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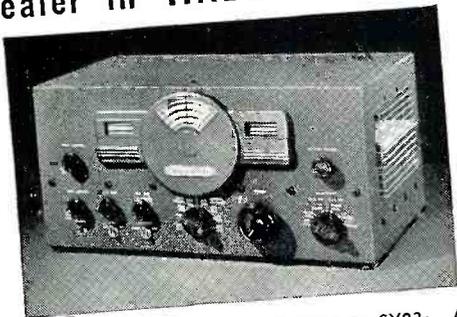
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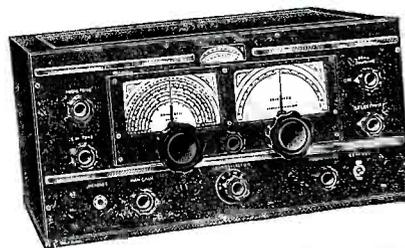


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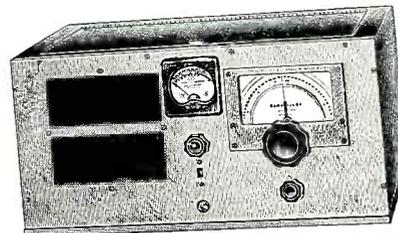


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126 1/2 S. Gay St., Knoxville, Tenn.



(Above) Broadcasting Stations employ operators, installation, maintenance men and Radio Technicians in other capacities and pay well.



(Above) Radio Jobbers and Dealers employ installation and service men at good pay.



(Above) Loud Speaker System is another field for Radio Technicians.



(Left) Police, Aviation and Commercial Radio are newer fields for which we give the required knowledge of Radio.

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WHY MANY RADIO TECHNICIANS MAKE \$30, \$40, \$50 A WEEK

Radio is already one of the country's large industries even though it is still young and growing. The arrival of Television, the use of Radio principles in industry, are but a few of many recent Radio developments. More than 28,000,000 homes have one or more Radios. There are more Radios than telephones. Every year millions of Radios get out of date and are replaced. Millions more need new tubes, repairs, etc. Over 5,000,000 auto Radios are in use and thousands more are being sold every day. In every branch, Radio is offering opportunities—opportunities for which I give you the required knowledge of Radio at home in your spare time. Yes, the few hundred \$30, \$40, \$50 a week jobs of 20 years ago have grown to thousands.

JOBS LIKE THESE GO TO MEN WHO KNOW RADIO

Radio broadcasting stations employ engineers, operators, Radio Technicians and pay well. Radio manufacturers employ testers, inspectors, foremen, servicemen in good-pay jobs with opportunities for advancement. Radio jobbers and dealers employ installation and servicemen. Many Radio Technicians open their own Radio sales and repair businesses and make \$30, \$40, \$50 a week. Others hold their regular jobs and make \$5 to \$10 a week fixing Radios in spare time. Automobile, police, aviation, commercial Radio, loudspeaker systems, electronic devices, are newer fields offering good opportunities to qualified men. Television promises to open many good jobs soon.

YOU ARE TRAINED FOR TELEVISION

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Act Today. Mail the coupon now for Sample Lesson and 64-page book. They're free. They point out Radio's spare time and full time opportunities and those coming in Television; tell about my course in Radio and Television; show you letters from men I trained, telling what they are doing and earning. Read my Money Back Agreement. Find out what Radio offers YOU! MAIL COUPON in an envelope, or paste on a postcard—NOW!

J. E. SMITH, President
National Radio Institute, Dept. 9MR
Washington, D. C.

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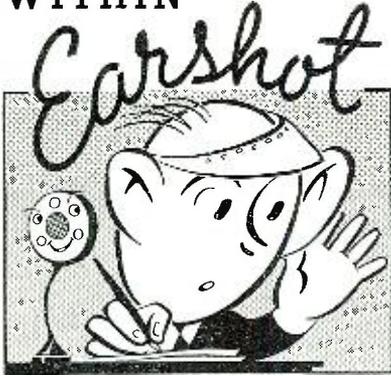
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WITHIN



OF THE EDITOR

WAR! That's all we hear from the radio. It is a sad commentary that the instrument that brings us so much pleasure should also be a tool in the wiping out of nations. A few issues back we said, "The next War will be won by propaganda, not guns," or words to that effect. Certainly the opening weeks of the holocaust, have proven that a mighty attempt by all the belligerents to "win" with radio (and leaflets) propaganda is being made. We still feel that the measure of any belligerent's opposition will be the measure of its people to absorb, without repercussion, the propaganda of its opponents.

One thing is outstanding. In these United States, the radio has made us an enlightened nation, and with the information pouring into our loudspeakers in spite of censors (see our first feature story in this issue), it will be difficult for any one to "sell us a bill of goods" that we, too, should join in the affray. At least here, the radio is still being used for peaceful intent.

WHY is the House of Representatives or the Senate any less "sacred" than the House of Parliament? We listen in on our President's speeches to the Lawmakers direct, while the English must get theirs secondhand. We wonder if there is not something behind that, that the British refuse to let a mike record the Prime Minister's speeches as they are made. Some may say that it is against tradition, but if the people are to believe that their government is a democracy, haven't they a right to cast tradition to the winds—at a time like this—and demand that they hear their own Prime Minister directly as he makes his report to the Parliament (the people), and not *after* he has made it?

WHEN is the trend going to change in amateur transmitting equipment or in the test instruments found in the average service shop? We have seen periods when our own particular transmitters and testers were completely outmoded by someone's ability to sell the radio man on the idea that his equipment was completely haywire
(*More Earshot on page 61*)

RADIO NEWS

Including Articles on POPULAR TELEVISION

The Magazine for the radio amateur
experimenter, serviceman & dealer

VOL. 22, NO. 5

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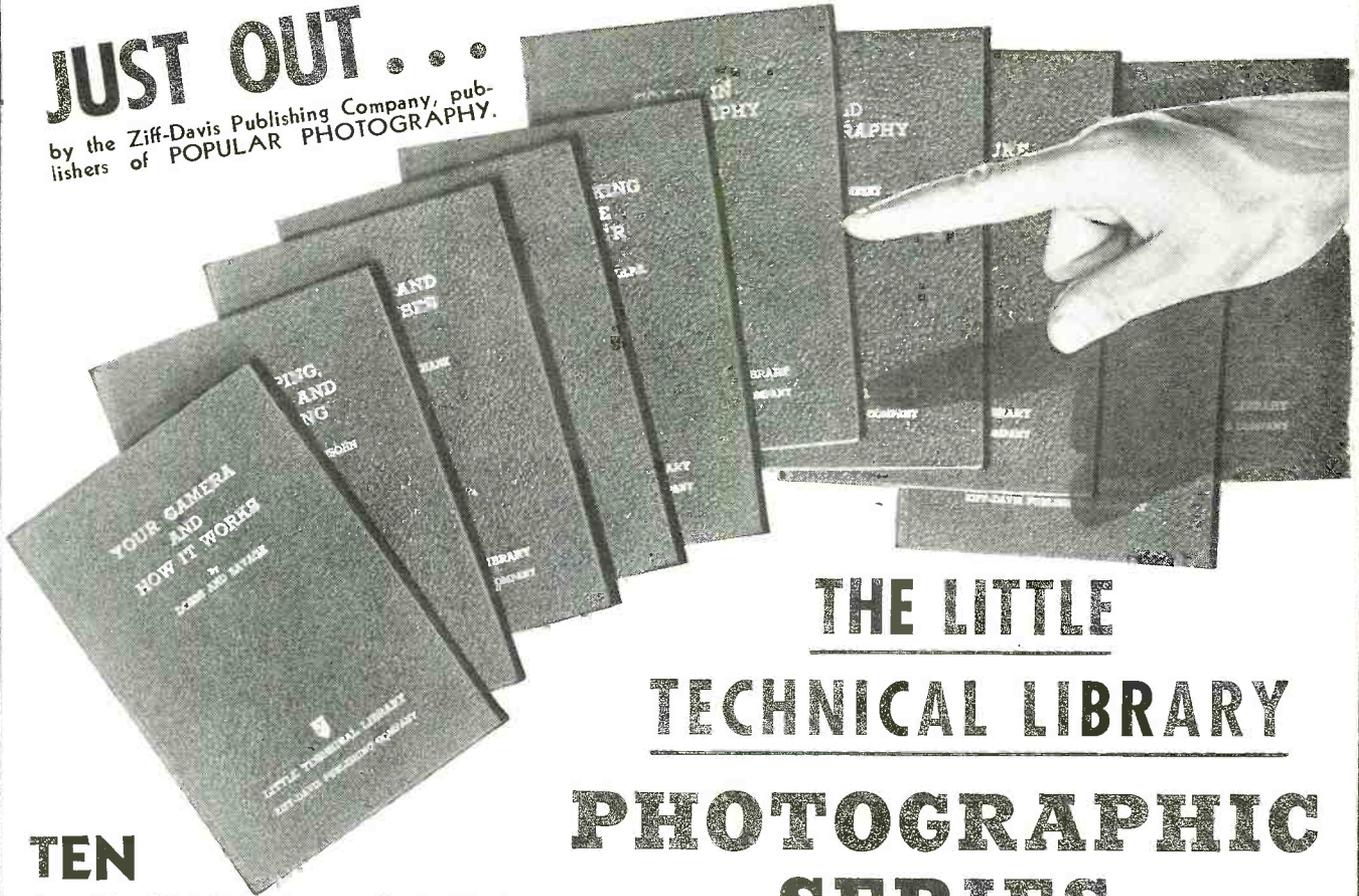
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RADIO NEWS is published monthly by the Ziff-Davis Publishing Company at 608 S. Dearborn St., Chicago, Ill. William B. Ziff, Publisher; B. G. Davis, Editor; Karl A. Kopetzky, Managing Editor; Oliver Read, Technical Editor; Herman R. Bollin, Art Director; John H. Reardon, Circulation Director; S. L. Cahn, Advertising Manager. New York Office, 381 Fourth Ave. Subscription \$1.50 per year; single copies, 25 cents; foreign postage \$1.00 per year additional except Canada. Entered as second class matter, March 9, 1938, at the Post Office, Chicago, Illinois, under the Act of March 3, 1879. Contributors should retain a copy of contributions. All submitted material must contain return postage. Contributions will be handled with reasonable care, but this magazine assumes no responsibility for their safety. Accepted material is subject to whatever adaptations and revisions necessary to meet requirements. Payment will be made at our current rates upon acceptance and, unless otherwise specified by the contributor, all photographs and drawings will be considered as constituting a part of the manuscript in making payment.

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BROADCASTER'S WAR CODE *EXPOSED!*

by
"Anonymous"

Yankee ingenuity has made this country one of the best informed nations in the World. How we manage to get the latest news right through the censors makes one of the most fascinating chapters of the early stages of the Second World War.

WHEN Kaltenborn returned to these shores from London, he is supposed to have said, "I found out more about the European Situation, here in the United States, in one hour, than I was able to discover over there in a week!" How do we do it? How does our press consistently reveal the true situation over there, here in less time than ever before? Some of the most important occurrences have been in print and on the streets days before they were officially released for public consumption in Europe. Some of our information, while over a week old, is still not being "told" over there. How do we get it? How does it get through the censor?



H. V. Kaltenborn, CBS, London-New York.



Max Jordan, NBC, Berlin.



Fulton Lewis, Jr., MBS, Washington.



Fred Bate, NBC, London.



John Steele, MBS, London.



John Gunther, NBC, London.

Assigned by RADIO NEWS to discover the reason, I was amazed at the trail and where it lead. The source of our best information is from radio broadcasts by our own commentators. No, they do not talk "right out," they use a code. And here is the story.

The War in Europe has elevated radio broadcasting and radio communication to an importance never before conceived by the radio industry. Weeks before the guns of warring nations announced the Second World War, radio had performed miraculous feats in keeping the entire world abreast of the events that transpired in Central Europe. In the United States alone, radio listeners heard both sides of all questions, and all diplomatic and political differences were discussed, for the most part, without biased commentaries or censorship. The three broadcasting networks, NBC, CBS and Mutual, scheduled almost hourly broadcasts from all the capitals of Europe during the crisis before the war began. Almost all of the European radio facilities were put at the disposal of the U. S. networks, and all press associations abroad contributed news as well as actual on-the-air reportings from many of the cities. The crisis was "covered" by radio with a

completeness never before realized on such an international basis, and at an enormous cost.

But with the sudden declaration of war, the entire radio and press facilities in Europe were placed under rigid censorship. Co-operation with American broadcasters began to dwindle as the European government turned to more important radio activities within their own countries. Propaganda of a rabid and unprecedented nature soon followed. And by the time the War was but a few days old the two spectres, Censorship and Propaganda, sped hand-in-hand through the maze of European airlines.

Of the two, Censorship is the most important to governments at war. It prevents the dissemination of information unfavorable to the country at war, it prevents unrestricted espionage activity, and it serves as a convenient check valve for the control of all news matter. But censorship also prevents the neutral listener from being informed of the *true* progress of the war. The people of the United States are internationally noted for their dislike of any kind of censorship, although we may realize its importance to nations at war. Radio and the press, working together, anticipated this general feel-

ing in America ever since the Munich crisis in 1938. They felt the present conflict approaching many months ago and made elaborate arrangements for transmitting the actual news out of most of the European countries into the United States. They developed their own means of secret communication—a means that would be unsuspected by even the most suspicious foreign censor.

And as a result of this secret arrangement, the people of the United States have been kept reliably informed on all developments of the war. America knew of the signing of the Russian-German Non-Aggression Pact five hours before the news was released by any European broadcaster. After the declaration of war, with more severe censorship, the United States was constantly advised as to military movements within all warring nations.

News commentators in the United States were better informed concerning *all* foreign events than any of the news analysts and reporters abroad. Max Jordan and Baukhage of NBC, broadcasting from Berlin, could only report on conditions in Germany, and more specifically in Berlin; they knew
(Decode further on page 59)



Sigrid Schultz, MBS, Berlin.



Thomas Grandin, CBS, Paris.



William Shirer, CBS, Berlin.

A S . . . S E E . . .

by **JOHN F. RIDER**

Dean of the Servicemen

The Second World War—and its effect on the servicing business. Selling at list!

(The opinions expressed herein are solely those of the author, and do not necessarily represent those of the Publisher nor Editors of RADIO NEWS.)

THE servicing business picked up tremendously during the last three weeks of August and no doubt will continue at the same rate for some time to come. As much as we want to see the servicing industry boom, it would have been much better if it had not shown its increase and if war had not been declared in Europe. In this I think that every serviceman in America is with me.

It is a pretty sad commentary when the revival of an industry is founded upon men dying in agony upon blood-soaked battlefields and other agenda of war. But it has happened—war has been declared and all we can hope for is that the United States youth does not become cannon fodder.

The tremendous interest in radio broadcasting has helped the entire industry—all branches. It was excessively expensive for the radio chains, but it proved profitable for the manufacturers of sets, tubes and parts. Believe it or not, servicemen actually stood in line in many jobber's places waiting to buy parts for sets actually "in work." That is something we have not witnessed for years.

Now that a demand is developing, what will be done about it? Will the industry continue serving the public at cut prices? Yes, we appreciate the fact that economic conditions are not the finest, but anyone who wishes to have their radio receiver repaired is definitely in the market for work and should not object to paying a reasonable price. We are not suggesting exorbitant rates—only reasonable, normal, profitable rates. . . . Reasonable profits to which the average radio serviceman is entitled without fear of contradiction from anyone. . . . Profits to which he has been entitled for years, but seldom achieved.

Opportunists have been much maligned, but as we see it, this is an opportunity for the servicing industry and it should not be missed. All we are saying is that here is a chance to recoup some of the losses of years past and if those servicemen who can get the business do not take advantage of the situation, they should have their heads examined.

In times like these men do not quibble over small amounts—a dollar here and there, yet it is that dollar or two which means profit or loss on a service job. . . . Why not try to get accustomed to making a profit. . . . Many industrial towns are showing increased activity. . . . The buying power of the nation as far as radio is concerned is located in these areas. . . . The majority of the radio broadcasting stations are in these areas. . . . The public is being served with radio news—they want the news—*let them pay for the news!* . . .

YOU!

As a radio owner will be pleased to know, that the better class of RADIO TECHNICIANS have joined together to so improve working conditions in the trade that you may be assured of fair treatment and efficient work at reasonable prices.

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TECUMSEH

Quality Radio Service

YOU MAY DEPEND ON THE SERVICE YOU GET FROM THESE SHOPS

The "plugger" distributed by the R.T.A. of Canada which is discussed by Mr. Rider.

We don't know which way this embargo thing is going to swing. But if we judge from the stock market, which at the present moment is sky-rocketing in steel, oil, motors, chemicals and other stocks of war character, industrial activity is going to show a decided increase. That will mean greater public income and higher standards. . . . For just how long—well, we don't know, but while it lasts the radio servicing business should get its share.

