 1940)

Oxide coated filaments: Very early work on vacuum tube filaments showed the value of coating the filament with certain oxides to greatly increase the electron emission at low operating temperatures. Tubes used in telephone work have employed oxide-coated filaments of platinum for many years. All of the latest tubes designed for radio receiving, employ either an oxide-coated metal filament or an oxide-coated cathode with a separate-heater filament operating at a dull red heat. The former construction is used in battery-operated tubes and power tubes. The latter type will be described later.

The *oxide-coated* filament is usually made with a very thin ribbon of metal which serves to conduct the current and heat the electron-emitting oxide. Often the ribbon is twisted on itself in such a way as to expose everywhere a sharply curved surface to make the oxide coating stick better. The reader should examine the filaments in some of the larger tubes such as the 245, 280 and 281 types. Several metals have been used for the filament wire or core. All early forms of oxide-coated filaments used a platinum or platinum-iridium filament core. The use of the large quantities of this valuable metal required for the millions of vacuum tubes manufactured, threatened to exhaust all available sources of supply and led to the search for cheaper substitutes. As a result, an alloy called Konel, several alloys of platinum, pure nickel, and alloys of nickel such as silico nickel, titanium nickel, chromium nickel, etc., are being used for filament wire by various tube manufacturers. Pure nickel, heretofore used extensively for filaments, is rapidly being abandoned in favor of these other metals on account of its chemical interaction with the carbonates used for the preliminary coating. The wire used must offer the necessary high electrical resistance, so as to be economical in operation. The best wires are those with a cold resistance several times that of nickel, and with the resistance rising rapidly as they warm up, so as to provide some measure of automatic current regulation. The wire must not stretch unduly when heated, to sag and "short" with the near-by grid. A high melting point is necessary, for the carbonates require about 750 deg. C. to provide the necessary emission.

A mixture of barium and strontium carbonates and a binder of nitrates, ordinary water glass, or alcoholic suspensions of barium and strontium oxides, is applied to the filament wire either by successive dippings and bakings in a continuous operation, or by spraying, as in the case of the independently heated cathodes, the applications being repeated until the coating material has been deposited. —30—

Aircraft Radio Checks

(Continued from page 17)

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For a minimum of 1 check per month, \$2.50 each; for a minimum of 2 checks per month, \$2.25 each; for a minimum of 4 checks per month, \$1.50 each; for a minimum of 8 checks per month, \$1.00 each. —30—

Bench Notes

(Continued from page 16)

men who were able to find these facts the easy way got extra credit.

Deduction runs as follows: The table indicated a thousand-ohm resistor between D-C. There were two condensers; customer said there were no more, and the current paths would have been impossible with fewer. They were obviously not electrolytics, and their working voltage was probably over 120. No inductance—the customer warned "no L." Impedance A-C was greater than B-C, so higher capacity was in "B" leg. Impedance A-B was greater than either A-C or B-C, indicating series condensers through A-B. Since impedance A-D was greater than A-C, and B-D greater than B-C, common connection was at C. Test voltage—commonest U. S. rating—was 120, which could be checked later by math.

Three mathematical steps were required to disclose condenser values: A-C and B-C are found by *Ohm's Law*. Capacity reactances through A-C and B-C by:

$$X_c \text{ equals } \sqrt{Z^2 \text{ minus } R^2}$$

Condenser values are shown by:

$$C \text{ equals } \frac{1}{2 \pi f X_c}$$

The four other current paths could be checked to confirm results, but were required only for proof—not solution—in order to employ the simplest method.

Many entrants did remarkably good jobs, as indicated by the multiple-tie winners, and most expressed pleasure from working true-life problems of this nature; but will the fellows who kidded me about my description of the large bypass can (*five-sided* box, sealed with pitch) tell me what they'd do if they were ushered into a theater box having *six* sides?

In figuring out the winners, it was natural that a system of scoring had

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to be set up. Rather than use a total number of possible points at the usual 100, the sum was only 7. Half points were given. Here is the system:

Deduction:	points
Arriving at circuit diagram and fact largest condenser was in "B" leg	(1)
Correctness:	
Mathematics and quantitative answers	(1)
Resistor wattage	(1)
Condenser type (paper, mica)	(1)
Voltage from knowledge of field, using math for confirming check	(1)
Presentation:	
Practical servicing comment, or any remarks which would be of value if made behind the counter of a radio store. (1)	
Conciseness, thoroughness, or any other feature which distinguishes one entry from others.	(1)
Total	7

Honorable Mentions

THE following contestants, while they won no prizes, submitted entries which, for one reason or another, were outstanding:

Carl E. Ellsworth, Louisville, Ky.; John Mednansky, Kadoka, S. D.; Fred C. Hall, Boston, Mass.; Jack Sheedy, Corozal, C. Z.; C. W. Nelson, Hayward, Calif.; Neill G. Carpenter (W5DEL) Lake Charles, La.; Alton P. Wangsgard, Lakewood, Ohio; R. Del Riego (XE1BD) Mexico City; Morris Relson, Washington, D. C.; Ralph L. Brown, Minneapolis, Minn.; D. E. Bovey, Newton, Iowa; Wilbert L. Misner, Vintondale, Pa.; K. E. Thompson, Indianapolis; Arnold Snowe, Harrison, N. Y.; C. M. Ryerson, Durham, N. C.; Paul Boorstein, Detroit, Mich.; E. L. Fahy, Clinton, N. J.; E. Mack Friedl, Houston, Texas; O. T. Jones, New Orleans, La.; J. H. Leiper, USS *California*; David M. Davis, Schenectady; Wallace F. Wiley (W9AZI); Donald Nelson, Urbana, Ill.; George A. Wall, Ft. Lauderdale, Fla.; Clarence B. Brown, Manhattan, Kansas; Calvin W. Rice, Milledgeville, Ga.; Thomas W. Purdy, Toronto, Ontario; Leo B. Hill, McKinney, Texas; R. L. Tardiff, Philadelphia; Gilbert Nowell (VE4GH), Winnipeg; Erich Fromcke, Lima, Peru; John Tomcak, Cozad, Nebraska; Gerald K. Miller, W. Lafayette, Ind.; Leo E. Rymasz, Detroit, Mich.; Jerome Hieronymus, Quantico, Va.; James A. Pottorf, Deadwood, S. D.; Franklin C. Brewster, Joliet, Ill.; R. H. Kaufman, Schenectady, N. Y.; D. E. Scott, Dodson, Texas; Frederick E. Ward, Cataumet, Mass.; Sam D. Salt, Pampa, Texas; G. A. Morgan, Jr. (W3INT) Takoma Pk., Md.; R. M. Crosby, Los Angeles; Charles G. Kaehms, San Francisco; P. B. Sawyer, Portsmouth, Va.; Farnell Bates, Larimore, N. D.; V. N. Andreev, Columbia, S. A.; Oliver E. Beaman, Lawrence, Kansas; Bill Tobin, Cambridge, Mass.; Benjamin T. Wood, Waterville, Me.; R. B. Fatherson, St. Petersburg, Fla.; Richard H. Howe, Granville, Ohio; Thomas Lee Wilson, Verona, N. J.; Percy R. Kuhl, Spruce Grove, Alberta; Ray Reynolds, Cincinnati, Ohio; Fremont Ogawa, Lava Hot Springs, Idaho; Howard P. Trich, E. McKeesport, Pa.; Freeman A. Spindell, Tyngsboro, Mass.; W. E. Keever, Detroit, Mich.; N. F. Murphy, USS *Vesta*; William Kendall, Detroit, Mich.; D. B. Clark, SS *Zanagrove* (British); John P. Hager, Brooklyn; R. A. Nestor, Roubaux, S. Dakota.

The Winnahs!

UNDER the scoring system in use, no entry made a full 7 points or 100%, but there was no choosing between the superlative entries of Jack Graham of Coleman, Alberta, Canada and Robert E. Moe of Bridgeport, Connecticut, so each is awarded top honors with a score of 6 out of 7 possible points.

Carl F. Mathisen of Milltown, N. J. and Nelson K. Malotte (W8QLK) of Buffalo, N. Y. won second prizes with a score of 5 out of 7.

Third, fourth and fifth prizes are a

year's subscription (or extension) to *Radio News*. There were multiple winners in each grade, and they are grouped as follows:

Three entrants take third place with scores of 4½ out of 7: Alfred Gronner of Zurich, Switzerland, Harvey E. Conroy of Kewaunee, Wisconsin and Dan Reed of Breckenridge, Missouri.

Fourth prizes with a score of 4 out of 7 to Richard Buchan, East Moline, Ill., Kenneth Yost of Dayton, Indiana and Harv Hamer, Dalton, Wisconsin.

Eleven got under the wire for fifth place with a score of 3½ out of 7. They are: S. H. Bruder, St. Louis, Mo.; Cal Brainard, Walker, Arizona; David W. Farrant, Beverly, Mass.; Edward Townsend, New Waterford, C. B., N. S., Canada; O. K. Powell (W9-FMW), Ainsworth, Nebraska; T. H. Mackintosh, Elon College, N. C.; L. T. Anstine, Woodlawn, Md.; C. T. Nicholson, Buffalo, N. Y.; A. P. Hayman, Orlando, Florida; Donald Carr, Yellow Springs, Ohio; and Harold Ruff, Topeka, Kansas.

Each of these winners is to be congratulated for having shown exceptional servicing talent. Congratulations!

To all who offered encouraging or humorous comment, I am extremely grateful; sorry I can't answer and thank each one individually.

If you lost out, take a stab at Repairman's Riddle No. 7, appearing in the next issue. Keep the ol' soldering iron hot!

-30-

Construct This Coupler

(Continued from page 9)

possible with this coupler. The wire for these leads should preferably be a heavy stranded type with lacquered high voltage insulation.