What do we mean by getting its share!—simply charging for what it does. War in Europe enables proper service charges in the United States.

List Price on Parts

IT'S being done. In Coffeyville, Kansas, 19,000 population and nine servicemen. Curtis and Statzer get full manufacturer's list price on parts which are sold to the public. For ex-

ample, a repair of a receiver involving a .01 mfd. condenser replacement calls for a charge of \$3.15. This includes the part, cleaning of the set, polishing of the cabinet and alignment if necessary. If the receiver had a bad volume control, the repair cost would be \$4.50. Set dealers secure a 25% discount on parts off the manufacturer's list prices. And these people are not fighting for business. They are doing service work for four of the best radio dealers in town.

Don't say that these people are nuts, because they have been in business for 10 years and they have made money. . . . To add insult to injury, they charge for their inspection. . . . Some are going to say that these charges are exorbitant. We don't think so, in fact, we are a little bit worried about the alignment operation. We trust that the price quoted does not apply to three- and four-band receivers. . . . Proper alignment is worth at least a buck a band—no matter how fast you can do the work. . . . This of course, does not apply to a four- or five-tube receiver, in which case alignment can be done more cheaply. . . . (We have certain ideas about this alignment business. The details are given elsewhere in this column.)

So you see, it is being done.

It can be done, if the industry will only try! That is where it falls down. . . . It will *not* try! . . .

What does it take? you no doubt ask. . . . Guts and selling or selling and guts, whichever way you want to look at it. Courage is something that is pretty hard to develop. . . . You either have it or you don't. . . . But even if you don't have much of it, you can't help but learn from what others are doing. . . . The fact that something is being done—should be proof that it can be done and that should fortify you to a certain extent—to at least try. . . .

Selling the customer on your ideas is something which can be learned—cultivated. . . . Others are doing it, why not you? . . .

We mentioned the concern in Kansas. . . . Don't you think it took selling to convince the set dealer that 25% off list is a proper price for replacement parts—particularly when the set dealer knows that discounts in the radio field run as high as 70 per cent. . . . We think it tougher to get a decent price from a set dealer than from four customers—yet it's being done. . . .

Sure it's a tough grind—but so is everything. . . . Nothing comes easy—at least none of the things we've tried to get—or the things our friends have tried to get—and more than likely it is the same in other fields. . . . But it can be had. . . . Maybe, with all the strife going on, this is a peculiar time to give a pep talk; but we can't help speaking in this tone after reading letters arriving in the office and recalling conversations with people on the road.

(Continued on page 62)



by **B. J. MUNCIWEILER**

Former Merchandise Manager, LIT BROS., Philadelphia, Penn.

How often have you lost a sale just as you thought you had it cinched? The author describes what's wrong with the average sales-talk and shows how you can increase your radio receiver sales.



AS a merchandise manager of long experience and a pioneer in the sale of radio receiving sets at retail I feel I am in a position to give some advice to others who may not have had the experiences of the writer.

When I entered the field the crystal set was a wonder and ear phones sold for \$12.00 per set and when I say *sold*, that is the exact word for in those days merchandise was scarce and high pressure salesmanship was not required; all a dealer need have was a stock on hand and the public did the rest.

However, as the product made by the various concerns became more perfect it seemed to me that salesmanship became more of a *hit and miss* affair. Also the question of a forceful exploitation of merchandise was perhaps the last thing undertaken by the dealer to make sales, secure prospects or gather "leads" from publicity started by the well meaning manufacturer. This leads me to voice another weak point in retail selling of radio merchandise.

Let us follow the well laid plans of almost every noted producer who will plan and devise—as near perfection as he can—for his product. His engineers look for shortcomings, and overcome them as found. The physical appearance of the cabinets are clever and a thing to delight the eye. Advertising is planned and vast sums spent on publicity, window displays a thing of beauty, folders, catalogs and pamphlets printed in the best and most

artistic style; and as yet the manufacturer or retailer has not secured one cent returns from his time, labor or investment—nor shall he till the final link in the chain of endeavor is completed. *And that is in the hands of the retail salesperson.*

Every cent expended, all the time employed, the best work of craftsmen and artisans fail or succeed by the one responsible for the success or failure. That one is the last person into whose hands the prospective customer falls.

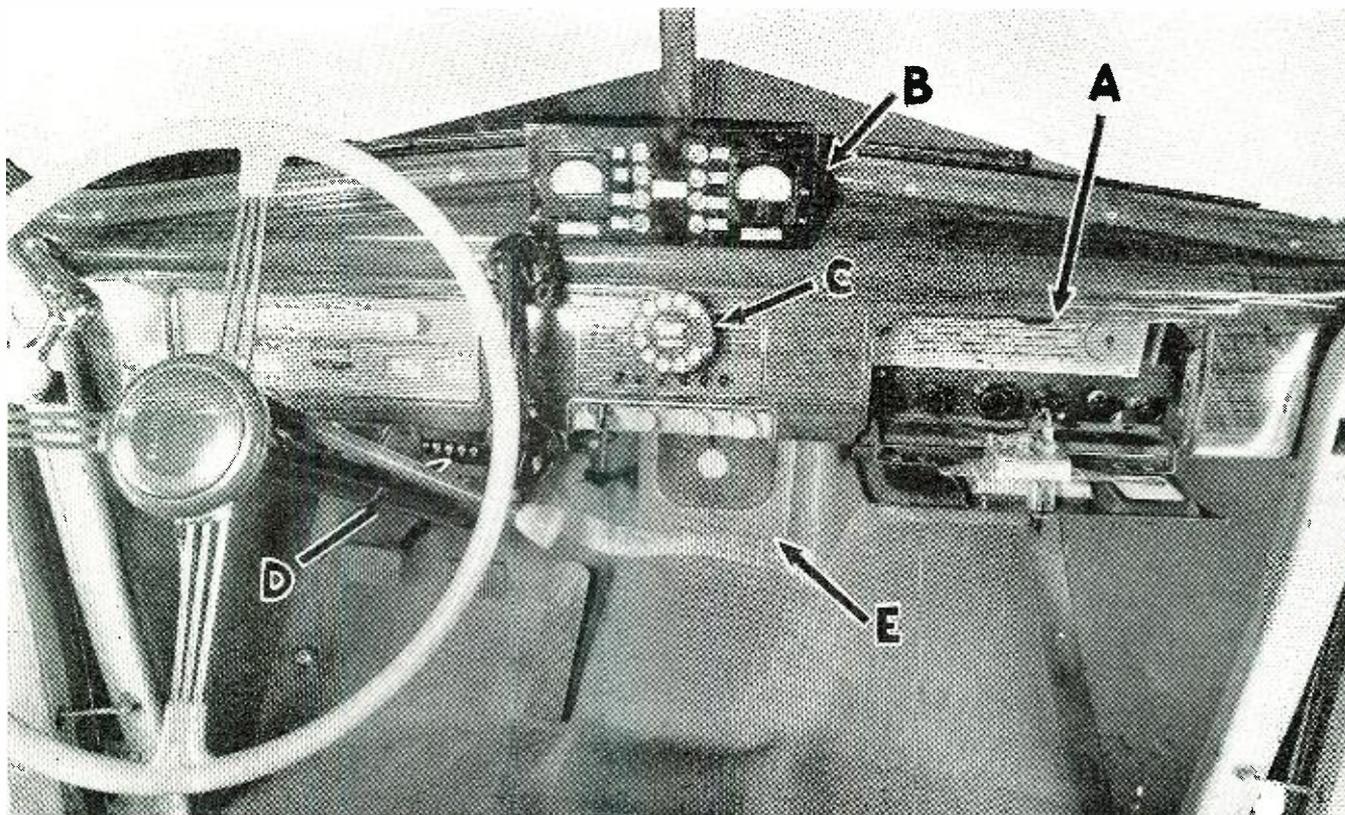
Make with care, fashion with skill, advertise and market with pains,—yet all can be a wasted effort unless the sale is made. Who makes the sale? It is a combination of all elements named above, but many times spoiled by the salesperson who uses *stilted phrases* and *shop worn salesmanship* to effect (or try to effect) sales.

Silted Phrases a Mockery

Radio merchandise today is sold by imparting to the prospective buyer certain advantages. Included in the exploitation must be a certain amount of individual thought. If this were not true, all a maker need do is to have his advertising man write a fixed set of remarks and sales would follow. Of course we know this to be a fallacy, as every person to whom the retail salesperson talks to have in mind different views, expressions or thoughts, as the case may be.

During my own experience, also in my visits to many noted dealer's

(Continued on page 54)



The "Dialomatic" installed in a 1939 Pontiac Coupé. The Howard 438 receiver (A) is installed in the glove compartment, its loudspeaker (E) is alongside; the dial control (C) is on the dash, while the switch board (B) is mounted above. The handset hangs in its cradle out of the way, and the exciter power supply (D) is mounted above the pedals.

INSTALLING THE "DIALOMATIC" MOBILE RIG

By **OLIVER READ, W9ETI, & KARL A. KOPETZKY, W9QEA**
Technical Editor **Managing Editor**

The most interesting phase of the "Dialomatic" is its installation and operation. Complete details are here included to transform your car to a mobile ham-shack.

IN this, the concluding article on the "Dialomatic" Mobile Transmitter, we will cover the actual operation of the stepper assembly and associated units. The original circuit required the use of band-selector buttons or switches to stop the stepper at the correct position on the radio selector switch. We worked out a circuit that is foolproof in operation as well as being far more efficient.

What will the dial mechanism accomplish? It will turn on the filaments automatically, select the frequency band we desire, change to another band without retuning the radio unit in the trunk, and turn off the filaments when we have finished communication.

To the police, this means that not

one, but *several* frequencies may be dialed during a chase through the various departments and to other police channels in nearby states or counties. Officials of several police departments tell us that once the chase is on that further contact with other services is impossible unless a land telephone is handy. This means a loss of valuable time for those engaged in the chase.

Applications of the Dialomatic

We have discussed only one of several methods for completing a mobile installation. This is not by any means the only practical setup for any of several applications. Take the amateur requirements for example; he is interested in operation on three bands to cover local, dx, and mobile frequen-

cies with as much coverage as possible within these bands. For this application the use of a separate exciter unit is best. Located at the dash, we may use either crystal control or electron-coupled oscillator at will. This will allow plenty of opportunity to get out from under heavy *qrm*.

The two previous articles described the construction of this method of frequency control. Further tests in two cars indicated that certain refinements could be added and we shall mention them for those interested in this version of the "Dialomatic." We found that by adding a separate tube for use as the crystal oscillator that more output could be realized than with the original setup. This circuit is shown

on the schematic diagram and is ideal for amateur applications. Crystal-control or ECO is had at will by selecting the proper position on the switch for the cathode return to ground. The plate coils are used for both methods, while the grid coils are used only for the ECO operation.

A small $\frac{1}{4}$ watt neon lamp without resistor was added as a means of showing that power was being delivered to the amplifier. This proved to be ideal for night operation and the use of a milliammeter is confined to measurements only.

For police, we may eliminate the exciter at the dash and build it within the trunk unit so that the entire selection of frequency will be made automatically and at fixed channels on assigned frequencies. It is well to remember that the *FCC does not permit a police officer* to make any adjustments to a transmitter which would or might cause "off-frequency" operation.

In a later issue of *RADIO NEWS* we shall show the construction of such a unit for fixed operation. This same method would be used in aircraft or similar services and is also adaptable to other uses aside from radio.

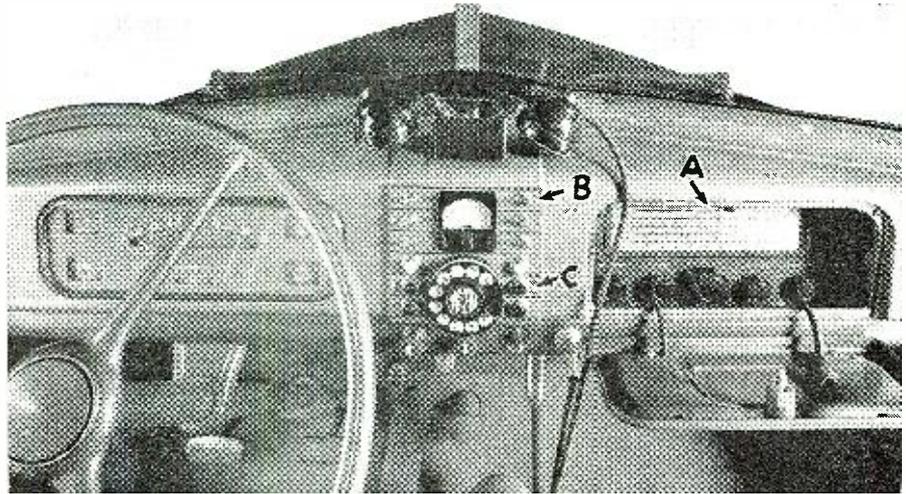
The "Dialomatic" Assembly

The heart of the entire system is the stepper assembly that turns the radio-frequency switch to select the proper circuits that are not within our reach. Inasmuch as the usual stepper relay is not designed to deliver *mechanical power*, we set up two units for observation with the intention of increasing the power on the stepper shaft so that sufficient torque could be had to accomplish the switching of the external selector mechanism.

The original stepper used was a *Guardian* unit that came with a group of relays; the stepper, the dial, and the holding relays. These were retained and are part of the assembly as it comes from the manufacturer. The amount of power is largely determined by the resistance of the coil used on the stepper relay. We decided to use one of very low resistance to enable the pull of the unit to be as great as possible, and in turn, to deliver the maximum power to the shaft.

We are not concerned with the amount of current drawn from the battery during the short pulses of the dial as these are too short of duration to affect the battery life. The relay coil is energized only during the pulses and will not heat with this overload during the short time of actual stepping. The assembly is furnished with a square bakelite panel on which are mounted 40 contact points and a rotary selector switch blade. These are used to indicate the position of the shaft connected to the radio switch by means of pilot lamps at the dash panel in the car.

They control the "filament ON" and the proper position for the holding relay to be brought into play. They connect the "filament OFF" relay that clears the entire stepper assembly from the battery and places the unit



A 1933 Chevrolet installation. The receiver (A) is again in the glove compartment, while the dial control (C) and switches (B) are on the dashboard.

in a neutral position ready for business when required.

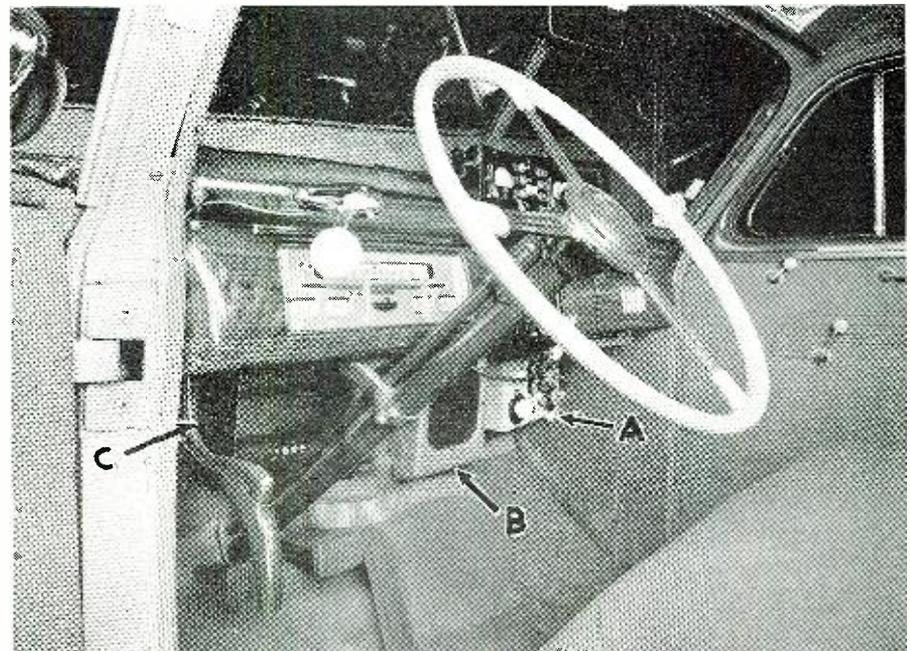
Now for the operation of the stepper: Beginning at the "neutral" or "off" position we dial "1." This seizes the dialing relay coil and completes a circuit to the stepper relay coil. This moves the stepper by one. The dial jack contacts close after the dial has come to rest and moves the stepper one point further. The filament relay closes and voltage is applied to the tubes and will remain there until the stepper has completed a full 360 degree rotation.