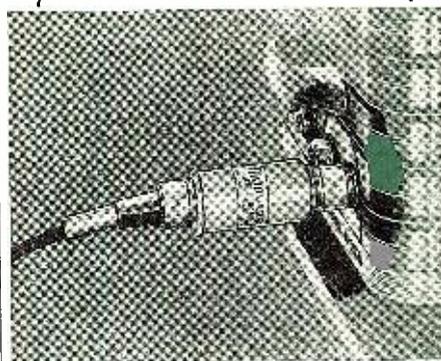
The accompanying diagrams show some of the more usual applications for this coupler. It might be stated here, that since the coupling and the inductance of the coils used in the coupler are variable, it is unnecessary to use variable linked coils in the final amplifier.

Figures 1 and 2 illustrate connections for parallel tuning. This arrangement is widely used to feed either an end-fed or center-fed Zepp that requires parallel tuning, to feed an untuned open line, and to tune an antenna-counterpoise system that has a higher natural frequency than that upon which it is desired to operate.

Figures 3 and 4 illustrate connections for series tuning. This arrangement may be used to feed either an end-fed or center-fed Zepp that requires series tuning, to feed a multi-band antenna where the feeders are too long, or to feed any system with either tuned or untuned feeders which cannot be resonated by using the hook-ups shown in Figures 1 and 2.

Figure 5 illustrates a hook-up that may be used to feed an end-fed antenna that is an even number of quarter wave lengths long. In some cases

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it might be desirable to ground the center-tap of the coil instead of the condenser rotor. This would allow the condenser sections to be used singly, in series, or in parallel.

Figure 6 illustrates an arrangement that may be used for feeding a single-wire-fed antenna, or for end-feeding a very long wire antenna.

Of course, these are only the more common arrangements, but this coupler will fill the bill no matter how unusual the requirement. It has been used to tune a 20 meter untuned line fed antenna on 160 meters, and to vary the coupling of a 72 ohm line into a fixed link on the final amplifier plate coil. This latter arrangement was accomplished by inserting a small amount of inductance into one side of the 72 ohm line by clipping portions of the 20 meter coil into the circuit. As the inductance is added to the 72 ohm line, the coupling is decreased. Taking all cases into consideration, it seems almost impossible to exhaust the possibilities of this versatile unit.

As was mentioned before, the coupler is mounted on the wall near the antenna feed-thru insulators. A wooden box was placed around it, with a hinged panel in front to allow the set-up on the coupler to be changed readily. The condenser rotor shaft extends through a hole in the bottom of the box. If it is desired to build a coupler of this type into the transmitter, it could be built with a door panel to allow the set-ups to be changed without going around to the back of the rack.

Improved 32 v. Power Supply

(Continued from page 15)

load is about 47%. With a 100 ma. load, efficiency seems to be the highest, about 50% to 51%. With condenser input to the filter, voltage is higher but the efficiency is lower. Care must be taken not to use condenser input when the line voltage is too high as the input condensers will start frying.

A few more changes are contemplated. These include a tapped primary on the transformer as mentioned before. A cover will also be provided for the bottom of the chassis. A cover of some kind may be put over the top of the whole outfit. If a cover is not used, some sort of insulating cover should be put over the inside row of filter condensers as these are about 500 volts above ground and could cause a bad jolt if accidentally contacted.

The writer would be glad to hear from any readers who may have constructed this power supply and would like to know what results they obtained and any improvements they may have made in it. Questions are always welcomed and will be answered in as complete a manner as possible.

Read RADIO NEWS! 25c

Hamchatter

(Continued from page 33)

W4FFI, of Cordele recently paid our office a visit and tells us that his rebuilding landed him on ten meters and that he will use that band during summer months. He had W4GFF wid him and Huberts said that he too was rebuilding.

W4GPR, George Corley of Cordele is new ham there and is planning 6L6 rig for 160 and at present is on 40 CW.

High voltage hurts—We know as we get across some the other day after all our warnings against it. (Now don't some of you bright wags make any remark about any so called high voltage in our rig. It was patterned after a well known RA article; well er—er—it was patterned any way).

Mr. Ed—Michigan Lewis wanted to know about W4FVO. It seems that he didn't find any gold up your way and we worked him about a month ago in Cottonwood, Ala. His present whereabouts is unknown to us. And as how we do it. Well, just get out and spend about ten times more than you make as a reporter and brother, that will qualify you as a Ole reliable if there was ever one. Of course, down in my neck of the woods there is one consolation. We have plenty of XYLs who can cook fried chicken and we always drop around for our news gathering about meal time HI. Does that explain anything to you, my Yankee friend? [Fried chicken, now is it?—Ed.]

W4DSA is on ten meter phone and according to reports really works the DX.

Had a nice letter this week from Leland Smith, W4AGI of Augusta, thanking us for a recent mention in this column. Our cooperation is yours OK at any time you may need it.

W4FUI of Knoxville, Tenn., is active on 160 meter band and Terry really has a nice signal.

W4FGD at McLanville, Tenn., is new to us on 160. Roy however puts a sock into my shack. What are you using fellow?

W4EQB, of Montezuma, Ga., is planning 400 watter using T55s in final.

Boy, life would be swell if we could fool wid ham radio all the time and not have to slay to make a living. Hi.

W4OCL, Atlanta, Ga., after being on ten has moved to 160 and is working both bands at present time.

W4MFP, also of Atlanta, has new one sisie 125 watter using T40 in final. Also operates on ten and is planning increase in power with T55s. Roy stays very active and his signal is worth working.

QRM from the 5th Dist. By Windy Bill.

W5HMV:

W5SX is now located in N. O., La.

W5IHR is modulating nicely on 160 nw more QRM but no key clicks. Hi.

W5IHH has new 100 watt rig on 160 nw.

W5EGG es W5DEL are carrying on checker game via radio.

W5ICV is back on the air nw that the La. politicians hve ceased to used P. A. systems.

W5EQL is back on fone agn, wid a class A ticket.

W5EWD is a first class CW bound.

W5HMZ has changed his QRA.

W5GPH is Miss. AARS NCS on 160 fone.

W5DAN is thinking of moving back to Calif. (A new sheriff has been elected in Pike County, Miss. Hi.)

W5HUY wrks early mrring DX on 160 fone.

W5WT is active agn.

W5ARD is getting ready to move out in his back yard wid his KW.

W5IUZ is a new one on 160 fone.

W5IFR es W5IFQ are two new ones in Greenville, Miss.

W5IHH is on in Bastrop, La.

W5HQE really puts out a nice sig.

W5IVT is a new one on 40 CW.

W5HVV really puts out a sock on 160.

W5FCH is a member of the McComb, Miss., Fire Dept. which is rated as one of the most efficient in the country. (FCH says they hv never lost a chimney or sidewalk.)

W5CQJ says 5HMV really puts out a nice sig up his way since he increased pwr.

W5IUG is going to twn on 40 in B.R., La.

W5IKV paid 5HMV a nice visit; old Jake is a regular on 160.

W5FTA is working portable off the S.S. Gulf Dawn on 10 fone.

W5IVR is W5WN's son es expects to QRM his Dad on 160.

W5ML is a v. ardent AARS booster.

W5HZZP is rapidly putting Houston, Miss., on the map wid his terrific signal. (first thing U know they put a Post Office up there Charles, Hi.)

W5BTH says nothing will improve the quality of a rig like a dynamic mike.

W5HQC is to be envied in the fact that he has one of those RARE ECO'S that wrks.

W5EWW is throwing out on fone nw.

W5ZV is still QRMing me on 10 mtr.

W5HHS/5 is on in Wicksburg, Miss.

W5BGU is putting out a swell sig wid a pr. of 250ths on 160.

W5MO is a real old timer who has succumbed to the fone bug.

W5BRB has been heard on 75 mtr fone wid a nice sig.

W5BJZ has moved in wid W5HEZ, thereby doubling the BCL's misery.

W5HVL, the old high velocity idiot, is still cathode rod on 75.

W5GEF nw has a nice sig on 10.

W5HNW toots a tooter in a band as a side

line. (So that's where old Windy J.P. gets his wind from. Hi.)
 W5GXO has really been hving some tough luck.
 W5GIZ is once more active on 75 but still refuses to get back on 160.
 W4AV/5 really does get out wid his prt rig in his car on 10.
 W5GIX has a nice sig on 20 fone.
 W5AIFW sticks to CW es has a beautiful fist.
 W5HRX goes to twn on 40 cw.
 W5FSS has the strongest sig in the 5th dist on 75 fone.
 W5EKV likes to get on 160 wid CW es embarrasses the fone boys wid his fast fist.
 W5GMR really works the DX on 10.
 W5DOK has trouble wid rats in his rig.
 W5HIX has one of the neatest home built rigs that we hv ever seen. Hi.
 W5FSI really knows hw to entertain visiting hams.
 W5GUX is interested in prt. rigs es really builds up some nice ones.
 W5HOT is another early morning 160 DXer.
 W5IVU gets out nicely frm his QRA wid low pwr. a Edna, Tex.
 W5GG has a swell sig on 160.
 W5HMV wrked a W6 who told him he was a loud R9. Hi. Jake.
 W5HLJ has one of the most melodious voices on the ether, she sure is a charming YL. (Hi. Edith!)
 W5FDC is still on 160 he says.
 W5GCS has really been quiet since acquiring an XYL. I wonder WHY?
 W5HEJ es W5HEK must be back on CW, long time no hear.
 W5BQD is the La. 160 AARS NCS.
 W5MH is one of the regular brass pounders to be found nightly on 40.
 W5GAL frequently is heard on W5GIW.
 W4BGO/5 the pride of Plaquemine asked me to leave him out this month. (OK Ben.)
 W5YW doesn't bleive U can't wrk doplex on fone.
 Aside to Windy Bill: Dere Bill: If you-all don't type futher from the edge of the paper, we won't be able to edit yore copy. Hi! Watsamatta, are ye short of paper? '73. Ye Ed.

W6PTJ reports:
 W6MGO has been operating portable at Gramman's Chinese theater during the showing of "Young Tom Edison." He has been on 10 and 160 most of the time and having a lot of fun trying to get patrons of the theater to talk over the mike, and ragchewing with the "hams" over the air and in person.
 W6RCD wrecked his new Ford in an accident and also his mobile job; fortunately he escaped with only a headache. Whether his headache was from the wrecked car or from the accident I don't know. Anyway, we're all glad you came

out of it with nothing more than a headache. Win. While waiting for his car to be repaired Win has been planning a new 10 and 20 meter beam. Don't know whether it is up yet or not, but when it is finished, I hope it works the way you want it to, Win.
 W6BP. the old brasspounder is still dividing his time between phone and c.w.
 W6BP, W6LFN, and W6PTJ went out and played a game of golf the other Sunday. Next time they plan to take an adding machine with them to keep score, or should I say to keep W6PTJ's score. Hi.
 W6LFN has become quite a sport enthusiast. He now divides his time between ice-skating, tennis, swimming, and golfing. His activities on the air have been very little, due to no antennae as yet. If you remember his pole blew down a few weeks ago and he hasn't put a new one up yet. When you put the next one up, Allen, be sure and keep your fingers crossed. Hi. Hi.

W6PXC is operating c.w. on 20 meters and does pretty good with his low power. I often wonder how Ralph works out from his QRA especially with those high tension lines running over his house, but for some reason or other, he doesn't seem to have much trouble.
 W6OIM and W6QFE are as yet still inactive. What's the matter with you guys? You both haven't deserted the ham ranks, have you?
 W2BOZ operating portable-marine in the Pacific has been on 10 meters lately and the fellows on the west coast have been working him as his boat makes its way up the coast.
 W2BOZ is radio operator aboard boat and said he is on way to China. Nice sailing O.M.

The Glendale Club seems to be off to a good start again and have quite a few active members. The gang gets together nearly every night on the Glendale net and have a good old ragchew. Some of the fellows on the net at present are W6LCY, W6UP, W6RIP, W6PNV, W6SCP, W6RED, W6SEJ, W6GFK, W6EHL, and W6DSP. There are more fellows on the net but I don't know all the calls. They operate on 1840 k.c. W6EGJ, W6SCN, W6QMX, and W6LCL also are quite active on 160. I hear that some of the fellows in Glendale are getting down on 2 1/2 meters. W6UP, I believe has a rig just about ready to go on 2 1/2. Don't know what power he is running, but a lot of luck on 2 1/2 W6UP.

The Forestry Net here in Southern California has been quite active of late. A good many of the "hams"—(bootleggers excluded, but definitely—and we still have them on 2 1/2) have joined the Forestry Net. Any week end one may find 2 1/2 meter mobile jobs scattered all over the hills and dales of Southern California; 2 1/2 meters is really being populated out here and shows every indication of being as good a band as 5 meters was a year ago. The bootlegger situation is still as bad as ever, and you fellows on 2 1/2 watch your step because the R.I. is cracking down on the hams who still insist on working them. A little cooperation on the part of you hams on 2 1/2 would do wonders in eliminating the bootlegger situation. Refusing to work them and logging the bootlegged calls, and then turning in the calls to the R.I. would help him a lot. To me it's not tattling and its only saving your own skins. All you licensed hams had to pass the exams and if a bootlegger is too lazy or dumb to try for his own ticket he don't belong on the air and it's your DUTY to help keep him off the air. What do you think, Editor?

Can't seem to find much activity on 5 meters so how about some of you ultra high fellows working 5 as well as 2 1/2. It's still a swell band, all it needs is a little repopulation. The DX can still be heard once in a while and its worth the effort to get up there.
 W6IOJ can always be heard nearly every evening, both on phone and c.w. John has always been the most consistent and active ham on 5 meters around Los Angeles and has a stack of qsl cards which really show what he has done in the way of dx on 5 meters. Here's hoping you continue to work more and better dx, Johnny.

W6QG has also been heard quite often on 5 meters and puts in a fine signal into L. A. W6QG lives in Santa Ana, Calif., which is about 35 miles from L. A.

W6QGI is trying to get on c.w. but is having a little trouble with the rig. George has been on 10 meters for the last year, but since the band is folding up for the summer he decided to try c.w. Incidentally, OGI had quite an unusual incident happen to him not so long ago. George had been working XE1Q in Mexico quite often and it happened that the xyl of a good friend of XE1Q was living here in L. A. and was also a friend of George's. One Sunday this lady was visiting George and his xyl and while there asked George if he could hear XE1Q. So George proceeded to call XE1Q with no result. Just then the phone rang and to their surprise XE1Q was calling long distance from Mexico City. He told George that he heard him calling him but couldn't answer because the rig was torn down. So to keep the telephone bill from running up George and his company talked to XE1Q over his rig while XE1Q was listening. Of course XE1Q couldn't answer back, but he heard every thing on his end o.k. I presume that George's visitors were quite clated over the results and went home in a very happy mood.
 W6PTJ just finished his new 5 and 10 meter converter and expects to be mobile on 5 meters while 10 meters is dead for the summer. Here's hoping there's somebody to work besides W6IOJ W6QG and W6LFN.

BY W7FHC Luther, Montana:
 Well, boys, most of the gang is on ten meters in the old seventh district that can

(Continued on page 62)

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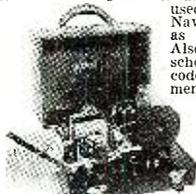
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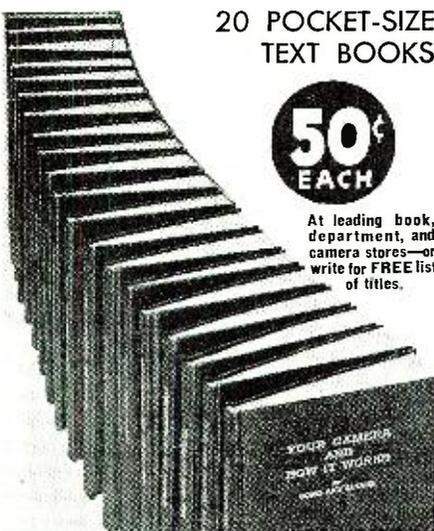
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Turn to page 10 of your July P.A.

ELIMINATING THE SPIN AND STALL

"He spun in" or "he stalled and dived to the ground" describes the fate of the majority of pilots who have lost their lives in aviation. To prevent the recurrence of such accidents is the aim of the Civil Aeronautics Authority. The Air Safety Board recently made a careful study of the death-dealing spin and stall. Their significant findings and recommendations to the C. A. A. are brought to you in the July issue of the world's leading aviation magazine.

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(Continued from page 59)

manage to get lined up on that band and have some time on their hands in daytime to work the ten meter band at time it is real hot then all at once the whole band fades out. That's the way here in the old seventh district. Wonder if this same in other parts. Will name a few of the bunch that are working ten now. W7DEN Billings, Mont. W7FTX Corvallis, Mont. W7GZI Cheyenne, Wyo. W7FFW and W7FFX of Cody, Wyo., and W7FPW also reports working a W4 in Atlanta, Georgia, on the 160 meter band using about 25 watts.

The Army Net on 1945 kc. has folded up in this neck of the woods till next fall and had a very fine net this past season, seem as though we are going to be transferred from the 8th corps area to the 9th corps area for drill next fall. Marion George formerly W7CDF The Old Man of the Mountains, was one of a few that passed the code test in presence of the R. I. at Billings, Mont., t'other day and took the exam. Marion was Down South by the Border when his former license ran out and did not get them renewed but here is hoping he makes the grade again. Seems as though he is unlucky with licenses, his folks' hose burned down once and burned his license and took him *right smart white* before he got all straightened out.

W7FXO had the misfortune to have his 1945 Army net Xtal go bad on him and therefore was not on the army drill last few drill periods.

If any you hams go through the Yellowstone National Park this Summer and don't look me up I will QRM you all winter or something although I get my mail at Luther. I don't live far from Redlodge, Mont. Just inquire of the assistant postmaster in Redlodge, and he tell you exactly where I have my shack, in the Land of the Pink Snow.

FROM the mail bag:
Sir,

After a pause of about nine months, here's that man with the purple ribbon again!

Since our last letter we have seen the Ham-chatter column grow by leaps and bounds, becoming more interesting as the amount of material submitted increases. Despite this, we have a complaint: in vain have we watched the columns for the warming sight of another "fish story" by 9ISR! What's the matter with John, anyway. Ever since our last letter, he has made himself very conspicuous by his absence. Don't give up, John. This unrest has caused all our activities to dwindle considerably. No longer do we stay up all night with the soldering iron in hand, trying to read a schematic through the smoke. Why, we've even given up our work on the invention of ours with the four knobs, to attach on a Communications Revr. Turning the first knob would slow up code (for beginners and 160 men). Knob number two translates foreign broadcasts into English (even those super-quick South Americans); knob the third is used when one misses an important announcement about the Fluffy-Wuffy Soapie Contest, because its function is to repeat everything that has been said in the last two minutes. Ah! Now for knob number four! That is our very special achievement; it is reserved for use on a QSO with a good DX station. When some fiend-in-human(?) form puts an RAC sig of 18 kw. on the DX just as he answers you, you turn the knob, and socko!—a monkey wrench comes flying out of the QRMing ham's revr, and hits him on the cranium, thus eliminating further QRM, cuss words, and torn DX maps!