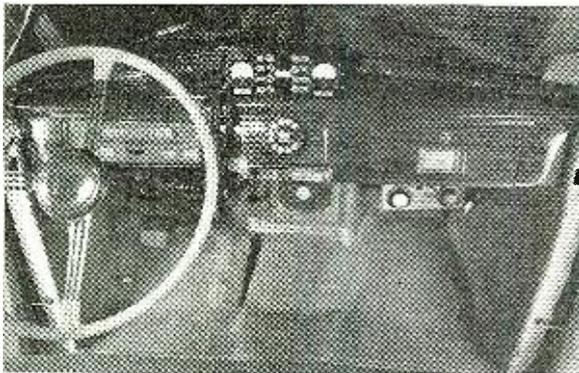
To reach the first frequency position, we now dial any number up to ten. As the proper contact is reached the holding relay will break the circuit to the stepper and further rotation stopped. Here is where the foolproof feature comes into play. If we dial



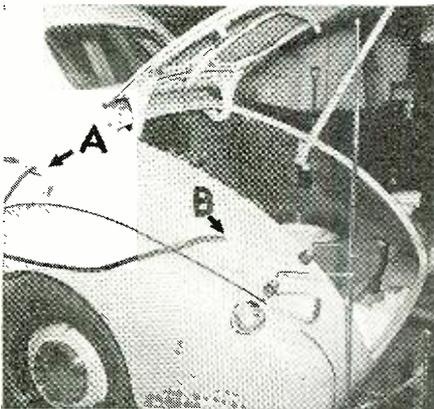
The trunk installation. Two storage batteries power the final amplifier. The final is to the left next to the tire, and is controlled by cables.

Side view of the Pontiac installation. The exciter (A) is against right firewall. The receiver loudspeaker (B) is against the middle; exciter power (C) at left.





When the glove compartment is closed, there is not anything to interfere with the normal use of the car by other members of the family, an important point to remember. The installation is very clean.



For fixed operation, coax (B) runs to front 36' mast. AC charging thru the outlet (A) keeps batteries up.

less than "10," we can dial again, any number, and keep on dialing, automatically the stepper will stop only at the 1st frequency setting.

Suppose we dial the number 6 by error. We can then redial any number or combination of numbers that will make up the difference and will not overshoot the fixed position we have selected. Our indicator lamp at the dash will light showing that we are on frequency. Ten more pulses will move us to the next band and so forth. As we leave the last band—we dial 8, 9, or 10, and as the arm reaches the "filament OFF" position, the relay will be opened and in turn remove all juice from the tubes. We are now ready to repeat the process from a cleared position.

Inasmuch as only one second is required to move between positions, the selection of three bands can be accomplished in the interval of approximately four seconds time.

Mounting the Complete Installation

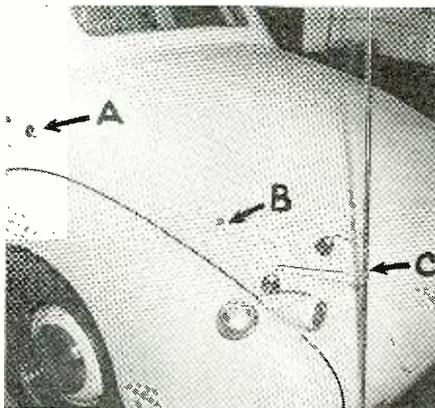
So many cars are on the market that each installation will require a different layout and method of attack for best results. We will cover two particular cases as examples. One was a 1938 Chevrolet Deluxe Sedan with two small panels located in the center of the dash—one above the other. These are easily removed by means of two

hex nuts. These two plates were removed and the switches, meter, dial assembly and pilot lamps mounted as shown. It was necessary to cut out the space back of the panels with a hack saw, but this was easily done.

The latest type W.E. police handset with push-to-talk button is mounted above the two plates and rests on a cradle which has been furnished with thin rubber strips cemented to the cradle to prevent slipping. No holding clamp was needed and the handset remains in place over the roughest roads. The cable connects

to an Amphenol plug and into a socket in the hole normally occupied by the choke button. This was moved over to an extra hole as shown and allowed additional room for the receiver to be installed.

The cardboard box in the glove compartment was removed and measurements taken to determine the size available for selection of a communication receiver. An examination of all available sets was made and the one found best suited to our needs was the Howard Model 438. This cabinet is extremely compact and is only fourteen inches wide. The speaker was re-



In mobile work, antenna (C) is used and outlets (B) and (C) are closed and capped with Amphenol screw caps.

moved from the cabinet and placed in a separate Lafayette baffle.

This left some two inches in overall height and allowed the cabinet to be cut off at the top to gain an additional space of one and one half inches. A piece of galvanized iron was cut and a new cover made. This was soldered to the cabinet and then replaced over the chassis. Brackets were made that fasten to the cabinet and then mounted back of the glove compartment—two in front and one large bracket to support the rear edge of the set.

The "B" eliminator (Howard, type 610) is mounted on the motor side of the firewall and connects to the set by means of the cable furnished with

the pack. The elimination of hash will depend upon each installation. Suffice to say that the usual generator condenser and the distributor resistor will be needed in all cases.

The metal box containing the Mal-lory 552 Vibrapack and the filters and relay is mounted on the opposite side of the car and also on the motor side of the firewall. The exciter unit is located to the left of the steering column directly under the dash. This was installed after the photograph was taken.

Another installation was made in a Pontiac 1939 Coupe and the location of the various units determined by this particular car. A different problem was met as the room available back of the dash at the glove compartment was actually less than in the Chevy. A test was made to see if it would be possible to operate the receiver in this position without the cabinet. This test was highly satisfactory and the set works perfectly without a cabinet in this car.

The motor block is bonded to the chassis with heavy duty flexible cable. Each spark plug is furnished with a suppressor to take out the last trace of hash. Ten meter reception is very good except when interference from passing cars is encountered.

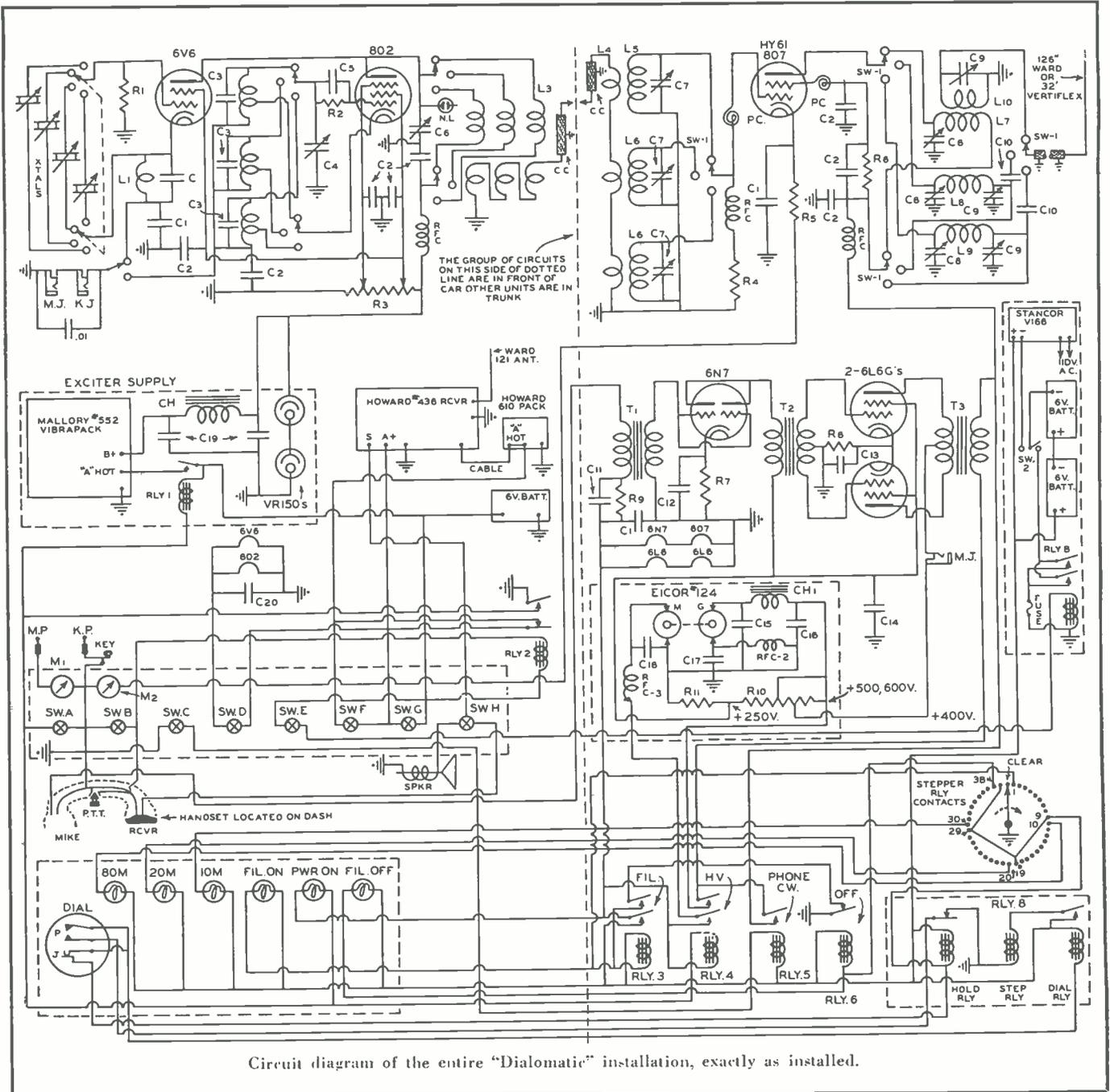
The placing of the exciter, receiver and exciter pack is clearly shown in the illustration. This installation required slightly different treatment at the dash. A metal box was constructed and a panel made to house the meters and switches and mounted above the dash. The handset is held in place by means of a standard hook and length of spring steel bent to hold the unit in place and to prevent motion while in transit.

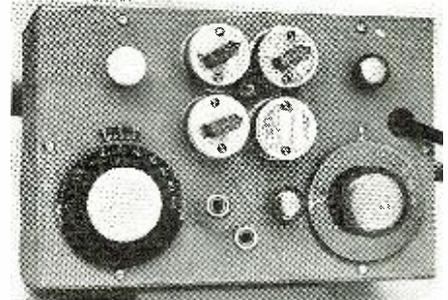
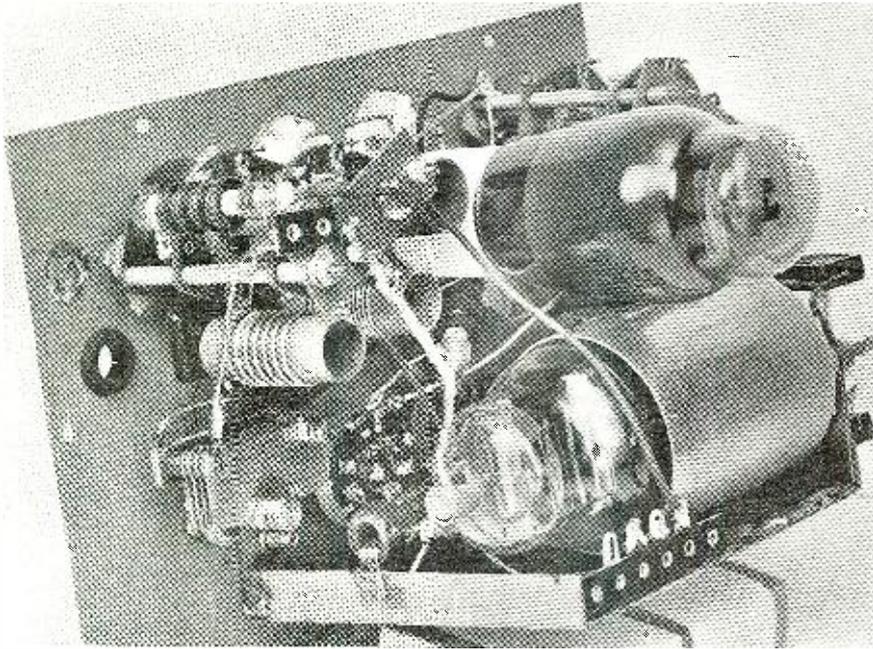
Installing the Trunk Units

Here again the car itself will determine the best place for locating the amplifier, charger, and batteries. On one make (Chevy) the spare tire was discarded and the car equipped with puncture-proof tubes all-around. This extra room allowed all of the units to

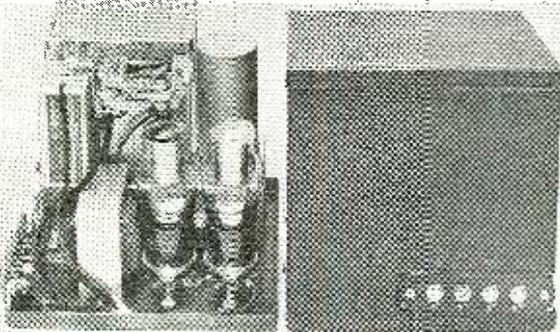


The 36' Vertiflex mast is mounted on its commercial base which is bolted to the top of the bumper extension.





The exciter from the front showing the 4 Bliley crystals and controls.



The exciter, above, is compact, containing 2 tubes. The voltage-regulated power supply, left, furnishes 300 v. dc., @ 100 ma. The ECO 302 RCA tube is set under the 6L6 (later replaced with a 6V6). Plate tuning condenser is towards front. Tubes in power supply are filamentless RCA VR150's.

the line plug. The location of the trunk units will be seen for the *Pontiac* as well as the installation of the *Ward police antenna*. This antenna extends to an overall length of 126". The mounting rods are adjusted to the contour of the car and provide a solid support against the wind pressure.

This antenna is pre-tuned to all bands at the transmitter and is set for maximum height each time the car leaves the garage. The receiving antenna is of the same type with the exception of the mountings. This is mounted on the receiver side of both cars in the same position.

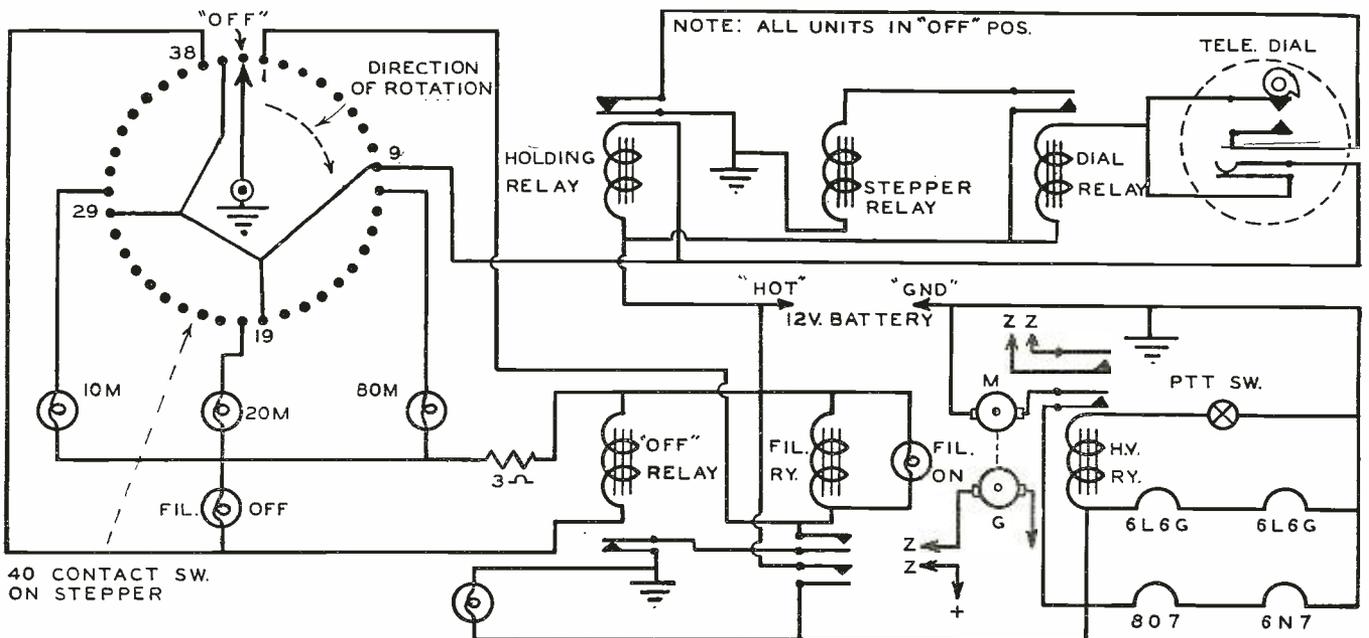
In times of emergency or for operation in a semi-permanent position, a 34 foot antenna can be used to an advantage. These are mounted behind the front bumper on the large insulators furnished. The *Chevrolet* has a *Premax*, while the *Pontiac* is equipped with a *Vertiflex*. A length of *Amphenol* coaxial cable connects to the trunk unit and may be removed at will.