So you see, Ed, what a calamity has been caused by our failure to develop these inventions—all on account of our laziness. Now we don't even engage in the annual task of removing the cobwebs from the 801's. We don't even get up to turn the volume control on the BC set; all we do is phone (from the divan) the engineer at the local BC Station and tell him to cut down the power on his rig.

Trusting that this raving has in no way impaired the peaceful progress at Ye Ed's office, and that you will forgive us for this outburst, we remain, V. T. Y. W9MGH.

NOW that the dx contest and the sunspots are a thing of the past, WSLEC rolled up the most points of any one in the Detroit vicinity with his 229 contacts in 22 countries for a total of 1,094,800 points.

WSRK entertained the members of the M.C. R.C. at one of their recent meetings with a fb travel movie.

WSOOL has a 112 meg rig in his flying machine and he is working some dx up there too. He would like also to make some skeds and QSO with the gang while flying around the city.

At a recent meeting of the Great Lakes Amateur Phone Association, Emery Lee the RI gave an interesting talk on Amateur Regulations and violations. He cited the many violations made by the hams and good naturedly told the hams to begin to clean their house before the FCC makes more drastic regulations.

WSUOX is a new ham hereabouts, he was formerly VE3OW in Canada. Welcome back into the ranks of hams, OB. He plans to have a CW rig going soon.

W8TQP has been doing some listening on the 2 1/2 meter band, claims that he cannot hear any sigs. Is your receiver working, OB, hi?

Speaking of 2 1/2 meter band, W8SLJ has completed his new 112 meg transceiver, he also is looking for contacts.

W8FTT spent recently a few days in a local hospital for a back injury sustained while "rassling" with a large bottle of water. We wonder if it was water, anyway we offer our well wishes for a speedy recovery.

WSQNA has completed his new 150 watt sup-

pressor-grid-modulated rig and will be on 160. WAMPX is thinking of giving up ham radio for his other hobby, photography, sorry to hear of it. OM.

W8REJ must heard of the saying, "when the cats away the mice will play," as he learned when he returned from a trip to California that three of his best pals had been courting his yf friend and also using his 866s.

On April 28 the Twelfth Annual Michigan Hamfest was held in Ypsilanti, a good time was held by all hams and swls. Many a fellow went home with a prize under his arm. W8CMP, President of the ARRL was the principal speaker together with W1LVQ.

Welcome to W8NEM who has moved up here in Escorse from Ohio.

W8KXK has moved to a new QTH in North Detroit, where he has plenty of the open spaces for all kinds of antennas. He will be doing his stuff on 160 as usual.

W8COW of Saginaw was a recent visitor to Detroit calling on friends.

W8RJI the super low-power ham has increased his power from his former 1.1 watts.

W1LVQ of the ARRL gave an interesting talk on League policies on Apr. 26th at the Lawrence Institute of Technology, an informal discussion followed.

W8LVR, "8 Little Violet Rays," has a new name for his cat who he had been calling "Tommy" till now. Tommy has had three kittens, so hereafter will be renamed Annabelle. Just a case of mistaken identity, hi.

This winds up on the done from the Detroit gang until next month, so 73 es C U AGN. LEE MASON, W8SPK.

BY Bad Crawford, W9BDO:

W9ADJ cum on one forenoon testing a powerfull lil 18 watt cathode mod 6L6 rig, es wid mi 3 watt vibrapak rig here, we did quite well thank-you for an 1 1/2 hour QSO on 75F. Still admire Clyde for his keeping a FB receiving layout to match his excellent layout of xmters—999 times out of a 1,000 it won't be his fault in having inadequate reception of any ham who hears his sigs. Nosed out some "noose" from Clyde about the neighboring "hams" as a promise of a picture of his basement "shack" located in one of the canyons west of Rapid City in the scenic Black Hills of South Dakota.

W9YOB "Wally" gave 160 F quite a whirl last winter using enough power the BCLs "heard him FB," but is now back on his beloved 40CW; tho like other considerate locals there, he also uses a "junk-box" 160F xmtir to ragchew around the burg wid. W9YKY, W9YJX, W9GWC, W9APT, W9BLK, W9SWV, W9AKO, W9ANW also hay-wired up these small 160F xmters and use 'em to "argufy" around town and once in a while a lil farther—hope the BCLs there appreciate their consideration; know we who would be in nuis-

ance-range of larger powered outfits do—to ad variety to their CW outfits on various bands, there in Rapid City.

W9GLA is present call of an old time active CW ham there in 1928-29, and he is using "considerable soup" on CW net freqs for S. Dakota state.

W9KNV shaking his fist on 40 and 80—no "foam".

W9IWT—I Wont Talk—he sez, so uses finger movements.

W9YH—Hot Young Ham—also finger-QSOs and saves his jaw. He was formerly from Chadron, Nebraska, but now Rapid Cityite. ADJ sed he got to cogitating and figgering and found out he was "godfather" to at least 26 hams as Clyde is about only Class "A" ham in that part of the hills who can give "C" exams—no RI in there for mani years either. Clyde is RR mail clerk as a means of acquiring the "wherewith" for his ham experiments. He ops on about all bands from 10-160 wid varying power and rigs.

Abt a 60-ft. high WSJK-beam for 20 which gives him globe-coverage. A ZL a year ago on 75F both ends is "it" for t band. Imagine all of you readers have "Clyde's" in your localities and state—hope so, for of W9ADJ personifies mi idea of a real good fellow with an "actual RST 599X rating." I often snicker when I remember what a good ardent CW ham Clyde usta be "way back when" I first QSOd him via CW, es lil later wid me on voice arguing for him to become civilized es use fone—I finally won out as I most always do when the other guy has-to "try and copy" my weak-wristed sending. Have driven many a ham to gab!

W9BDF Prof. Mack of Mohrville, S. Dak. is about ready to turn the kids loose and dismiss skool til fall, and enjoy his annual fishing trips, as I write this, "Mac" goes to the "Land of 10,000 Lakes" and doubtless craves a "Wall Eyed Pike" about a fundamental wavelength of 2 1/2 meters long to place among his piscatorial QSLs!

W5EAK-9 now at Blunt, So. Dak. using a 30 watt 6L6 cathode mod rig on 160-75-30 is having lotsa fun as usual! Huked Hon. Milo on his 13th weddin' anni es he was warbling to me abt it's "Bein' 13 yrs wid the wrong OW"—likely Opal the "P.S." wud sing it "Wrong OM" after awl these yrs! Milo cudnt make ani of his "Polecatz" hr him; so another morn I caught W9FLZ es Milo at same time es then they "boined me up" for writin' abt 'em in past; but when we cotched W3AOX "ol Ox" fm Okla outa the S-W pasture, the Polecats were really smelling high t.A.M.!

W9BJV, Apparently Stan is doin' sum experimenting on the Ultra-highs, whilst his "tired-man" Cliff W9URQ duz the wrk.

W9ELM Jerry tries to keep a Sunday morn sked on 75F wid his bro W9EY for family gossip. Usin' a lone 849 as mod now but winding up a new trans so he can use two-of-'em.

W9HJY Yankton "Ed" is hrd back on 160F agan, es Ed reports two new hams W9JMO with 12 W to a 6L6, and W9JEL, both on around 1895 kcs.

W9HRR sez no-news when I queried him, xcept he is finding 160 in it's seasonal slump so will hafta go back on 40CW agn.

W90XC gave me a "man bites hawk" report one forenoon when W9DWG and I answered his CQ on 75F. Lo these mani yrs have I bn gettin' reports of bein' QRMd by W9DWG if I op'd on 3915 kc end, but "Red" reversed report by telling me I was way on top of Burt. Even when he was using batt pwr Burt's sig has always bn vy FB in strength throuout the yrs.

Got big kick outa hearing QSO by W9MKD "Bob" the BC op of Bismarch, N. Dak. and W9EKP the printer Don of Gothenburg, Nebr. "Bob" was relat'g his experiences at KFYYR Easter morn when "X's" hit, and he was all by his lonesome trying to keep some sort of modulation going thru the old boiler when the NBC lines were put out of commission by excess voltage up around 500 volts generated by "Mama Nature" and added to regular 1.73 volt line potential which is normal. "Bob" sed lines got back to normal just before relief op cum on duty. Hi. MKD specializes on making recordings and canned and un-canned Don with appropriate side-remarx. Hi.

W9PRE-9 has been heard "testing" on 75F from Devils Lake, N. D.

W9VAE is sort of helping keep Minot, N. Dak. "aired".

W5AKZ and W5HNR still elicit a snigger outa me wid their 75M fone rag-blast-chaws in the eyes, with "B. & S. B. Network".

W9DGR Marshal, Mo. is being called considerable on 75 lately.

W9IIS "Irate Irish Skoolteacher" another 'show-me' on 75.

W5ADM "In Beautiful Texas" has been heard these mani years on the lo-freq end of 160 chatting with locals and DX there.

W5AYC—a yaller cat—160 QRM to the BCLs of Clifton.

W5EPZ comes to us from Irving, as we "hear'd it".

W5HRQ represents the northwest part of Oklahoma as best he can.

W5HXI wid his "power co's delite" was heard discussing generators driven by a V-8 engine with W5EJZ.

W5EST Bartlesville helped eliminate QRM on 75 one Sunday morn by joining up on high freq end with W9DWF, W9YFW and miself.

W9DWF shud be able to hear 'em as Gawge had a pre-selector on his receiver to co-operate with his gud xmtir. Stan W9YFW—youn'g, wild & wooly—really was making more than his share of noise on 75 that morn with his 6L6 14W imp mod class "A" into a 1/2-wave doublet; and told us he hunted, fished and swam in his spare time when radio was slack.

Vy nice QSO wid W9PJY Brookfield, Ill. a

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bit earlier tt A.M. and Carl sed wuz wrking "all bandz" wid a 102 ft. flat-top, center-fed ant. a P55 wid 70 W in es an RME 69 for reply-snatcher Carl sed W9ZHR same village had bn-herd in or wrkd K6 on 160F; and had acquired all stuff except "ambition by-George" to bild KW rig.

W4AUP in Alabam—(darn ya Pete)—can't raise him on 75 ani more in down if he can wrk W6's on 75. Last QSO we had wuz on 20CW late last summer. Previously nice KSOs on 75 abt 5 A.M. MST.

W4ERX Birmingham heard callin' CQ on 75 in afternoon came back to a "raise" b4 a W9 got thr calling W4ERX who sed handle was Kramer es usin' VFO thr in "Amos n' Andy's" old home town.

W9FXQ of Colorado Springs, Colo. was hvin' himself a FB QSO wid W6QLK.

W9OMN now teaching at Vernon, Colo. lays most of us in the shade of by-gone history with his "21 yrs of the wrong-hobby" ham-raydeo! Using a 17W inp fm a Vibrapak rig at this sitting.

W9QEC finds the water fine after a cuppla wks of tongue-QSOing on 75M in the "Mile High" burg, tho hrs batling 40 M QRM, too.

W3EVK heard one midnite "seeking U" which proved to be a W1 in Conn.

W8HLM also 75M few min later Charles decided "time to mod the mattress" es shut off the midnite filament-oil.

W2JZK QSOing femme-friend thru Howard's W9MVK land-line huk-up was livliest-spot that "dark-noon" on 75—seems W2JDD, W2JDT and W2LJJ rated in part as part of the family. More lafs es bewildered than than any show I ever spent 2-bits 2-0!

Cuppla-hrs later W6BYX, WSZX, W4ERX, W9KKB and W9ZVP were in lively round-table on 75 on high-freq end; but W9ZVP—Zanzibar's Vicious Poppa—tuk-out es gave me a buzz when he herd me tri es fail on Pete W4AUP; Leonard is onli running 50 W inp to a small xmtr nw es enjoying it as well as the ½-KW rig he usta use.

W8DBG in Ohio received here in late afternoon while QSO W3HGA. Here we often hear W8, W3, W2 es sum east-coast W4's es 1's up to 2 hrs b4 sundwn here on 75; in morn, they "stay-in" suntimes 'til around sun-up hr, which wud b up to 2 hrs after sun-up there. Vy rarely, tho, we can QSO 'em at those times.

"Handfull" of ZL's and VK's in the 550-1100 end of regular BC band are most "unusual" stuff I'm hearing rite now—dalite til sun-up. Heard 13 of 'em on mi birthday.

W9DTP Minneapolis made me wonder if he was thirsty es wanting sum "suds" when I hrd him usin' 75 furr "Seek U Milwaukee!" Hi, Hi.

W9UTR St. Cloud, Minn, putting out a CQ one forenoon—shud hv raised sum 4 MC ham as doin' FB hr at the time.

In Sunflower state W9PPO articulating on "seventy five" W9JTN same band emanating from Wichita wid nice sig.

W9LSK of McPherson bro't "Cliff" outa spkr on 160 in afternoon.

W9ISW a new lower pwr'd ham near W9ESL as to QRA es freq was going round and round wid W9IDR on 160F one eve.

W9ECF, Floyd of Leonardville, is really an old, old timer on 160F es CW, es one of the few of the "old gang" of 1930 I still hear on the "bestest" neighborly band. Hv QSO'd him at noon on 2-60CW.

Now fer sum skandal abt our own "White Spot"—Nebraska.

W9CGS Omaha called W9GTG Hayes Center on 3.99 mc to enquire abt his friend W9OHV Max whom Fred was happy to report had then rec'd his permanent appointment with C-A-A stns, es also Max must b a BCL fan of the Majors 4 he bo't a new Plymouth; whilst Fred is waggin' around wid a new Fawd es preparin' to QSY to Grand Island whr the "Irish Valentines" originate as he has been transferred thr effective soon. W9CGS, Rudy, was usin' RK20's 150W "in" cathode mod, ½-wave end fed "breather."

W9CSE fm home QRA, QSO, W9OGS on 160 sunny Sunday afternoon es YL "Cara" at side of OGS, but no-raise by CSE wen he tried tuning up his "88-turn" antennae coil to get the gal in resonance. Hi.

W9PRE is a new ham—CW test by W9ADJ. Hi—now hrd at Chadron 1.9 MC.

W9HAF Claude of Grant; W9QNP printer at Culbertson; W9NXQ Fennie the bakerman fm Grant; and ol' Rose W9HNG Madrid gang up on 160 F es CW news es Sundays and throw the gen'mun bovine around es abt! All their sigs were a trifle "up" the P.M. of the "eclipse."

Old Rose W9HNG aptly put it, when he sed "160 went 'out' when the tree leaves cum 'out' in spring, es cums 'back' in fall when tree leaves, leave!" Riter'n two rabbits, HNG.

W9MJY has found the fundamental of his ½-wave twisted pair doublet changes when the trees leave-out and again back to normal when they fall off. Ken has his 75 M ant in trees in his yard, tho.

W9EYE Chadron is rattlin' the dots off his bug now-a-daze again since got another attack of "QSO 'EM" fever. Up to date rig, mainly 40 CW. Hpe click wid U agn Ward—long time no QSO!

W9IPV on 160F hollerin' 4 W9FOB—metropolis to capital city.

W9TGY Republican City trying for Lloyd of Gibbon W9WBX via 160F.

W9PDH told me he save the CW-exam to Leonard Jurgensen of Tilden who is a Morse op and at this sitting up relieving the Romeo "In the Land of Hard Water es Beautiful Wimmen" as Louie is sick. Likely Leonard will be on with his own call b4 your optics scan this line. Oh, yes; W9MJY got his adjustment on and a new 802 and is "on" agn.

W9SQT Ben of Elm Creek then, the gossip since hath sed Sidney bi now, was one of mi 40 M CW victims. Ben's info wuz tt W9EWO still lives es walks, but nary a talk via ham radio—lost the fever, Don? Bounced over the trails 83 miles northward es had brief visit wid Homer the spasmodically active op of W9HNP —her naughty partner—who is to QRL melting rosin for the BCLs to emit mani electrons on 75 as of old.

W9FXN es YF BJU rolled up the road in their new "GM-Vibrator" so we four rosin in person abt radio es "RADIO NEWS" too, bi-wosh! Two days later W9IDO and W9IRZ came along and gathered up W9TIF—this is fun—and miself and we drove westward for attending a radio club meeting that nite of the Western Nebr. Radio Club held that-time in nice new City Auditorium in Alliance, Nebr. "Being there" involved 400 miles of travel for IDO es IRZ, es 225 for TIF es I—think of tt U hams who R lucky enuf to onli go a few blocks or miles es find "hams" by the duzzens th! Doubt th R yv maui more than 200 hams in the whole west-half of Nebr., so wen wx was incliment to boot. We were surprised to find about 30 hams, SWL es servicemen who had to roll wheels partly as far as we had.

Enroute W9TIF spied a Hotel in Bingham (a small cow-town) with a sign on front which read "C Q's Hotel"—ani of U tie that? We didn't hv time to stop es investigate to see if ani connection between builder, proprietor or just-who was responsible for ham designation.

W9AZT Cliff was the guy with the gavel at this gathering; and after W9MGV—my gal vanished—the story disposed of the "lost minutes" they got into the topics for the eve which were plans for a hidden-xmtr hunt during late-June meeting portable equipment for emergency use—and, those two bro't out a wealth of antennae info mainly by W9ARE who "happened" to be there (conveniently close by, eh "Rich"). MG V had haywired up a "loop" previously which did not have the "directional effect" he craved so ARE used the blackboard and chalk and many words of explanation of commercial theory gained from practical experience in working commercial angle of radio, and when "Rich" got thru

with that, I failed to hear a single ham say "tt's the way I tho't it wuz" 'cause gosh-darn it, we novices all tho't tuning for maximum was way to find whr sig was cumin-from, insted of using "minimum" which gives darn-sharp right-axle direction xmtr is located at. Next transmitting aerials and methods of feeding 'em efficiently, etc., and "Rich" sed two half-waves in phase with correct feeder match rated around the top for effectiveness but straying even 100 ke from fundamental reduced efficiency sadly.

W7CEO was rather interested in co-axial cable. "Rich" gave us sum dope on the monitoring station near Grand Island and said he figured they were "friendly" towards the "ham" and not out-after each and every one of us to lift our scalp, but of course when they are checking around the "ham bands" or in the commercials and find the wrong sort of emissions cumin from Johnny Ham's pride and joy—well, a "discrepancy report" is sent to ham who is off the reservation in some manner. "Rich" sed he zot an "Irish Valentine" when he was in Iowa for an 80 meter "harmonic" that did not fall in side the 40 meter band, which caused "our hero" to do considerable "X" work with antennae couplers as "harmonic eliminators" for safeguard against future "valentines." Final result was out-Collinsing Mr. Collins coupler, utilizing link-coupling for pick-up and being darned-sure it was not "to close," adding one or two (according to bands to be tuned to) additional coils in series with each leg of the feeders—looked OK as per diagram and explanation; tho here in these sandhills we simply zotta-have a fundamental ant if we R gr "zet out." Sand is NG for "ground," es "loadin'" ants won't do the trick for us it seems.

Several small receivers of commercial mfg. exhibited there, but all wud "eat" batts pretty fast if used yv long; MG V had a small 2 bottle affair 6.3V type filament es one 45V "B" supplied it for use wid "cans," old standby "regenerative" cret. MG V also had along a "VFO" exciter bit in an old A-K box th wud wrk as a "luggable"—nary a "pee-wee" clip on either piece of apparatus!