Transmitter Operation

The complete circuit is shown just as installed in the two cars. The exciter unit is placed in operation by throwing the filament switch and by pressing the push-to-talk button on the handset. An additional switch is pro-

be placed in accessible positions without crowding. The battery charger was made by the *Standard Transformer Corp.* for heavy duty use (No. 166), and is of the dry-disc type with tapering charge.

An *Amphenol* connector is mounted on both cars to bring in a 110 volt a.c. line for charge. These are furnished with waterproof caps and a short chain to retain the cap should it work loose or not be put in place after removing



Circuit diagram of the details of the stepper relay mechanism.

vided which permits this same condition so that initial adjustments may be made to the units. The exciter uses an 80 meter crystal for output on that band, 40 meter units being used for 20 and 10 meter output from the amplifier.

The 807 operates as a doubler on 10 meters and the slight amount of regeneration adds to the general efficiency on this band. The 6V6 oscillator tube makes use of a tuned cathode coil in the ground return. The LC is selected for Tritet action and is best suited when the plate circuit is tuned to the second harmonic of the crystal. The tube will deliver ample output, either as a straight oscillator or oscillator-doubler without shorting-out the cathode coil.

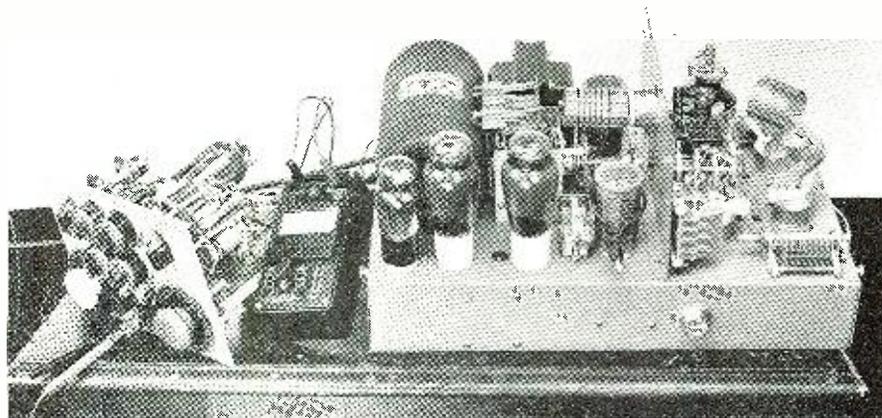
The *Browning* coils are selected by the rotary switch on the right hand side of the box. The left side contains the grid coil assembly for the 802 EC oscillator and are used only when operating electron-coupled. The construction of this unit was covered in the September issue of *RADIO NEWS*.

The amplifier circuits are adjusted by applying excitation to the individual sections and tuning them to the antenna at full extended height. The grid coils are resonated by means of the small condensers that fit inside the coil forms. The links are wound loose around the ground end of the coils so that they may be adjusted for maximum transfer from the exciter drive.

The audio amplifier is tested into a dummy load (Ohmite) and a check made for quality. The input must be carefully made for best response from the handset and this point determined by an ear test. A good point to remember when first adjusting the transmitter for modulation is that the person using a handset is at the same distance from the carbon transmitter during each conversation. Once set—the gain will remain practically the same providing the amplifier tube is loaded to the same current for each band.

A push-to-talk relay (Ward-Leonard) is provided for complete operation from the handset button. Another is provided as a safety switch to the trunk units by disconnecting the battery from all equipment during times when the apparatus is not being used.

Now, let's look at a mobile installation from the *practical* angle. First of all, we must be completely equipped to carry on communication with maximum speed and convenience. We may be assured of this by carefully planning the balance of accessories in the car since they will all play an important part in the final results. Various units will be needed to complete the picture. A transmitting antenna should be selected with great care. Too many of the ordinary fishpole varieties do not possess the needed finesse to permit trouble-free operation in a fast moving car. This may be better explained by taking the mechanical assembly into consideration. Unless the rod is equipped with a lock-



The laboratory set-up used in testing the "Diplomatic" prior to its being installed in the cars. This is a necessary step to "debug" it.

ing device at each section—we might encounter trouble from one or more of these sliding down and in turn upset the tuning of the transmitter.

We selected those especially made for the purpose. The main transmitting fishpole is the same as is used on the newest police cars and is known as the *Ward DeLuxe* police antenna. This has an overall length of better than 10 feet and may be tuned to all amateur frequencies by means of the suitable networks shown in the diagram. The antenna is of the telescoping type and each section equipped with a locknut. The top section consists of a thin, whippy rod which is extremely flexible and will give freely upon coming in contact with an obstruction.

The 36' *Vertiflex* on the *Pontiac* and the 34' *Premax* on the *Chevrolet* collapse to a length of approximately six feet and are carried along for service when a sufficient signal might not be radiated from a remote location with the mobile antenna. They fit on their respective insulators and are held firmly in place without guy wires. Needless to say, they are not used in *transit*. The receiving antenna is also of the transmitting type and is equipped with side mounting insulators in the same way that the regular transmitter one is mounted.

We chose the receiver antenna for its ability to withstand hard use and the fact that we could extend the antenna to a height of some twelve feet above ground in order to receive weak signals. Remember that most factory-built communication receivers have an antenna primary designed to operate with an input impedance of around 400-600 ohms. If we attempt to match a fishpole (about 30-80 ohms) to this input, we will encounter quite a loss and our signals received will be way below the capabilities of the set. By omitting the shielded lead between the antenna and receiver we can raise the impedance presented to the set and in turn get a better transfer of energy.

It may be necessary to provide additional filtering to some of the instruments behind the dash but we did not find this needed in the laboratory installations.

Care of Battery Equipment

Too much stress cannot be laid on the necessity for good batteries for use with a mobile unit of this kind. By purchasing the best and ones of ample capacity, we may be confident that a failure will not take place at the worst possible moment. In making our selection—we decided to install ones having a sufficient rating to provide some 15-20 hours of continuous duty between charging.

The batteries should be kept clean and free of spilled acid at all times, and the connections smeared with oil and grease before any permanent connections are made. This will offset or prevent corrosion from taking place and add to the general life of the cables. It is well to keep some rags in a metal or, better yet, a rubber container for use in care of the batteries.

Conclusion

We regret that space does not permit other applications of the "Diplomatic" to be covered. The use of such a system in various Government services will at once be appreciated. Those who have seen the unit work have been amazed at the simplicity of the stepper idea and the fact that a maze of expensive relays could be done away with in r.f. circuits. Many remotely-controlled devices will be better handled with the diplomatic operation, and in the very near future we expect to apply our inventions to other transmitters and mobile rigs.

Remember that this system is not limited to three-band operation. A larger chassis might be used to allow space for additional coil assemblies and pi-networks and the system extended to twelve or more frequencies. The stepper is available with more contacts so that it is simply a question of providing the proper switch which will have the proper number of contacts and to carry out the circuit for additional positions. We will be pleased to hear from those who build this transmitter and trust that they will obtain the excellent results that it is capable of giving.

[*Patents have been applied for on the stepper relay and the series link-coax cable.*—Ed.]

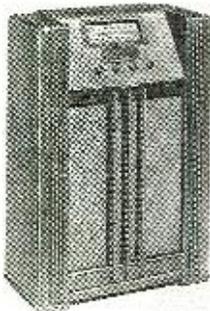
What's **NEW** in Radio

E. I. Guthman Co. have incorporated refinements in their U-10A Frequency Meter-Monitor in the form of a 6E5 tuning eye, and includes other features. Temperature stabilized. Fundamental range 840-1030 kc. strong harmonics covering 5 thru 160 meters. 7 1/2" dial may be set with extreme accuracy on WWV or 19 broadcast stations. Voltage regulated. Added fre-



quency standard thru built-in 100 kc. oscillator. Detector tube provides audio monitoring and zero beating; cathode ray tube connected to monitoring detector gives visual deviation. For 105-125 volts, 25-60 cycle, A.C.-D.C. Uses one each 43, 25A7, 6J5, 6E5, VR-105, 55-A.

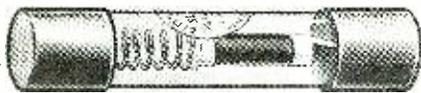
Stewart-Warner, Chicago, announces a new line of home, portable, and television sets. Among the many new models is the set shown, known as Model O1-6E7, a 6 tube AC console. Covers



broadcast, police, and European short wave. 6 station Magic Keyboard tuning. 6 buttons. 10 tuned circuits. 10 inch speaker. Record playing connection. Wired for television sound. 3 position tone control. Built-in antenna. Automatic bass compensation and tone control. Superheterodyne. Dignified modern cabinet. High finish.

Littlefuse Inc. announce a new line of "Sto-Blo" fuses, made to carry harmless inductive or capacitive surges and overloads for a reasonable period of time; but, on the other hand, to blow before the danger point is reached. They prevent needless "blows."

They are really a dual purpose fuse having:



Ⓒ SPRING Ⓑ RESISTOR Ⓐ FUSE LINK

(a) a simple fuse link, and (b) a resistor element which provides the heat inertia or time lag. The spring (C) serves not only to open the circuit, but to take up the expansion of (A) thus preventing crystallization on repeated heating and cooling.

On severe overloads the fuse link (A) melts as a conventional fuse. But on prolonged overloads the resistor (B) heats up and melts the fusible alloy connecting to (A).

The applications for these fuses are quite numerous. They protect motors, vibrator circuits, intermittent control circuits, inductive power packs, etc. Most motors, for instance, would soon burn out if stalled for any reason because of the excessive current it draws when stopped. The same is true on many coils, solenoids, magnets, relays, etc.

A new series of band switching assemblies for amateur transmitting applications has just been announced by Bud Radio, Inc., Cleveland, Ohio. Three units are included in this new line, and all are designed for operation from 10 to 160 meters.

The OCS-1 band switch assembly is intended for use in a pentode oscillator or buffer stage that is capacity coupled to the following stage. A maximum input of 50 watts may be applied to the stage using this unit.

The XCS-1 band switch assembly is designed for use in push-pull grid or plate circuits, or single ended plate circuits where plate neutralization is used. All of the coils in the assembly are center-tapped and center-linked. This unit is intended for operation in stages where the input power does not exceed 100 watts.

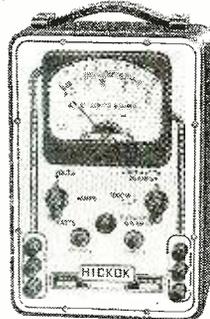
The XCS-2 assembly is intended for use in single-ended pentode plate circuits and single-ended grid circuits. All of the coils in this assembly are end-linked, and are intended for operation in stages where the input power does not exceed 100 watts.

All three assemblies are supplied with complete installation instructions and a dial plate marked 10 to 160 meters for easy identification of the coil positions. Each unit requires a 100 mmfd condenser of suitable spacing to tune all bands.

The new Model 900 Hickok Tester has ten ranges of A.C. Volts, Amperes and Watts. While designed primarily for electrical appliance testing it is also useful for radio as a wattmeter check for A.C. sets.

Model 900 is especially valuable for A.C. trouble finding as it tests appliances while in actual operation, indicating wattage consumption, amperes and line voltage. Being completely encased in steel, it may be used around heavy current carrying conductors without danger of stray field errors.

Has four ranges of watts up to 2000, four ranges of current to 26 amps, and two ranges of volts 0-130-260. A Dynamometer meter with a specially designed current transformer is employed with suitable switching to obtain these ranges. Provision has been made for testing in two and three wire circuits. Detachable leads are furnished for connection to small appliances. Low range of 0-20 watts will measure power



consumed by electric clocks, bell ringing transformers and similar appliances which remain on the line permanently.

Available in 60 cycle and 25 cycle models. For detailed information write The Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland, Ohio.

Operadio Manufacturing Company, St. Charles, Illinois, announce a complete mobile PA system that features the "Economizer Control" for the conservation of battery supply. This control consists of three separate switches, one for the filaments of the tubes, one for the power supply for the generator, and one for the power supply to the phonograph motor. When the System is operating and reproducing phonograph records,



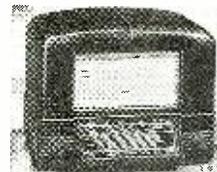
all three switches are on. If, however, the System is to be idle for a short time, the power supply and the phonograph motor switches are turned off (these draw the greatest amount of current from the Battery) and only the Filament switch is left on, keeping the tubes warm. This "Economizer Control" increases the useful length of the battery charge from 25 to 50%. The equipment is built up to the Operadio

high standard of perfection. It is beautifully finished in baked gray wrinkle and may be had in various models.

Model 172 consists of a 25 watt amplifier, a 12" turntable with a 78 r.p.m. motor and crystal pickup, all of which are part of the amplifier assembly; two 12" Operadio heavy duty permanent magnet dynamic speakers; and a hand type dynamic microphone, complete with switch in handle, cord and plug.

RCA Victor's "New Yorker" radio has been placed on sale in the United States for airline executives, pilots, amateur aviation enthusiasts, and others interested in following commercial and amateur ship-to-ground communication. Government weather reports and other types of aviation radio broadcasts.

A radically new circuit design worked out in the RCA Victor laboratories fitted the "New Yorker" for its original mission as an extremely sensitive and selective table model radio to over-



come the difficulties of short-wave radio reception in the tropics. Likewise, its efficient coverage of the 62, 49, 40, 31, 25, 19, 16 and 13-meter bands makes it perfectly adaptable for its new use in this country. Reception on radio channels assigned to commercial airlines and ground stations, itinerant aircraft, and the Civil Aeronautics Authority Airways Radio weather stations are all provided for.

A moulded plastic cabinet of unusually smart design will find the radio a prominent place in the home of commercial and amateur flyers, where members of the family can keep close tabs on the distant flyers and be assured of their safety and progress.

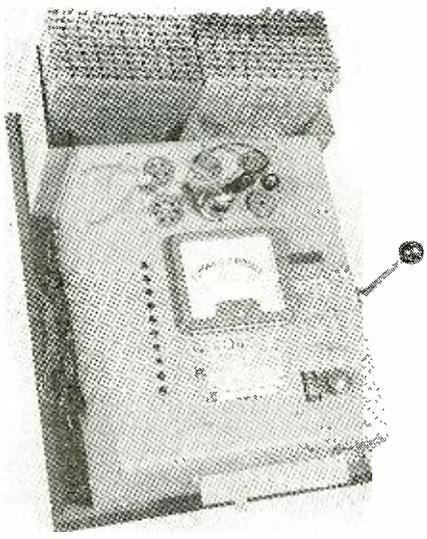
The six-tube receiver has four bands, including the European long-wave band, and includes a plug-in connection for Victrola attachment. The "New Yorker" radio is available in black, brown, or ivory plastic cabinets.

Ready for delivery are three new Stromberg-Carlsons—a low-priced maple console in authentic Early American design, a 3-band table radio with 3-gang selectivity, and a convertible AC-Battery model. With these additions the current Stromberg-Carlson line comprises 42 models of varied designs, woods, types and price classifications to meet any radio need. The new models just introduced are the only ones Stromberg-Carlson plans to bring out at this time, according to Lee McCanne, Radio Sales Manager.

New Stromberg-Carlson Model 420-F is an authentic Early American Hutch Console in solid maple, priced to appeal to buyers of low-priced maple furniture.

It employs a 12" Stromberg-Carlson speaker, Electric Flash Tuning, Bi-focal Tuning Indicator, Automatic Drift Compensator, and Slide Rule Dial.

Dayco Radio Corp., Dayton, Ohio, present the D.R.C. Robot. Entirely automatic, it is positive



assurance that the tube will receive a correct test. The customer is safeguarded, and the operator is certain he may rely on the facts as shown by the indicating devices.

Simplicity is the keynote of operation. A card index, covering all tubes, is arranged for handy quick reference. Simply place the proper card in the slot provided, insert the tube in testing socket, pull the lever and the Robot gives you the exact answers.

Internal mechanism is mechanically and electrically constructed with 100% safety allowance. The metal case housing the working parts, and the card index rack are beautifully finished in baked enamel.

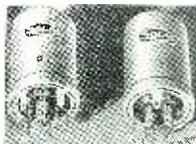
Non-warpable wood base, beveled edge, smartly finished in black.

Main indicator is a large meter calibrated for direct reading.

Ten short test indicators, in one operation, automatically locate any existing shorts.

185 Index cards, covering 580 receiving tubes now in use are used; additional cards will be available as new tubes are announced.

Solar Manufacturing Corporation, makers of capacitors, Bayonne, N. J., has just announced dry electrolytic capacitors for use as original equipment in radio sets, and for service work,



incorporating a new type of mounting with base prongs which fit chassis slots and are fastened by twisting. This is known as the Solar DY type. Available in all standard values. Listed in the new Solar No. 10 catalog, which may be had by writing Solar direct.