"Solly" W9RGK had a "six men es a boy" piece of portable gear th looked neatly constructed, wrking zab or fist, if enuf AC was available to power it. Club just purchased es exhibited a 3-voltur Dodge AC gen with bul engine th shud fit RGK's xmtr. Insofar as CW was concerned W9INR's 3-valve affair of an osc bit so cud be used xtal or self-controlled, es two parallel tubes in PA, all octal sockets which gave "chance" for a great mani types of tubes, es designed also so if one tube QRT, cud use other two, or one alone in osc to feed ant if got "it bad"—yep, Al wuz gc b fixt til the last bottle "went west" if a case of "push-es-C" ariz. He also had a Sky-Buddy wid arrangements to use his 6V dynamotor to supply plate to it as well as to "run" Emergency condx. In test-al-ways "noisier-bell" es even a KW rig has but it's effective "ground wave" then. W9TIF es I use these 2-5 watt rigs almost daily and we hv mani FB QSOs during daytime, es a fellow wid zud rec'r like W9QOS 150 miles away "copies" us nearly solid at nite on 160 F thru QRM. And, yes, "Solly" fundamental doesn't contain as much energy as a higher prwd xmtr's "harmonic"—ll advantage thr. Hi, Hi.

W9IAB, a newer ham, told us he had moved east of Alliance and wud agr b on wid ll engine driven 200 w AC Westinghouse alternator. W9CDL was surprised wen I told him how well his "microphone muttering" came thru last winter on 160. His trub was, not hearing replies to his calls apparently; Uses 40CW mostly. W9VRT es I met for first time tho mani a zud QSO wid "Neary" on 80 es me n 75 in yrs gone past. 40 es 160 is his "meat" now. Same hands for W9LWS who recently went vocal—gess his YF enjoys the gab around the house more than his making signs. Im wat she said when had a chat wid her b4 meeting convened. The YF's played games es otherwise entertained themselves while we "recussed" technicalities. Too bad we didn't hv ol' Pop Rolli W9IDR—Italy's "dark roneo" along to entertain those wimmen!

W9SDL is finally back on agrn on 75, 80 es 20—Johnson Q 4 20F. Kenneth has a larger rig this time, he sed.

Gess hv forgotten names es calls of sum of rest at the meeting, but ain't forgot "the fun" we had gettin' home. Had rain-snowed in morning b4 we left home but hole off and trip thr was fairly nice but cumin' home we ran into a sticky-snow th plastered windshield til IDO cudn't "televise" road yv well es slow was it, til last 25 miles when it was cold enuf snow QRT sticking. 1 1/2 hrs cumin home, es dalite wen we got in; but FB meeting anyway!

W9OQN had on lo-freq end of 80CW. QSO. W9MJA es sez sn will b on 160F thr in O'Neill.

W9TIF visited W9FXN-W9BJU cuppla daze; es W9WRY es W9YLC enroute home. "Razz-berries" R planning on a get-together at sum sandhill late in June.

W9UCM writes FB ltr fm Chanute Field sayin' Unk Samuel sure is "larning" him wat makes the electrons elect, etc. Sez, his "ham" experiences helped him a lot in this Army Air Radio Corps skool, es is amongst "tops" in the CW class; was sent dwn near St. Looie for abt 6 wks training thr, es wen he finishes at Chanute in July will likely be sent to Calif, next. Forrest enlisted last summer, was called late last fall.

Nope, ur-wrong OT! W9QXQ ain't "portable-mobile" even if he duz sound it-way on 75 with the subndnd "putter" of his litely "motor-boating" amp. But, Dear's "muffler-belt" must be slippin' sunthwars: Most of us really get "motor-boating" when we get it, but I'll b darned if hi isn't well-trained es nearly-quiet! Yep, I ain't furrgot abt the "2-tied" ham of

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last issue—will give U more abt tt next time, so keep on gessing.

Mi big puzzle of the moment is how tall is W9UZE's OW? ? ? I heard him telling sum guy his OW was using xming aerial for clothesline, or vica-versa. 225 watts. His being a BC op, he shud kno "ants" but I still can't figger if clothesline "aerial" is low or OW high? Lot of rest of us agree wid him tho wen they too wish they'd used up the time the band was "dead" fm Easter on in "rebuilding" es renovating equipment at tt time wen few QSOs wud hv bn lost.

Very happy to report Roy W9RYV is feeling btr agn.

73 everybuddie es "poppa-cracker" for ol' Uncle Bud, of Raydeowe Foam Stayshun W 9 Bad Demo Opr.

W9KOH blurts out wid:
The last few days old man Sol has been playing havoc with ham radio. Sunday Mar. 24 all bands went out except 10 meters which opened up for some hot short skip about 7 P.M. This condition was very hard on the DX contest. There wasn't much DX anyhow except South Americans that I could hear. I worked 20 countries and made about 35 contacts. QO51M is a new one coming in fine on 28,495 kc.

A new Net on 160 meters that meets every evening at 5 P.M. is called the "Got to Gab." Most of the members are in college towns and exchange traffic, chew the rag, etc. So far we have myself, W9LIS, W9RHC, W9VZQ, W9APY, W9IVB, W9TFQ. Any one else welcome on 1866 kc.

W9VZQ is now operating portable with fb sig in Kirksville, Mo. Nice going John, with that 15 watts.

W9WZH of Kimball, S. D., was sure laying a fine sig here last eve with his 200 watts, call a honey.

W9IPO is a new ham in Waterloo, Ia. Welcome to 160 meters Ed, that sig. of yours is us again Doc.

W9BIQ of Quincy is having lots of fun nowadays on 10 meters (when the band is open). Ralph always has a nice sig. on 160, lots of luck on 10, and with that new Howard 437 pal.

W5ILT is sure barrilling in here now with an increase of power up to 250 watts. Nice going Max.

W9JEL is also a newcomer on 160 meters from Yankton, S. D.

W9LLA of Centerville, Ia., hopes to be on the air soon with a nice rig. We hope you like our gang Frank and welcome to you. Frank is the Son-in-Law of W9QQC, who also has another Son-in-Law who recently acquired his call, W5ITO, of Fort Smith, Ark.

W9IVB of Marysville, Mo., is laying a wallop in here with a new 700 watt rig on 160 meters. Keep up the good work Dale.

W9KZL is also a new ham in Ottumwa, Ia. That 10 watts is really doing a nice job down here Les.

W9LKL is sporting a new RME 69. Bob did someone finally take that old race horse off you hands? Maby you sold it back to W9KLC? Hi.

W9IES of Sterling, Colo., puts a very nice sig. out here in Mo. Hope you can hear us next time. Hi.

W9IHA, an old timer in Chillicothe, Mo., has a very nice sig too now on old reliable 160.

W9SAS up in West Allis, Wisc., is poking right on thru the QRM the last few nights. Keep up the good work there Hal.

After midnight on 1866 kc you can hear the Voice of West du Pere, Wisc., W9QFH. Tony only has a kw so that's the reason anyone from coast to coast can hear him.

I had a very nice visit from W9EAN of Garden Grove, Ia., and the YL Dorothy. Nice going Jack, and come again soon.

About the strongest 8 out here is our good friend W9OZP, Auburn, always packs a wallop. That kw of W9KVM in Indianapolis sure takes good care of that freq. on the high end of 160 meters. Boy what a sig.

W9WKP over in Auburn, Nebr., has increased power to 400 watts and has he got a sig. WOW! Jerry just don't park on 1866 kc. Hi.

W9QUZ of Springfield seems to be the only one there on 160 meters but with his sig they don't need any more; sounds swell Jim.

W9QMG up in Prentiss, Wisc., is sure doing a fine job now with a vertical ant. on 160 meters. Don call CQ and the band all call Don.

You fellows have probably wondered who has the most foreign QSL cards, here's the low down. Mr. John W. May, 1202 Richmond St. in Pittsburgh, Pa., has cards from 154 countries, and 132 Or. more from each continent. I just received a photo of them so it must be so and all cards are from phone contacts. Boy what a collection.

W9DMK is on the air in Kansas City with one of the new Stancor 40 watt jobs. If you guys have there Olin, welcome to 160 meters.

W9GKN has been very active during the daytime on 160 meters, we wondered why, as he has a fine job: answer (mumps). Hope you are getting along ok Slim.

W9QHY and W9RHC of Columbia, Mo., recently held a demonstration at the Engineers St. Patrick's celebration, handled traffic and had some fb contacts.

While I'm giving the lowdown on my neighbors I might as well include myself; I'm using one of the new Hallcrafters Super DeLiant 8X 25's now and boys it's a honey.

So long fellows from the King of Happiness, W9KOH.

AS I sit me down to crack off this spasm of fortunes and misfortunes, lives and loves of our brethren and sister "hams" "X's" at-

mospheres) is still with us. Hope no one got a bigger "bang" out of this spell of radio-contrariness than

W9AGL up in the Black Hills of South Dakota who picked himself up off the floor after being "floored" when he touched his 160 meter aerial discharging the accumulated static-charge from "Aurora Borealis"—xmr wasn't on!

Also in So. Dak., W9BGB is being transferred by his firm to Sioux City, Iowa. Vern regrets leaving his antennae systems there at Winner as he works out FB on most all bands.

W9DBU, Graville, is another "hi" pwr 15 watt-er on 160 F using a TZ-20 PA, es a Sky-Buddy hearer. Sig gud, too, by cracky!

W9DYM remains about the most often-heard ham on 75F.