The Transformer Corp. of America, through the Clarion Institute of Sound Engineers, announces the new Clarion Model C-148 Deluxe Portable Sound System for Sound Men, Theatrical Troupes, and Orchestras. It offers ample power for large ball-rooms and auditoriums, five channel mixing panel allowing the simultaneous use of five Microphones, Streamlined appearance and Ultra-Modern Aero-Luggage Carrying Cases. The Amplifier has an output of 31-40 watts, employing two 6L6-G output tubes in push-pull



with inverse feed-back. Five high gain Microphone channels and one medium gain Photo channel make this unit adaptable to all applications. A tone equalizer permits individual control of both bass and treble tones.

Amplifier, two 12" heavy duty Speakers, Velocity Microphone and Stand are contained in two sturdy carrying cases.

Complete information and catalogue available by writing to Transformer Corporation of America, 69 Wooster Street, New York, N. Y.

Vulcan Electric Co., Lynn, Mass., have a new solder pot to save wasted solder, electricity, and first cost with this more efficient small rectangular unit designed especially for solder dipping of small and delicate parts.

Rectangular in shape with a 2 3/4 oz. solder capacity. Inside dimensions are 2 3/4" x 1 1/2" x 3/4" deep. It is heated by a 75 watt replaceable

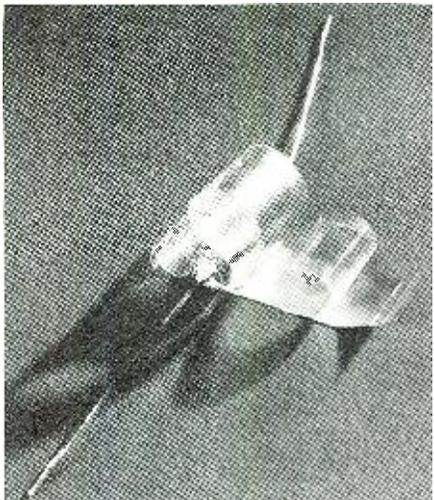


cartridge unit. A permanently attached approved six foot cord and attachment plug is provided. The cord is protected from spilled solder where it leaves the pot for a safe distance by a metal tube. The pot is cast iron with sheet metal legs and mounting holes. The finish is black with nickel plated cord guard, and moderately priced.

Bakelite Corporation announces the development of Bakelite polystyrene film for electrical insulation purposes. All of the many advantageous properties that are found in Bakelite polystyrene molding material are incorporated in this new film which has been developed espe-

cially for such uses as wound capacitors in radio sets and other types of electrical equipment. The low power factor of the Bakelite polystyrene film produces capacitors which are extremely efficient. It is also important that these capacitors have stable capacitance not only with changes in temperature but also for various frequencies. The electrical properties of this film will remain constant even at varying temperatures.

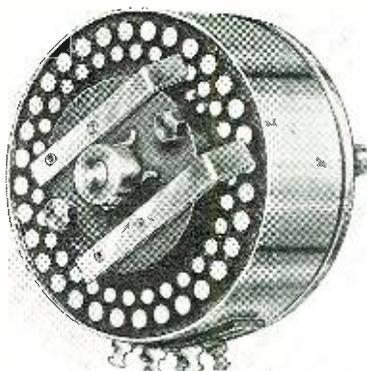
This is made possible because of the stable characteristics of polystyrene and its exceptional water resistance. The film is water white in



appearance, but may also be had in a tinted shade of purplish black. It is supplied in ribbons 1 1/2" and 2 1/2" wide and wound on spools to a diameter of 4". The standard thickness is 1 mil; certain other thicknesses might be supplied. Full details as to the physical and electrical properties of this new material may be had by communicating with the Sales Department of Bakelite Corporation, 247 Park Avenue, New York City.

A stud-type Attenuator known as IRC Type B-31 and having unique design features which make it especially suited for low level work has been announced by the International Resistance Company, 401 North Broad Street, Philadelphia. Bridged "T" ladder or potentiometer networks are available.

A spiral clockspring connector used in each arm of the bridged "T" eliminates two series



pressure contacts and makes possible a maintained low noise level of -150 D.B. Noise is further reduced by a contact of laminated beryllium copper operating over beryllium copper contact studs.

30-step attenuation is provided. Standard attenuation is linear for 24 steps, 1.5 D.B. per step up to 36 D.B.; tapering off to 65 D.B. on the next to last, and to infinity on the last step. The bridged "T" circuit has constant impedance looking "in" and "out." Standard impedances for the bridged "T" and ladder networks are 50, 200, 250 and 500 ohms, with other values being supplied on request.

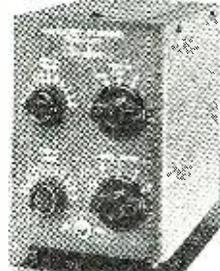
Resistors used are IRC Type BW bakelite molded wire wound for low impedance circuits and IRC Type BT Insulated Metallized resistors for high impedance circuits. Dial plates are calibrated either in decibels or in number of steps. The Attenuator is 2" long by 2 3/4" diameter.

Complete details are now available in a new IRC Data bulletin data sheet available from the manufacturer upon request.

A crystal-controlled oscillator which will more accurately serve many of the purposes of frequency meters and service oscillators and which, because of its flexibility of application and low price, will be of interest to hams, servicemen and laboratory workers, is found in the new Hallcrafters HT-7 Frequency Standard.

Fundamental outputs at 1000, 100 and 10 k.c. are provided, each with harmonics made

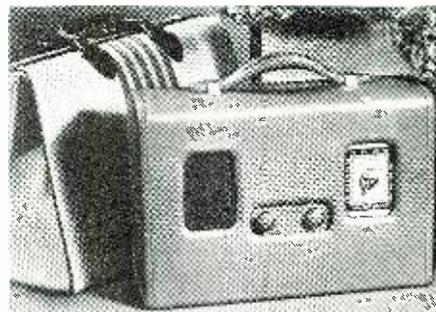
useful even in the highest frequency ranges by a built-in, tunable harmonic amplifier stage. A dual-type 1000-100 kc. crystal controls the outputs at these frequencies. The 100 kc. crystal position also locks in a multivibrator which provides the 10 kc. output. Precise accuracy of the 100 kc. output (and therefore the multivibrator 10 kc. output) is assured by provision for slightly varying its frequency to exactly resonate, at its fundamental or a harmonic, with other standards such as WWV's transmissions. Ex-



actness to a fraction of one cycle is thus obtainable. The 10-kc. harmonics are strong enough to provide useful check points to well over 15 mega-cycles and the 100 and 1000 kc. harmonics well beyond 30 mc.

The entire unit is inclosed in a steel cabinet 8"x7 1/2"x5 1/2", finished in gray stipple. Four tubes serve as crystal oscillator, multivibrator, harmonic amplifier and power-supply rectifier. Its panel controls are: fundamental frequency selector switch, 100 kc. crystal tuning, harmonic amplifier band switch, harmonic amplifier tuning, and on-off switch.

Three new models have been added to the popular battery-type radio receiver line which was inaugurated recently by the General Electric radio and television department, Bridgeport, Conn., with the first "Carryabout" model. Two of three are identical in chassis and performance characteristics, but have different carrying cases, while the third is a combination radio-

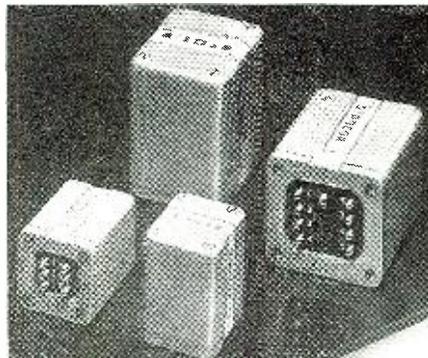


phonograph model. None of the sets require ground or antenna connections.

The two radio models, HB-402 and HB-403, are four-tube superheterodyne sets, with a broadcast band of 540-1600 kc., a 4 1/2-inch permanent magnet speaker, built-in Beamscope, automatic volume control, and excellent sensitivity and selectivity. Without batteries they each weigh approximately five pounds, and are about 9 inches high, 13 inches wide, and four inches deep. With the battery complement each weighs about ten pounds.

Standard Transformer Corp., Chicago, announce their new line of Hi-Fi Transformers.

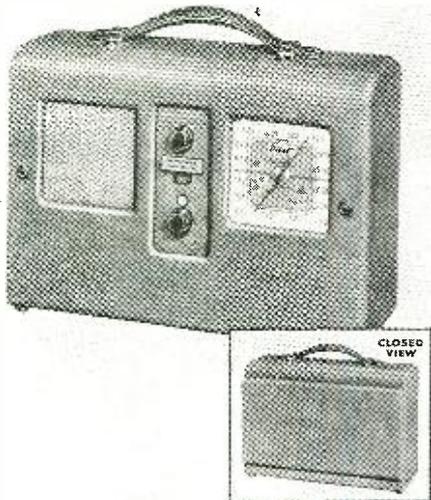
The coils are of pie-wound and hum-bucking construction where necessary; with electrostatic shields brought out to a terminal. A uniform frequency response from 30 to 15,000 C.P.S. is accomplished by coils having low distributed ca-



capacity, and laminations of high permeability alloys. All of these materials are of the best quality obtainable. They are made in the industry's most modern transformer factory on precision equipment. Duplication of laboratory methods and test equipment are used throughout the entire fabrication process; insuring a uniformly excellent product.

The Pilot Radio Corporation has just announced the new Pilot "Featherweight" Portable. This set, which is no larger than a briefcase, introduces for the first time in radio, "The Economizer," an ingenious device which can be turned off or on at will; through its use, the listener can cut the consumption of battery current about fifty per cent when maximum power is not required.

This device is the same in principle as the mechanics employed in cutting down the current



on electric refrigerators.

This new Featherweight Portable weighs only eleven pounds complete with batteries (light enough to be carried by even a small child). It measures 13 1/4" x 9 1/2" x 4 3/4", yet is a full-sized radio, complete in every detail.

A snap-on cover is detachable and snaps on the back of the case when the set is in use. The Featherweight is a "natural" for vacationers and weekenders; advance orders for this model indicate a demand which the makers will be hard put to fill, it is alleged.

The Monarch Manufacturing Company of Chicago, Illinois, is introducing a new type of batteryless flashlight which operates on a new principle of power source. The trade name of the new item is Flashmaster.

According to Jack Gaiter, chief executive of the Monarch Manufacturing Company, the Flashmaster incorporates a revolutionary, self-generating device that for the first time puts this type of electrical equipment on a practical working basis.

The Flashmaster is compactly constructed and is operated by a finger-tip driving handle. The speed at which the driving handle functions determines the intensity of light desired. The lamp used is a standard General Electric or Westinghouse miniature flash lamp, G-3 1/2-06-2 volts.

Designed primarily for the dual function of output-half-wave rectifier service in AC-DC receivers, the new Arcturus 70A7GT Midget Tube also has the rectifier heater tapped so that a .150 ampere pilot lamp may be connected between pins No. 6 and No. 7, thus making it suitable for triple duty use in combination portable, battery-operated AC-DC receivers as well as straight AC-DC sets.

The heater voltage of this new Arcturus tube



is 70.0 volts. Heater current is 0.15 ampere. Plate and screen grid voltages of the power amplifier section are 110 volts. Power output is 1.5 watts.

AC plate voltage of the rectifier section is 125 volts maximum and the DC output current 60 ma. As the DC output current flows through the pilot lamp section of the heater, it is obvious that the tube is intended only for circuits where a pilot lamp is required.

Technical data sheet showing typical connections for the 70A7GT Midget will gladly be

supplied on request to the Arcturus Radio Tube Company, Newark, New Jersey.

Cornell-Dubilier engineers announce the new larger type CA Carrier Current Coupling Capacitor. This unit is greatly superior to previous types. The fog type petticoats provide a large coverage distance between terminals. The capacitors are constructed with galvanized malleable iron mounting flanges so that they may be stacked for series, high voltage connection. New internal mechanical construction affords great tensile-strength. The base and top are sealed so as to afford leakproof service. The Capacitor sections are designed for low resistance at high frequencies, and very low 60 cycle stress. These individual units are now made up to 46 kv., but may be stacked to operate at any desired voltage.

Ward Leonard Electric Co., Mount Vernon, N. Y., announces a new Underload Relay for ham rigs.

The new construction follows the design of the Ward Leonard remote control relay with the



addition of an Adjustohm Resistor connected in the coil circuit permitting adjustment for desired "pick-up" of the relay armature.

These relays provide protection to Class "B" modulator tubes and prevent possible breakdown of the Class "B" modulator transformer secondary should the Class "C" tubes fail to hold the load due to less of excitation.

Universal Microphone Co., Inglewood, Cal., is now in production with its new Universal Cinema Model Microphone, crystal or dynamic, in several impedances.

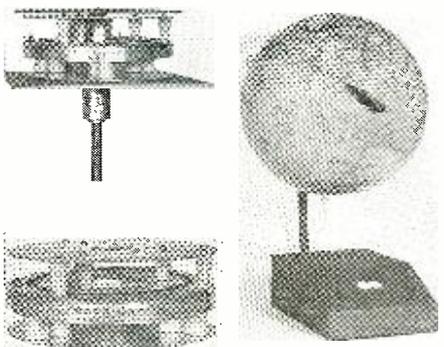
Though designed primarily as a cinema model in swivel yoke for movie use, the new precision instrument, finished in the new type of golden gunmetal, makes an attractive microphone for any stage or orchestral use.

The microphone is said by its makers to be



outstanding because of its wide range pickup, freedom from background noises, and it is not affected by climatic changes of any kind. No polarizing voltage is required and each instrument is carefully calibrated. The assembly comes packed with 25 feet of rubber covered cable.

General Rotary Antenna Company of Springfield, Ohio, announces the development of their Roto-Cap. Cat. No. RC-6, which provides an efficient method of rotatable coupling for operating the same 20M antenna on both 20M and 10M. The antenna can be conveniently arranged for these two bands without the use of two feed systems. The arrangement is both practical and efficient. The Roto-Cap fits between the rotating

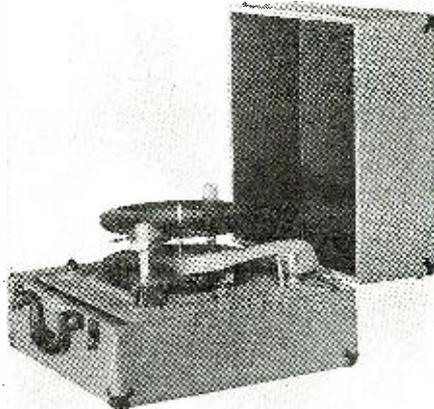


and stationary plates of all types of General Rotating Heads, or on any type of rotating head where space of 4 1/2" depth and diameter of 10" is available. The type of design protects it from the weather. Soldering lugs permit attaching 600 OHM line. Best type of stearite stand-off insulators used. Supporting plates sheet steel

udylite plated. Capacitor plates are aluminum, unit is rigid but light in weight.

Robert Prell, recent graduate of Los Angeles City College, has joined the research staff of Universal Microphone Co., Inglewood, Cal. He had worked at the factory during several summer vacations. Prell is the youngest member of the Sheriff's Communications Reserve, organized under the Los Angeles Major Disaster Council for use in emergencies.

The new Webster-Chicago automatic record changer is offered to the jobbing trade in a light, well-balanced carrying case covered with airplane cloth. Cover lifts off when raised up on hinges. Plays twelve 10" or ten 12" records.



Push-button control for rejecting; also for change to manual. Designed to be easy on records. Model 1230 for 117v. A.C., with crystal pickup and volume control in switch, lists at \$77.50. The Webster Company, 5622 Bloomingdale Ave., Chicago.

An intercommunications system consisting of up to seven stations, any one of which can converse with any other with absolute privacy, and over which three conversations may be carried on simultaneously between as many pairs of stations without interference is offered by the Lafayette Radio Corporation, 100 Sixth Ave., New York City, in the "Multiple Master" model.

Each station unit of this system consists of a small ivory and black plastic cabinet which houses the a.c./d.c. amplifier, power supply and combination microphone-speaker. On its face



are the sample controls consisting of 6 station-selector buttons, push-to-talk switch, on-off switch and volume control.

Transmission occurs only while the push-to-talk switch is held down, eliminating the possibility of normal conversation going out onto the line unintentionally. At all other times the unit is in the receive position ready for any incoming call directed to that station.

To make a call the button corresponding to the desired station is pushed in, the push-to-talk lever held down and the name or number of the desired station spoken in a normal voice. The lever is then released automatically placing the unit in readiness for the reply. Pick-up sensitivity and loudspeaking output are both more than adequate to meet all volume requirements even in a large room.

With coming elections requiring considerable mobile equipment, the announcement by Bell Sound Systems, Inc., 1183 Essex Ave., Columbus, Ohio, of a new and improved combination mobile system is of particular interest. It incorporates a 15 watt amplifier and is known as the Model M-15.