W9EXX "Diz" farms 800 acres cum farmin' time es op's 160F wid HY61 bottle in PA swatted 40 times, in winter. 200 acres in wheat —take a lotta OWs to make all that "dough" up. Apparently W9HFS, 20 miles nawth, is a bro of EXX. 160F, too.

W9HRH is nw up-to-date on 160 F wid an ECO. Fred's lil gal, Norma Jean, 7 yrs old, figgers to be a "radio girl" wen she "grows up" so U "radio romeos" can be readi wid ur amarious adjectives a decade fm nw.

W9KOS also op's wid an ECO on 160 es 10F using 400 W to pr T125s, when his radio shops doesn't keep him QRL.

W9LRA—louisiest radio amateur—George still duz it when it coms to FB 160F sigs.

Regret to report the passing of W9OQG's mother recently. Leg infection, and during the month or more she was in hospital at Pierre, W9OXC thr maintained a sked wid home folks so they cud talk home, es kept informed of her condition.

W9ZAL is agn hrd nw es then on 160F es as always. Joe has nice sig. RR agent in his "spare time."

W9ZBU, another RR "Casey Jones," sparing time for "ham" radio on 5 of our best bands.

W9YBX-9 nw at Yankton used to op KMMJ so his cross-band 75F-40CW QSOs wid W9AUD keep both ends caught up on gossip of mutual friends. Hrd one "ham" express surprise at Adelene's CW ability as he was under the impression YLs were NG on CW!

Down "Sunflower" way I'm agn hearin' ze big-chief Clark fm Medicine Lodge on 75F—long time no hear. Clark.

W9FRK—freq rdo KW—wid Lee es Margie of Troy been doin' sum FB qsoing wid the 75F gang lately.

W9FMZ at Kincaid is another "ham" easily hrd on 75F.

W9HJM—ham jam mustard—Hays, did his share in a FB gossipy ragchew when I QSO'd him while I was visiting W9IDR a while back. Es, duz the "jam" his bottles full 2 overflov'n!

W9HSL, Miford, is also new to my auditory organs—75F.

W9KKS, Natoma, hrd calling a W5 wid a good 160 F sig here.

W9KXB—Kenny's Xrayed Bunions—got a heavy razzing fm the early—A.M. 75 M gang abt bein' a printer, yet outa QSL's! Hv had mani nice chaw-razz wid Ken as well as DX hunting wid score even on 75F as he caught one K6 4 me es I one 4 him. Hi.

W9MQB fm aeroplane and Oil town of Wichita popped outa spkr one afternoon while I was dipping 75F band.

As did W9PKD—pancakes kraut doughnutz—and W9YCL, both of Salina and on 75F.

I "CQ'd" one noon on 75 and got a raise outa W9UCQ of Beloit, but he failed to cum agn so no info on him es rig.

In the "Show Me" Mule state of Missouri I hrd nice QSO between W9BRN Butler, es W9JXG now at Springfield who, I hadn't hrd in long, long time. JXG usta keep 160F "hot." Es he cudn't send CW then ani btr than I can nw! Hi.

Over Minnesota way—in the Land of Ten Thousand Lakes—W9DKL was hrd on 75 one eve wid a gal visitor named Grace (and her mother) who wrks for same "Boss" as Ben—June cumin' Ben and any danger which "boss" U'll b wrkin' 4 bi then, Ben? Hi.

W9EGU Henning with a Collins FXB 30 200 W inp center-fed Zepp 50 ft high, an xtal mike and a HRO had just returned fm a visiting trip into south; when W9HEO Willmar with his 530 W inp to his ho-maid xmr using an 882 final es N01X recr, es me had a FB 3-way QSO one afternoon, tho I had to QRS 2 abt 300 WPM for 'em. Hi. Lo-freq end of 75F.

Fm North Dakota we have hrd following 160F stns: W9DVL Berthoud; W9GGQ Park River; and W9UNU—Uncle Ned's Underwear.

Last fall W9GIM of Cedar Rapids, Iowa, was "in" on a 4 hour 4 way "hair down" ragchew wid W9EKP, W9GDB es miself on 75F. "Les" W9GIM promised a photo—QSL at the time—got it the other day es vty FB so I sent him mi QSL! OY W9GDB must get himself up "early" quite often as I find mani east or west coast stns tell me GDB is onli other Nebr stn they hv wrkd.

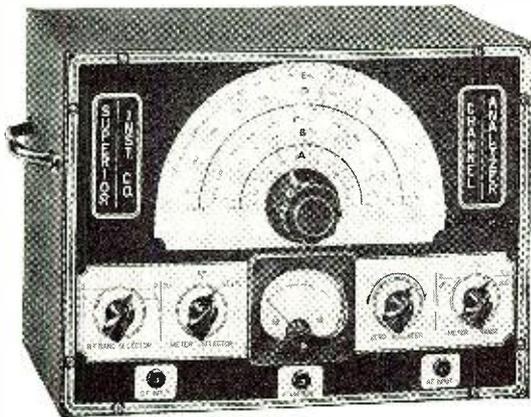
Wuz dwn on 40CW recently es hooked W9JNL nw of Rock Rapids, Iowa, es Wayne had "heck-uva" time trying copy my rotten fist. First time I QSO'd him he was runnin' an eats-shop at Hastings, Nebr es he wuz on 80 es me on 75F es cud copy me OK it way. Hi.

Another 40 contact for me was W7HFG Sheridan, Wyo., but I QSY'd to 75F so "Bill" didn't hv to "guess" his way thru mi lame wrist. Hpe I got U converted 2 fone. Bill, "Bill" sed W7COV Big Horn was abt closest es best fone near him. If I cud send as gud as "Bill" I'd use more CW es not hv spend most of QSO-time apologizing 4 mi terrible sending.

W7FIB "Bruce" at Laramie is another 40 M contact 4 mc. 250W inp 2 pr. 242A's es 1/2-wave ant Bruce sed thr.

—30—

THE NEW CHANNEL-ANALYZER
Follows the SIGNAL from Antenna to Speaker



The well-established and authentic SIGNAL TRACING METHOD of locating the very circuit in which there is trouble, and the very component that causes the trouble, is now for the first time available at a price any radio serviceman can afford.

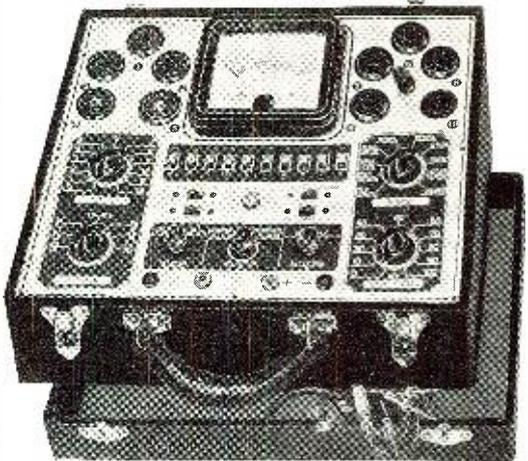
THE CHANNEL-ANALYZER will

- ★ Follow signal from antenna to speaker through all stages of any receiver ever made.
 - ★ Instantly track down exact cause of intermittent operation.
 - ★ Measure both Automatic-Volume-Control and Automatic-Frequency-Control voltages and circuits without appreciably loading the circuit, using built-in highly sensitive Vacuum-Tube Voltmeter.
 - ★ Check exact gain of every individual stage in receiver.
 - ★ Track down and locate cause of distortion in R.F., I.F., and A.F. amplifier.
 - ★ Check exact operating voltage of each tube.
 - ★ Locate leaky condensers and all high-resistance shorts, also show opens.
 - ★ Measure exact frequencies, amount of drift and comparative output of oscillators in superhets.
 - ★ Track down exact cause of noise.
- The Superior Channel-Analyzer comes housed in shielded cabinet and features an attractive etched aluminum panel. Supplied complete with tubes, three specially engineered shielded input cables, each identified as to its purpose. Also full operating instructions. Size 13"x10"x6". Shipping weight 19 pounds. Only **\$19⁷⁵**

THE NEW MODEL 1280 SET-TESTER Combines Models 1240 and 1250

A complete testing laboratory in one unit, the Model 1280 combines the Models 1250 Multitester and 1240 Tube Tester. (See specifications of each below.)

- ★ Instantaneous Snap Switches Reduce Actual Testing Time to Absolute Minimum.
- ★ Spare Socket and Filament Voltages Up to 120 Volts. Make the Model 1280 Obsolescence Proof.
- ★ Latest Design 4 1/2" D'Arsonval Type Meter.
- ★ Works on 90 to 125 Volts 60 Cycles A.C.



Even those servicemen who through past purchases know they can always get SUPER-VALUES from Superior, will be amazed and delighted when they read the specifications of this all-purpose instrument and then note the unbelievably low price. The Model 1280 features a 4 1/2" D'Arsonval type meter for easy reading of the various scales, and in line with our new policy of stressing appearance as well as serviceability in our new 1200 line of test equipment, our Model 1280 utilizes an aluminum etched panel, designed for beauty as well as ruggedness. The primary function of an instrument is, of course, to make measurements accurately and when designing test equipment this is our first thought. However, we also appreciate the important part the appearance of an instrument plays in the impression a serviceman makes on his customers, especially on home calls. We have, therefore, paid special attention to the outward design of all of our new instruments. For instance, the panel of this Model 1280 is made of heavy-gauge aluminum and etched by a radically new process which results in a beautiful, confidence-inspiring appearance.

Model 1280 comes complete with test leads, tabular data and instructions. Shipping weight 18 pounds. Size 13"x11"x6 1/2". Our net price **\$19⁷⁵**

Portable cover \$1.00 additional

THE NEW MODEL 1250 MULTITESTER



SLOPING PANEL FOR PRECISE RAPID SERVICING

Etched Aluminum Panel

Specially Designed Electronic Rectifier Enables Linear A.C. Scale, High Stability and Little or no Temperature Drift.