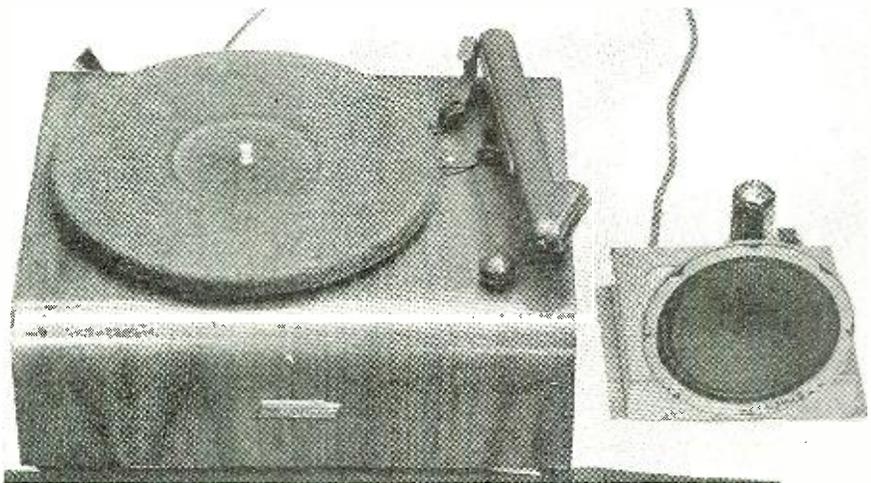
Because of its exceptionally fine tone quality and moderate size, plus the fact that it can be operated on either a 6 volt DC storage battery or a 110 volt AC line current, it is practical for either mobile or regular portable use. It is sufficiently powerful for sound trucks, dance halls, carnivals and fair grounds, as well as large political gatherings.

ONE TUBE PHONO-RECORDER

by **M. N. BEITMAN**

Allied Radio Corp.
Chicago, Illinois

It is a simple matter to make yourself a nice recorder for those records you have been wanting to hear. One tube is needed.



The recorder is actually smaller than the turn-table at its left.

RECORD playing equipment is becoming more popular every year and represents a real opportunity for the aggressive radio experimenter and serviceman to cash in on the demand for this type of product.

Ordinarily, a phonograph pickup of the magnetic or crystal type, in conjunction with a suitable electrical turntable, is used with a house radio set. The pickup may be connected directly to the radio, or may be used by means of the wireless type oscillator, to transmit a signal to the radio receiving set. To fulfill a need for separate amplifying equipment to be used with record playing devices, special units have been constructed in the past. All of these have been priced quite high and used a number of tubes.

The one tube amplifier and speaker combination described below, will serve to amplify the output of any type of phono pickup and, of course, this simple device can be constructed inexpensively and quickly. You will find this unit an excellent side item, to sell to your customers, who already have record playing equipment. Also, the unit may be merchandised with any inexpensive record player to make a complete installation.

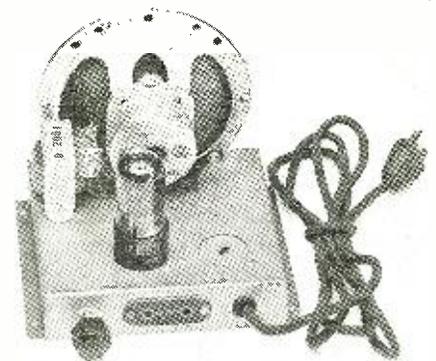
Surprising as it may seem, a single tube does provide sufficient amplification, when fed from a regular high impedance magnetic or crystal pickup, and delivers .6 watts of undistorted audio power to a properly matched speaker. The newly developed type 70L7GT tube combines in a single envelope a beam power amplifier and a diode rectifier tube. The rectifier section, of course, is simply used to provide d.c. plate power. The beam power amplifier acts as a pentode and gives an actual gain of about 200, although the theoretical amplification is about 2,000.

The original model illustrated was built on a small metal chassis base.

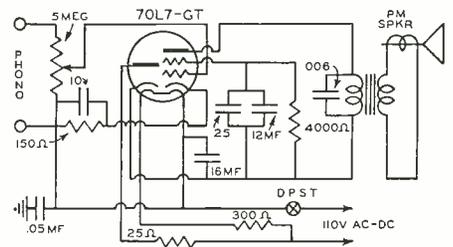
Jacks are provided for connecting a phono-pick. A record player of the type illustrated will work very well with this amplifier. A midget type, one-half megohm volume control is incorporated in the input circuit. The signal is then fed to the control grid of the beam-amplifier section of the tube. The output must be carefully matched to the p.m. speaker, in order to realize maximum output and keep distortion at a minimum. The load on the plate side should be 2,000 ohms, and the transformer should have a correct impedance ratio to match this load to the voice coil of the speaker used.

The diode section is used as a half-wave rectifier. But 16 mfd. capacity is used in the input section, and the plate voltage is taken directly from the point. Beam power tubes require very little filtering of plate supply. The screen voltage is more critical, however, and an additional 4,000-ohm resistor as well as 37 mfd. more capacity is used. This additional filter also slightly reduces the screen grid voltage. Also notice in the rectifier input circuit the use of a 25-ohm resistor. This resistor is employed to limit the current drain during the warming-up period.

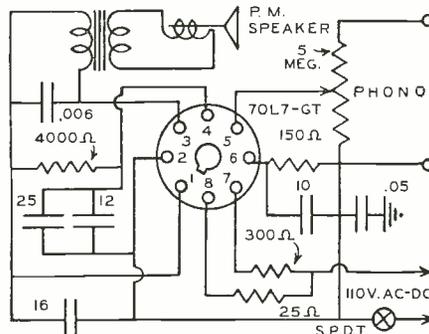
By purchasing the complete kit with the punched and formed chassis base, the job of assembly is simplified.



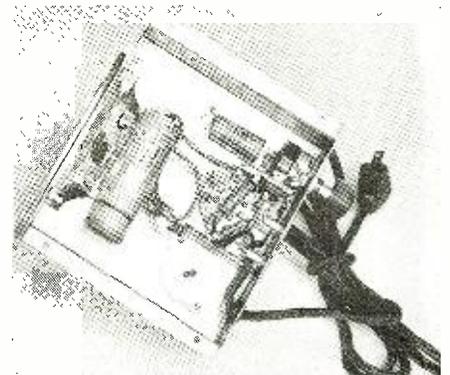
Nothing to it! The rear of the set proves it, too. Easy to build, operate.



Circuit diagram of the 1 tube set. Below, the underside of the chassis.



Pictorial diagram of the connections.



Serviceman's Experiences

by LEE SHELDON

Chicago, Illinois

A tale of a dog's tail that ruined a serviceman's tale.

"OW did you make out on that Weissmantel call?" Al asked from the workbench when he heard me drop the tool-kit inside the front door.

"Two twenty-five for a volume control and one tube," I replied.

"Come back here—I can't hear you very well," he said, "I thought you said two twenty-five for a volume control and—"

"I *did* say that," I replied. "He sure was a tough man to do business with!"

Al stood with his soldering iron poised, staring as if he expected me to smile and show I was kidding. But I wasn't, so he laid down the iron and put his fists on his hips.

"I've known Weissmantel for ten years," he declared, "and he's *not* a hard man to do business with. He's free with his money, and a good fellow to boot!"

"I'd like to be the one to do it," I replied, calmly lighting a cigarette on the iron barrel. Did you know you can usually get a light that way if you don't press too hard? Makes the smoke taste a little—

"You seem to favor the more elaborate means of going out of business," Al taunted. "What say we knock off work early tonight and paint the show-windows black?"

"Aw, no," I said, "then how could we see out?"

Acting flip when Al is sarcastic is like slapping a thin tiger in the teeth with an underdone hamburger, but I was not in a placating mood.

"Why didn't you bring the chassis into the shop?" Al asked.

"He was in a hurry, and I was afraid of losing the job," I replied. "You must give the customer what he wants, you know."

"*You* didn't," Al shouted. "Customers want their sets fixed right first and in a hurry second. There's not a set owner living who really wants you to save time at the expense of a properly-tended chassis. If any of them felt *that* way, they'd throw their sets out of the window instead of calling you. Besides, the customer is likely to think you haven't *got* a shop if you use his living-room carpet for a workbench!"

"Foolishness," I maintained. "We'd lose plenty jobs if we refused to do spot work. The customer doubts your ability when you avoid immediate repairs."

Al had drawn wind for an answering blast, but when the door opened, he exhaled at low pressure. "I'm not through with you yet," he remarked as he passed, "Stand by for further denunciations."

"Hello, there, Weissmantel," I heard Al say, "how's the world treating you?"

"Very seldom," my would-be customer answered. "I brought my set in for you to fix. Your *son* worked on



"The least flustered was the dog . . . perhaps he just wasn't interested . . . but he nodded wisely."

it this afternoon, but it's still on the nut. He seemed to be in a hurry. Won't need it until Thursday, so take your time."

"Right," Al replied, "I'll phone to tell you the price tomorrow."

When my partner came back, I beat him to the draw.

"That doesn't prove a thing," I said. "I'd have lost the job if I hadn't worked in the house, *Dream Daddy*."

"When he called you my 'son' he was probably referring to your mental relation," Al laughed. "In the future, though, bring every major job you can into the store. Better chance of getting a good price; makes a good impression on the customer when he sees you are willing to spend time on the set instead of trying to rush through the work to collect. And it gives us more time to diagnose and adjust. After the work is finished, we can give it a long shake-down test without taking time away from other shop jobs."

"Some of those little boxes aren't worth carting," I insisted. "If the work isn't done quickly, they're not worth while!"

"You go down awful deep for your ideas," Al replied. "Is it better to haul all our instruments to the house than it is to bring a little set to the shop? Why bring the mountain to Mohamet?"

"Leave religion out of this!" I demanded sternly. "I still believe the quicker we handle midgets, the more we can repair!"

"We're in business for profit, not work," my partner replied. "What if you *did* save time by working in homes? You'd only squander it later on something like that last project of yours during National Safety Week—trying to breed fuses into electric eels!"

"Modern speed—" I began.

"Forget it," Al said, beginning to lose patience. "Why should we equip an expensive shop if you insist doing business huckster-fashion?"

Al began to turn out the store lights just as I was about to squelch him. "*Sleepy-Time Pal*, it's time to black-out. Your conversation is as monotonous as the bottom of a mackerel. Let's put *Salutary Sales & Service* to bed. I'll walk over to Asbury Avenue with you. Did I ever tell you the one about the musician who went nuts trying to swing *Rock of Ages* on a snare drum?"

After I left Al, Mr. Bolton—a neighbor of mine—caught up with me, and we walked over to Noyes Street together. I didn't pay much attention until he remarked:

"I have a little set in the library that squeals. Say—you know something about electricity, don't you? Why don't you drop in and look at it for me?"

Isn't that always the way? You run around all day looking for work, and then—when you *stop* looking—a job falls right into your lap!

"The folks are all up, and we have a guest—but come on in," he continued genially, "they will be glad to play the set after you finish."

He introduced me to his family: Sonny and Suzy, the children; Mrs. Bolton, and the visiting Aunt Gertie.

"You've all heard of Dr. de Forest, the *Father of Radio*, haven't you?" he asked, pointing to me. "Well, meet the step-son!"

"H'ya, folks," I said, with a flash of
(Continued on page 46)



The code-contest table before the heat was turned on and the World's record fell—at 75.2 wpm.

25 YEARS OF CODE

THE Code Machine had been adjusted to deal out high speed, the judges made sure that the tapes were intact as received from the FCC office in Boston. An operator at the Code Machine adjusts the tape, moves a switch and a Code Contest which is destined to cause a record to topple begins.

There are half a dozen contestants: Ted McElroy, W1JYM, World's Champion with a receiving record of 69 wpm; Levon McDonald, W8CW, the ARRL Champion with a record of 60 wpm; W4CRV and a few others. At the start of the contest, W4CRV waits five seconds or so, then begins to type; McElroy and McDonald wait fifteen seconds, then they too begin pounding the typewriter keys. The Code Machine is moving along at the rate of 50 wpm.

I take up a set of fones and listen. Occasionally I interpret a "the" or an "and," but for the most part it sounds like ICW pouring through in a kaleidoscopic wave, beautiful to the ear but a conglomeration of QRN to my mental ken.

The machine increases to a speed of 55 wpm and three contestants sigh and drop out while a fourth, W4CRV, slackens the speed of his typing, then, as if pushed on by the momentum of his 50 wpm copying, whirls his fingers over the keys in one final, furious sortie, listens intently for the space of half a score of heartbeats and reluctantly takes off his fones. All the while, McElroy and McDonald, the two remaining contestants, seem to be copying effortlessly.

Once more the machine increases

by **JAMES W. HARRISON, W4FSE**

Asheville, North Carolina

Is this code speed business understood by the average operator? We would all like to believe that it is as simple as it looks. Walter Candler found an unusual answer.

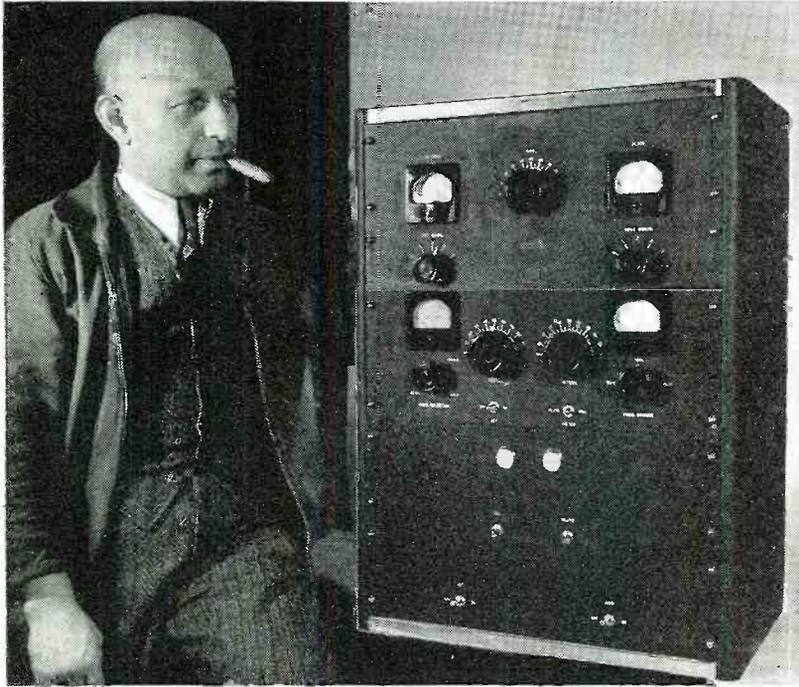
its speed, this time to 60 wpm. The two contestants increase the tempo of their typing. Their moving fingers seem to be tapping a symphony in four hands. There are gasps from the gallery, then silence, eloquent with amazement and praise. Another adjustment by the operator at the machine and the speed is increased to 65 wpm, approaching the world's record. No sooner do the contestants adjust their copying to the new speed than it is moved on to 70 wpm. Both contestants are still copying furiously. McDonald, bulldog-like, is frowning intently; less phlegmatically do his fingers fly over the keyboard of his "mill." Neither contestant gives any intimation by glance or grimace that he knows he has broken the former record.

At 75 wpm there is a noticeable discord in the blending of the sounds from the two typewriters. Is there an ebbing in the receiving ability of one of these champions? A glance of the

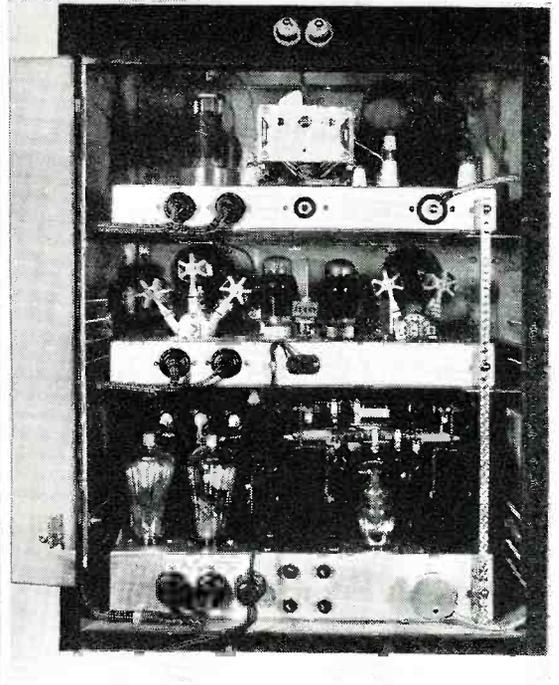
(Pse turn to page 52)



Awarding the cup to Ted McElroy for breaking the World's record at 75.2.