Here is an opportunity to acquire a Multi-Service, Precision Engineered Instrument, for less than you would have to pay for an ordinary Volt-Ohm Milliammeter. Besides making the usual volt, resistance and current measurements (both A.C. and D.C.) this unit accurately measures the CAPACITIES of mica, paper and electrolytic condensers, INDUCTANCE of coils, chokes and transformers, DECIBEL gain or loss, of power amplifiers and public address systems, WATTS output of amplifiers, receivers, etc.

SPECIFICATIONS

Complete A.C. and D.C. Voltage and Current Ranges	High and Low Capacity Scales .0005 to 1 mfd. and .05 to 50 mfd.
D.C. Voltage: — 0-15, 0-150, 0-750 volts	3 Decibel Ranges
A.C. Voltage: — 0-15, 0-150, 0-750 volts	—10 to +19, —10 to +38, —10 to +53
D.C. Current: — 0.1, 0-15, 0-150, 0-750 ma.	
A.C. Current: — 0-15, 0-150, 0-750 ma.	Inductance: 1 to 700 Henries
2 Resistance Ranges	Watts: Based on 6 mw. at 0 D.B. in 500 ohms .006000 to 600 Watts
0-500 ohms, 500-5 megohms	

Model 1250 works on 90-120 volts 60 cycles A.C. Comes complete with test leads, tabular charts and instructions. Shipping weight 9 lbs. Size 9 1/2"x11"x6 1/2". Our net price..... **\$11⁸⁵**
Portable Cover \$1.00 Additional

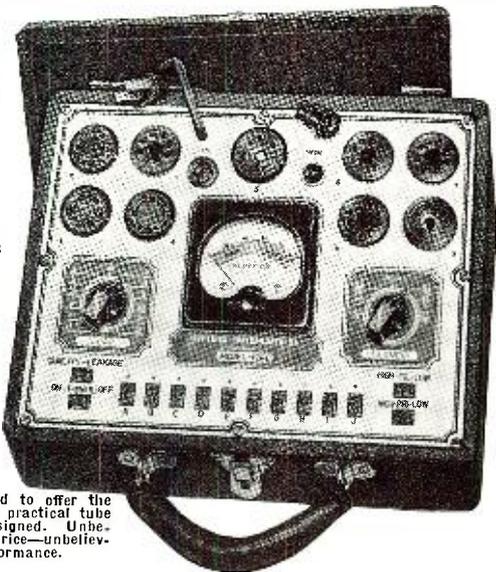
THE NEW MODEL 1240 TUBE TESTER

Instantaneous Snap Switches Reduce Actual Testing Time to Absolute Minimum

Tests All Tubes 1.4 to 117 Volts

Sockets for All Tubes—No Adapters

Superior is proud to offer the newest and most practical tube tester ever designed. Unbelievably low in price—unbelievably high in performance.



- ★ Tests all tubes, 1.4 to 117 Volts, including 4, 5, 6, 7, 7L, octals, loctals, Bantam Jr., Pennt, single ended, floating filament, Mercury Vapor Rectifiers, the new S series, in fact, every tube designed to date.
 - ★ Spare socket included on front panel for any future tubes.
 - ★ Tests by the well-established emission method for tube quality directly read on the GOOD & BAD scale of the meter.
 - ★ Jewel protected neon.
 - ★ Tests shorts and leakages up to 2 megohms in all tubes.
 - ★ Tests leakages and shorts in all elements AGAINST all elements in all tubes.
 - ★ Tests BOTH plates in rectifiers.
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 - ★ Latest type voltage regulator.
 - ★ Features an attractive etched aluminum panel.
 - ★ Works on 90 to 125 volts 60 cycles A.C.
- Model 1240 comes complete with instructions and tabular data for every known type of receiving tube. Shipping weight 12 pounds. Size 6"x7 1/2"x10 1/2". Our Net Price..... **\$11⁸⁵**
Portable Cover \$1.00 Additional

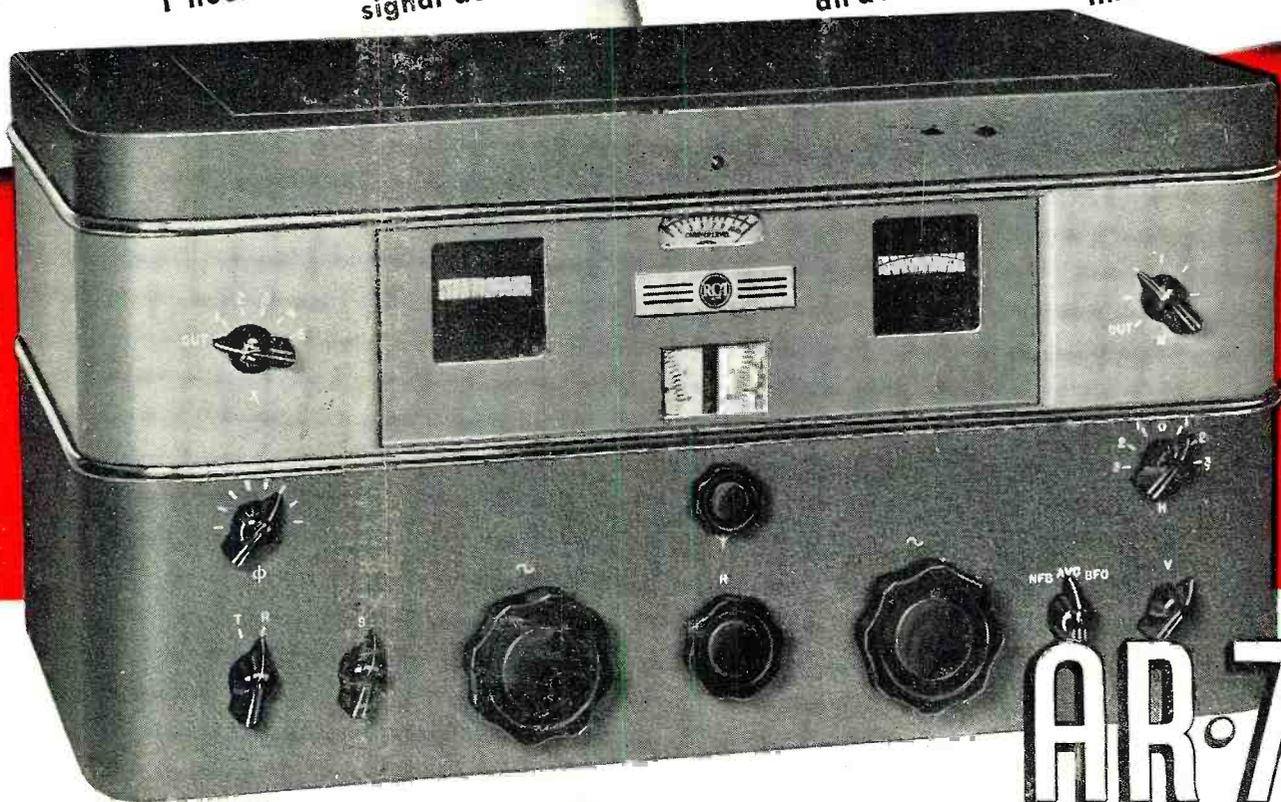
SUPERIOR INSTRUMENTS CO. 136 LIBERTY ST., DEPT. RN7 NEW YORK, N. Y.

UNMATCHED STABILITY!

Tests under average conditions show maximum drift at 30 Mc to be only 3.0 KC on 1 hour run, thereby keeping signal audible.

HIGHEST SIGNAL-TO-NOISE RATIO

A 2-to-1 ratio of signal-to-noise is obtained at an average sensitivity of 2 microvolts throughout range.



AR-77

COMMUNICATION
RECEIVER

*Unbeatable for the Amateur Shack...
Unexcelled for Short Wave Listening!*

You'll never really know how stable, how superior in every mechanical and electrical feature a moderately-priced receiver can be until you've tried the new AR-77! Whether you're looking for a truly topnotch job for your amateur shack or short wave listening den, the AR-77 will surpass anything you've ever tried at anywhere near the price.

This is a set that says goodbye to dial-twiddling on those hard-to-get stations. They're easily tuned in—and, once you've tuned them, they stay put. During a 60-minute test starting one minute after turning the set "on", the drift at 30 megacycles was only 3.0 kilocycles. In this same test, when the line voltage was varied from 105 volts to 125 volts, the drift at 30 Mc was only 1300 cycles. Match this stability if you can!

The AR-77 has the highest signal-to-noise ratio of any general coverage receiver made by RCA, and that's saying plenty. Get your nearest RCA Amateur Equipment Distributor to give you a demonstration. You be the judge!

Net Price, \$139.50 f. o. b.
factory. 8" Speaker in matched
cabinet, \$8.00

AR-77 COMMUNICATION RECEIVER

Frequency coverage, 540-31,000 KC in six Ranges—"Stay-put" tuning; dual R-F alignment; negative feed-back in audio amplifier; uni-view dial; calibrated bandspread for 10, 20, 40 and 80 meter bands; accurate signal reset; variable selectivity in six steps with crystal filter; improved image rejection; adjustable noise limiter; antenna trimmer; high-gain pre-selector stage; standby switch with terminals for relay plus many other features.

"S-1" SIGNAL RECEIVED THROUGH "S-4" NOISE

The manually-operated Noise Limiter of the AR-77 is a feature that has aroused unusual interest. Peak noise voltage hundreds of times higher than the signal is pulled down to signal level. "S-1" 'phone signals have been successfully received on the 10-meter band where ignition noise was pounding away to the tune of an "S-4" reading on the carrier level meter!

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