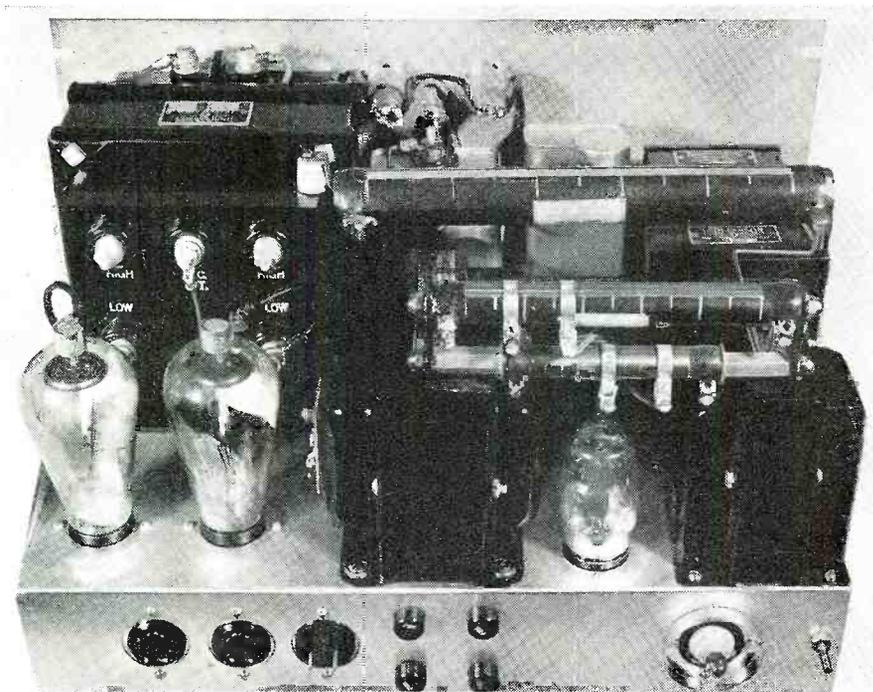


Resembling a commercial transmitter in appearance, this rig shows more than the average engineering in design and sound planning.



An appropriate safety precaution measure is the door interlock and fuse plug assembly.

THREE } TUBES BANDS HUNDRED WATTS



IN OVER twenty years of activity at W2FZ, bigger and more complicated transmitters than the one described here have been built. But 1940 will find the amateur with more tubes and associated equipment available than ever before, allowing greater finesse in the design and construction of ham rigs. The present transmitter has been the beneficiary of this. It has resulted in ease of operation, economy of design and space, and, since medium high-power is attained with a total of only three r. f. tubes, economy of the pocketbook.

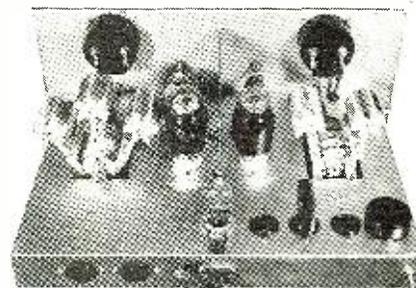
The basis of the transmitter is the new RCA 813 beam-power tube. This tube requires but 0.9 watts of driving power and can be fed about 300 watts to the plate. In class C telegraphy, a single tube therefore affords well over 200 watts output. Yet, due to the 813's tremendous power sensitivity, it can be amply driven on all bands by a two-stage exciter unit, permitting simple band-switching. This inherent

All power supply components are well tied down with ample room for tubes.

by FRANK FRIMERMAN, W2FZ

The Bronx, New York City

When a ham builds it so well that even we were fooled into thinking it was commercial, we know that he has something there. We recommend this rig for a fine piece of work.



The exciter-buffer chassis shows superb craftsmanship and design.

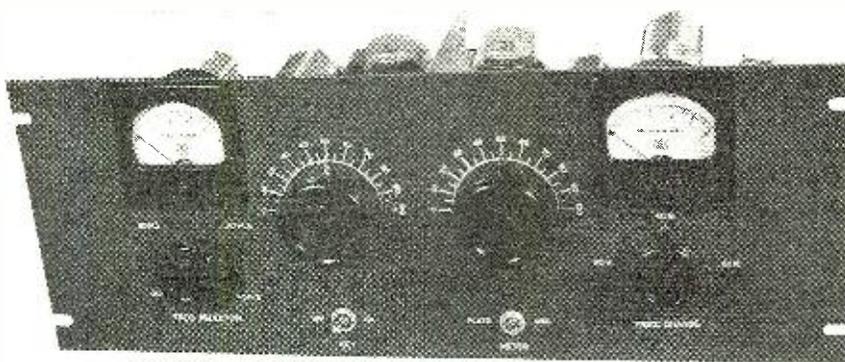
simplicity is further valuable because it allows compactness. Thus the entire transmitter, including power supplies, is housed in a standard table-height cabinet.

The transmitter consists of three units, assembled on standard relay-rack panels and chassis. The lowest (chassis "A") contains the power supplies, the middle (chassis "B") has the exciter stages, and the topmost (chassis "C") bears the 813 amplifier. This is strictly a c.w. rig, intended for traffic and DX on the 20-40-80 meter bands, so no provisions for modulation have been made.

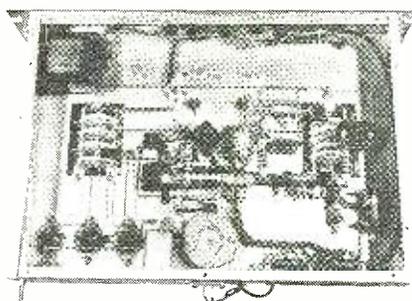
The front panels for all of these units were first drilled and then sent out to be engraved with the proper scales and indications. This is not more expensive than purchasing dial plates and other markings, and gives a more professional finish.

The exciter unit employs a pair of *Taylor* T21 tubes as crystal oscillator and buffer-doubler. These tubes are 6L6s adapted for high-frequency use, so it looks like a clean sweep for beam power. When operated as a buffer, the second T21 must be neutralized; this is accomplished through the use of center-tapped tank coils and a small "grid-leak" type of neutralizing condenser. Four crystals are used: two each in the 40 and 80 meter bands. On 80 meters, the second T21 acts as a buffer, and only the two fundamental frequencies are available. However, on the 20 and 40 meter bands, four frequencies are available, by doubling and quadrupling, and by doubling and buffering, respectively. This arrangement gives maximum employment to each crystal, and therefore maximum flexibility. Direct quadrupling from 80 to 20 meters is practical because of the low grid requirements of the 813.

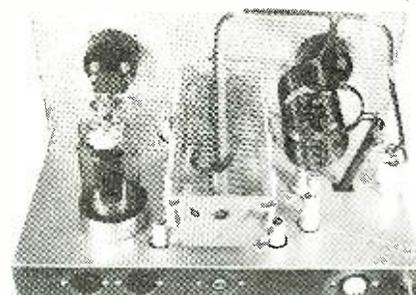
Band-switching is done by means of *Yaxley* four-point switches. As indicated, the oscillator tank employs a four-gang switch, the buffer-doubler tank a five-gang switch. This is one more gang than is electrically necessary in each case. They were used to make the mounting of the Coto-Coil jack strip easier, since the added length of the switches permitted mounting of the strips by means of angles. As shown in the photograph, the coils are mounted athwart the switches. A thick copper shield above



Notice that trouble has been taken to have the panels commercially engraved. This alone can make any rig look like a manufactured one.



Note the cable wiring and neatness. Nothing haywire about this transmitter. It works very well, as expected.



The final amplifier has exceptionally clean lines. No r.f. losses here. The wires hanging down go to ant. posts.

the chassis serves to isolate the stages. The keying relay is mounted on sponge rubber to damp vibrations and is provided with a key-click filter (C₁R₁).

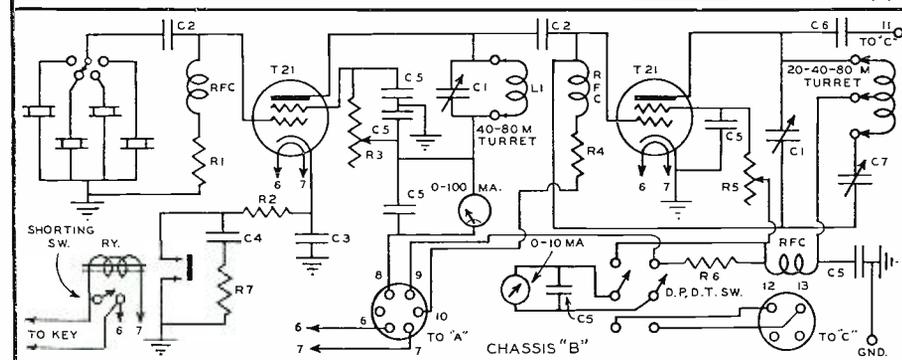
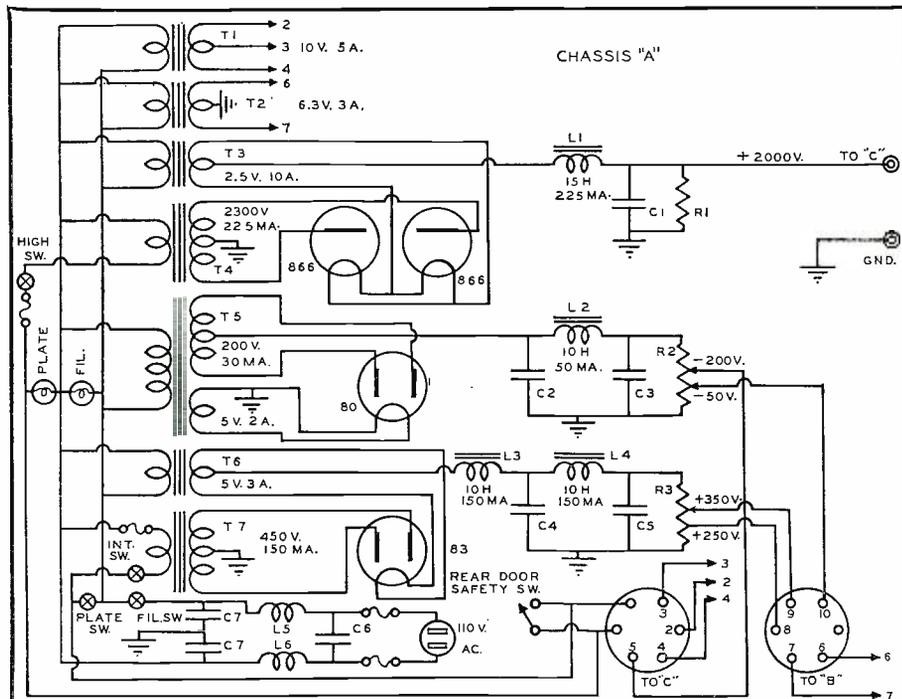
Considerations of panel symmetry allowed the use of only four meters. An antenna ammeter and amplifier plate milliammeter are in the amplifier unit. In the exciter unit, one milliammeter is permanently in the oscillator plate circuit, while another of 0-10 ma. range may be switched to either the buffer-doubler plate circuit or the 813 grid circuit. A switch to short-circuit the key is also provided for tuning ease.

In the amplifier circuit no neutralization is necessary, although the tube is always used as a straight amplifier. Plug-in coils are used in the tank circuit. The antenna coupling coil is mounted on an arm which can be swung to and fro by means of a knob on the front panel. A series condenser in the grid circuit is used for varying grid coupling. A jack on the rear of

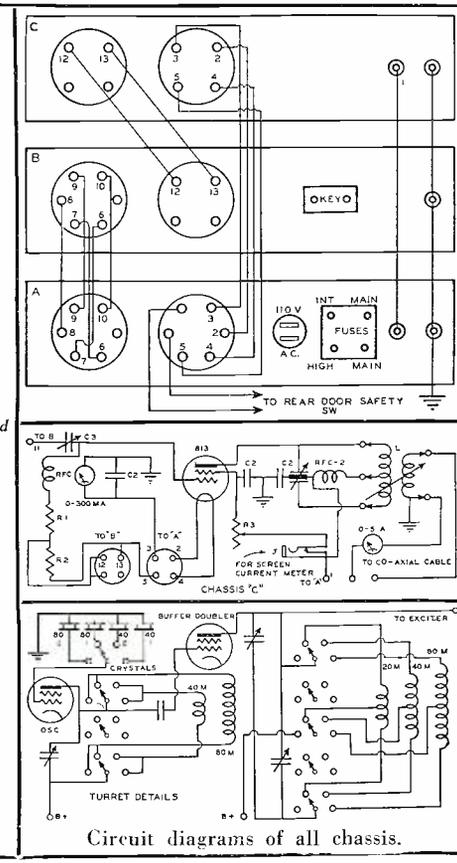
the chassis is provided for plugging in a meter to read screen current, should that be necessary.

The transmitter has been designed for maximum ease of operation and greatest physical simplicity. Therefore, to provide break-in operation, keying is done in the crystal stage. The other stages are provided with a combination of resistor and fixed bias, from a bias pack, thus allowing this type of keying. Again, condenser coupling is used between stages. While not as efficient as inductive or link coupling, this method is far simpler, requiring fewer inductances and switch points. The loss in efficiency is more than compensated by the circuit and physical simplicity obtained. Furthermore, with a tube requiring the modest excitation of 0.9 watts, it would be misdirected perfectionism to design a super-efficient exciter.

The power supply unit has been designed for long life and safety. Three separate packs are provided: the first



- Chassis "A"**
- T₁—Thordarson T64F14.
 - T₂—Thordarson T19F97.
 - T₃—Thordarson T64F33.
 - T₄—Thordarson T19P62.
 - T₅—Thordarson T60R49.
 - T₆—Thordarson T79F84.
 - T₇—Thordarson T75P50.
 - L₁—Thordarson T19C43.
 - L₂—Thordarson T13C28.
 - L₃—Thordarson T74C29.
 - L₄—Thordarson T74C29.
 - L₅—Thordarson T74C29.
 - L₆—Thordarson T74C29.
 - L₇—Thordarson T74C29.
 - L₈—10 amp. R.F. line chokes, Ohmite.
 - C₁—2 mf. 3000 v. Aerovox Hy-Vol.
 - C₂—8 mf. 600 v. elect. Aerovox.
 - C₃—16 mf. 450 v. elect. Aerovox.
 - C₄—4 mf. 1000 v. paper Aerovox.
 - C₅—4 mf. 1000 v. paper Aerovox.
 - C₆—1 mf. 400 v. paper Aerovox.
 - C₇—1 mf. 400 v. paper Aerovox.
 - R₁—100,000 ohms, 200 w. Ohmite.
 - R₂—10,000 ohms, 25 w. Ohmite.
 - R₃—25,000 ohms, 25 w. Ohmite.
- Chassis "B"**
- L₁, L₂—40-80 and 20-40-80 meter oscillator and doubler tanks, Colo-Coils.
 - C₁—140 mmf. midgets, Hammarlund.
 - C₂—0.001 mf. 500 v. mica, Aerovox.
 - C₃—0.01 mf. 500 v. mica, Aerovox.
 - C₄—5 mf. 600 v. paper, Aerovox.
 - C₅—0.02 mf. 500 v. mica Aerovox.
 - C₆—0.01 mf. 500 v. mica Aerovox.
 - C₇—National NC-600 1.5 mmf.
 - R₁—50,000 ohms, 2 w. Ohmite.
 - R₂—400 ohms, 15 w. Ohmite.
 - R₃—20,000 ohms, 10 w. Ohmite.
 - R₄—75,000 ohms, 5 w. Ohmite.
 - R₅—10,000 ohms, 10 w. Ohmite.
 - R₆—10 ma. meter shunt, Ohmite.
 - R₇—40 ohms, 10 w. Ohmite.
 - R₈—40 ohms, 10 w. Ohmite.
 - R₉—6 v. AC keying relay.
- Chassis "C"**
- C₁—Hammarlund split-stator TCD-75-G.
 - C₂—0.002 mf., 3000 v. Aerovox.
 - C₃—100 mmf. midget, Hammarlund.
 - L₁—500 w. coils, Barker-Williamson.
 - R₁—4000 ohms, 10 w. Ohmite.
 - R₂—10 ohms, 10 w. Ohmite.
 - R₃—125,000 ohms, 50 w. Ohmite.
 - RFC—300 ma. rating.



delivers 2,000 volts at 225 ma. for the final amplifier; the second is a low-power pack delivering about 250 volts for biasing; the third, also low-power, delivers 350 volts at 150 ma. for the exciter tubes.

The two-plate transformers are individually fused, and the power line is separately fused. The power line is also filtered for r.f. Individual switches, normally closed, are provided on the front panel to control the exciter and amplifier plate supplies. This is a useful tuning adjunct.

All connections are brought out to sockets at the rear of each chassis. The interconnections are shown. In conformity with the safety practices so dramatically illustrated by the tragic death of Ross Hull, the amplifier high-voltage lead is brought out separately to stand-off insulators which are completely covered by metal shields, and a safety switch in the high voltage transformer primary cuts off the high voltage when the cabinet is opened.

ON THE COVER WE HAVE . . .

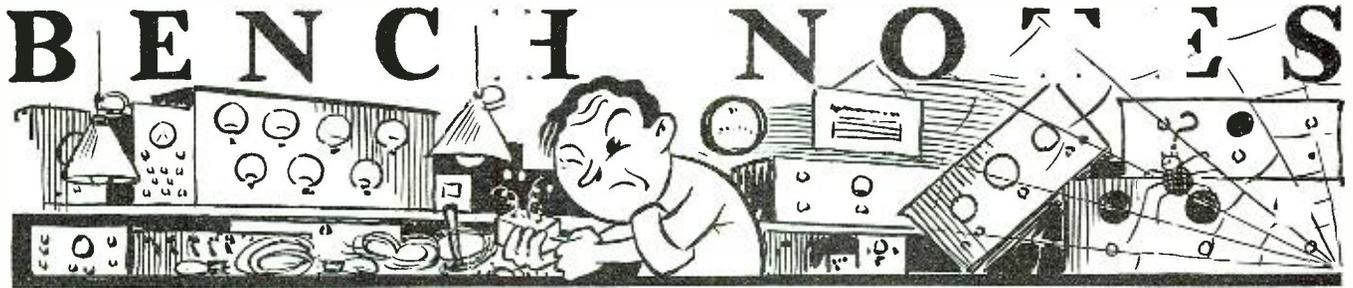
A picture of an Army officer of the U. S. using radio during the Pacific Coast Air Corps maneuvers. Similar scenes are being re-enacted all over Europe by the belligerent nations. The man on the cover seems to be using a key, but he might also be taking bearings on some "enemy" position by the compensation method. Government Regulations prevent either accurate information on our armed forces at this time, or accurate pictures of what they are doing. Hence the Editors can only guess.

One of the gravest problems of the War in Europe is how to keep the broadcast station on the air—and thus disseminate propaganda for home consumption—and at the same time prevent the enemy from using the broadcast signal as means of locating the antenna from which the radiation is taking place. Generally, these antennae are situated close to the cities, and with commercial equipment now in ordinary use both here and abroad, it is a simple matter for the airman to provide his plane with a direction finder and locate the transmitter.

Since this is the case, the foreign broadcasts have been of short duration. While a bearing can be taken within as little a space of time as two minutes, and the stations are on the air for fifteen minutes at a time, it is still true that the error for drift, and other variants cannot be corrected for during that short time to enable the enemy aircraft accurately to locate their target. One notable exception to this has been the station at Warsaw. Here the station has been on the air for hours at a time, and the invading German Air Force had little or no trouble in locating the city, blackout or no blackout. The results of their finding Warsaw are now known to all.

It is alleged that the Germans have a smart way to evade this enigma. They have several broadcasters placed all over the country operating on the same wavelength. The switch from one station to another is made at rapid intervals and without any warning whatsoever, and without interrupting the program. In fact, as a rule, the listener does not know when the station has been changed, since the receiver's AVC action takes up the "slack" in the signal, should there be any, due to the varying distance from the transmitters. Because of this, it is believed, the British, who might have been following the "beam," one time got lost and dropped leaflets over Holland instead of their Berlin destination.

Here, in the U. S., there is work going on in laboratories, experimenting with radiation which can be controlled so as to hide the exact location of the transmitter. Little progress has been reported, but there have been some transmissions which so cleverly bent the radiation as to make it seem to the direction finder that the signal came from, say, the East, instead of from the North, from which it actually came.



by **LEE WARD**

Service Manager, San Francisco, California

THIS is written during the season when canoes are tugging at their moorings; when frustrated fish are nibbling at tin cans for want of my hooks; and when many a hot-dog is quivering for lack of a dab of piccaililli. All this goes on in the happy outside world while I sit here sulking and prodding the Muse. Sorry if I'm petulant. Why hasn't someone invented a typewriter a person can use without taking his feet off the desk? However, when you read it, snow may be flying, and Thanksgiving around one or another corner—depending on whether you are a Federalist or a resident of Maine or Vermont.

Last week, you see, I tucked my tool-bag under the workbench, said good-bye to the boys in the store, and asked the editor to supply a guest conductor, in order to give the motorman a vacation. This was denied me, and now the only thing that stands between me and nature is the space between here and the ~~30~~. This column will therefore be done in what is known among the members of the guild as one heluva hurry.

Queer Calls

I COULD tell you about my call to 4444—44th Street, apartment 4E, during which I stumbled into 3E by mistake, and found a set owner (who later turned into a customer) working in back of his console. Naturally, I mistook him for the one who called the shop, and went to work. Meanwhile 4E phoned to the shop and raised the dickens because he had to wait. But you wouldn't believe such an outlandish coincidence, and the fact that it is really true makes it no more plausible.

For the same reason, I wouldn't think of telling you of my trip to a customer I hadn't seen for four years. For no other cause than a rumbling conscience during an idle afternoon, I tied up a set of tubes and drove to his house, hoping to cash in on some of the good-will we generated by allowing very low time payments when he bought the receiver.

When I arrived at his home, he left the phone to answer the door. He had been dialing the store—to order a set of tubes! To this day, that man believes his wife secretly called the shop without telling him, just for the joke.

Other servicemen, I suppose, have come across similar occult occurrences,

but they sound impossible to anyone except the person to whom they happened; so I'd better get on another track.

Not that I'm afraid of being fired—I always have my store to fall back on, and a store isn't what a writer usually falls back on when he is fired. Even if the store should go under, radio isn't the only profession!



A. D. Cammisano, of Camm's Authorized Radio Service, 1621 Montrose Ave., in Chicago, keeps a rapidly rotating stock of trade-in midgets on hand.

Giant Oak

REMEMBER one man in particular who made great strides in a new profession after a humble beginning. Long ago he stood at the window of a radio transmitter, enchanted by the sparks he drew from the screen with an old nail. The huge generators held him spell-bound; the engineers were as gods.

The station staff, learning his family was too poor to buy even the simplest wireless receptor, hired him to run errands. Late at night, he became well grounded in radio by working in his basement. From then on he advanced into radio literally step by step. He ran to school in the morning, ran errands at night, and ran to his cellar in the early morning.

Later, he made quite a name for himself; but I like to picture him as he was during that early formative period—wearing out his little shoes

to earn money for his experiments.

Today, eighteen years after, I do not think this successful man would deny it was while he was running errands that he gained the sound business judgment which characterized his later life. He was a radioman who *knew* what he was after. What's more, he went out and *got* it!

Perhaps you have read his newspaper notices. He owns a shoe store in Passaic.

Mysteries of Radio

NO, LOSS of employment does not worry me. Some other things do, however. For instance, that reader who addresses me as "*Bence Notes*"—does he read this column by telephone? How can I manage four new truck tires before the end of next month? What moral right, when I refer to "a serviceman in Washington," has the technical editor to ask me—in a penciled notation—to specify either Washington, D.C. or A.C.?

What justification, by the way, has the term "a.c. voltage"? Literally, this denotes "alternating current voltage," which appeals neither to the ear nor brain. The conventional "120-v. a.c." really means "120 volts of alternating current." A *volt of current*, I hope, is a treat still in store for us. The subject is especially confusing to me, coming as it does immediately after my decision to accept the disturbing fact that current direction is opposite to that of electron charge.

Then there's the *vu*. Just when I get to the place where I can use *db* casually in customer conversation without sounding like little Wilbur reciting his first poem, in comes the *vu*. It's a first cousin to the *db*, but it carries a meter as part of its definition. Most of us don't fully understand *db* yet, and the intrusion of *vu* will probably result in four more interpretations of its meaning than there are cures for a cold.

If it's proper to wire in a resistor, or hire an operator, why don't we blow a condenser? While we're about it, how can we be expected to explain the television exoticisms *telecine*, *multipactor*, and *signal clipper* at a stage in the business when no one has been able to describe *frequency modulation* in less than five thousand words?

New terms are coming out faster than new tube types. Yes, and tubes—

(More Benchnotes on page 62)

Ring the Bell

How to use the telephone with intelligence—to get results.

by SAMUEL C. MILBOURNE

Expert Serviceman, Greenwood, Miss.

LAST month, we decided to make more money in radio servicing. We found out that it could only be done by getting new business and increasing service sales which, in turn, could be accomplished only by EFFECTIVE advertising.

We decided to apportion 5% of our total service sales to an advertising budget and that this money could be taken out of each day's receipts being kept separately in the shop and in a box or envelope marked "ADVERTISING BUDGET."

We found that the first way to improve our business was to improve our own appearance because cleanliness, a pleasant appearance and a "brushed-up" look pays profits.

Then we looked around our shop through the eyes of a prospective customer and decided that something must be done vastly to improve its appearance. Temporarily, we gave it a good shop-cleaning and resolved never to let it get that way again. Then we decided to save toward a real shop renovation inside and out, using not one cent of our present working capital or profit, but, temporarily, the EXTRA net profit we get from the additional service sales made as a result of the new 5% advertising budget. Our goal is to own and operate the *finest looking and most profitable radio repair shop in town*. We agreed that a shop must look both modern and efficient, and that replanning and redecorating will accomplish this by increasing both the number of and the per-job profit on service sales. This money is also to be kept separately in an envelope or box marked "Shop Modernization." Finally, we agreed to *follow through consistently for success!* Carry on from here.

THIS month, we will devote our space to a form of advertising which requires negligible expense—except in cities where a per call charge is made—telephone advertising. It is hard to conceive of a radio service business without a telephone, but thousands of servicemen try to muddle through without their finest contact with their customers. If you do not have a telephone in your shop at the present time, by all means get one installed NOW. You can't build a decent business without one.

Perennial Profits from Old Customer Lists

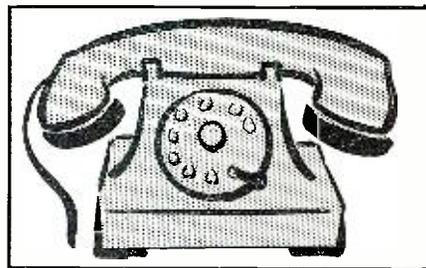
One of the easiest ways to increase your present service sales is to call your old customers once a year and offer a complete check-up service on their radio. Do not get too technical with them regarding the work to be done. Always translate it to them in terms of *satisfactory reception, program enjoyment* and the low cost of such recreation. If you have a list of all your past customers and the dates you served them, you are that much ahead. If not, sit down at once and



Cultivate your old customers; don't weed them out—they are worthwhile.

make a list of all the customers you can remember whose radios you have repaired. Look up your old records—consult your local telephone book if you are in a small enough town to make this possible—be sure that each job was done at least a year ago.

Now get the phone numbers of all those who have phones, saving the bal-



The most useful instrument in any service shop. Can you use it smartly?

ance for a small mail campaign which we will consider next month.

Phone Campaign to Old Customers

In doing any phone selling, the time you phone the prospect is very impor-

tant. Pick a time of day when you think the prospect is in a most receptive mood. Not when the housewife is cooking meals, getting the children off to school, resting in the afternoon or out marketing. Experiment for the best time in your locality—it pays. Usually this will be from 9:30 to 11:30 A.M. and from 3:30 to 5:30 P.M. Selling by phone during the evening hours *sometimes* works, but only if the family is (1) at home, (2) not entertaining, or (3) if the man of the house is the one to call. Do not call men at their office during business hours. If they work for a large organization in a minor capacity, you may be breaking a company rule and you will get a cool reception and a short answer. If the man is an official, he probably has too many things on his mind anyway and you will be told, sweetly, that he is out or in conference. Thus, call him at his office only on invitation. Here is your message to old customers—you may change it to suit:

"Good afternoon, Mrs. Jones!"

(Put some feeling, some warmth into your greeting. Sound as if you really wanted to call her.)

"This is the *Active Radio Repair Service*, John Dough speaking. Last May, a year ago, we repaired your radio and as every set requires a periodic check-over and tuning up—the same as an automobile—I called to offer you our regular annual check-over service. I'm happy to hear that your set seems to be operating satisfactorily, but usually a yearly check-up—the same, Mrs. Jones, as a doctor or a dentist would give *you*—results in assurance against more serious repairs later on. I know that you would rather spend two dollars now to get trouble free program reception for the next year than be faced with a big repair bill just at the time you or Mr. Jones want the radio for some special program.

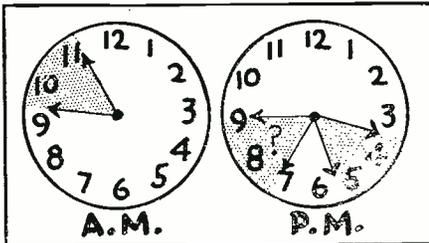
"The cost is quite nominal—\$2.00 includes a complete cleaning, testing and re-alignment of every circuit in your set. Of course, you're not interested in these technical terms, but they merely mean that your set will be returned to you working in perfect condition. If it requires a new tube or other part I'll be glad to phone you an estimate which will be inclusive of the annual check-over service. Yes, ma'am. We can pick up the set, do the work and return it to you within 24 hours. I

might point out that radio tubes and parts cost less now than ever before; but, of course, I can't be sure how long they will *stay* as low priced. Shall we say 5. P.M. for the pick-up? Thank you, Mrs. Jones, I'll be there!"

Note that the check-over price should be based on an amount ample to cover the serviceman's time and expenses as well as return a normal profit. It may be varied with the size and age of the set or the locality in which the serviceman operates. However, it gives you a grand opportunity to get a larger repair job if the conditions warrant it. In most cases they do. But remember this rule—*A job on which you take a loss is WORSE than no job at all!* There appear to be certain times and circumstances where it would seem to be the right thing to do, but in the long run it pays to take the profit *today* rather than the alluring greater profit some time in the far distant future. Don't kid yourself into the frame of mind in which the manufacturer was who exclaimed, "I take a loss on everything I make, but *look at the business I'm doing!*"

Now, the trick to successful telephone advertising is *perseverance*. You must, *must*, **MUST** keep on trying until you get not one, but at least *two* calls this way each day. I say two, because the *second* one seems easy after the first one. It's that old "ice-breaker" that's the tough hill to get over.

A word here about using the telephone effectively. Speak directly into the mouthpiece and about one inch away from it. Don't shout—don't whisper. Do not use slang or "crack wise." There is nothing so abominable to some people as a "smart alec." Remember that, when you telephone someone, you are *their guest*, just as if they invited you into their house if you called personally. And above all, please do not commit the zenith of asininity and open your conversation with, "Who's this?" I always feel like replying, "Who the hell cares?" Ask



The best times to call your customers on the phone is when they're NOT busy.

for the person with whom you desire to speak.

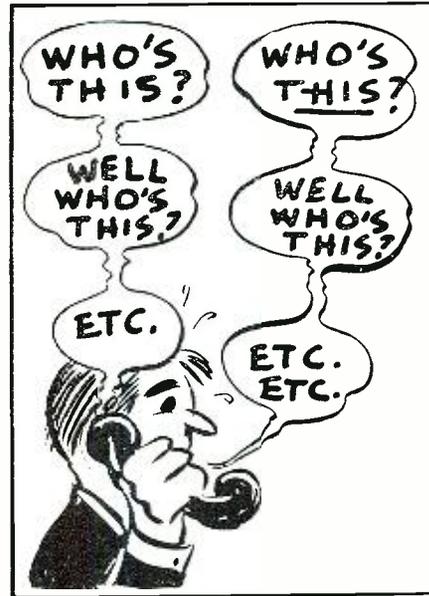
Speak slowly and distinctly. Be pleasant and persuasive at all times. Try to cultivate the "voice with the smile." Think of how many square feet of shop surface the profit from that job will paint and then *give*, brother, *give!* Be prepared to take it on the chin on a number of tries. If the prospect roars at you and slams down the phone, just mentally diagnose it as "something he must have

et" and go merrily on to the next one. Never get mad and lose a sale. Always keep trying. Remember that two new repair sales a day mean over 600 a year!

Calling Newly-Made Customers

Your daily phoning is not over. Every set you repair should be a potential advertisement for *more* repair sales. Allow 3 days to 1 week after you return a repaired set and then phone the customer as follows:

"Good morning, Mrs. Jones! This is John Dough of the *Active Radio Repair Service*. I'm checking up on our efforts to give you the best radio reception possible. Is your set working



This inane, annoying type of conversation is sure death to prospects. Always give your name and business.

satisfactorily? That's fine. By the way, Mrs Jones, now that you have assured yourself of our satisfactory radio service, you probably know several of your friends or neighbors who might be interested in bettering their radio reception. May I have their names and addresses?"

At this point, the customer will either give you a name or two, or she will say that she doesn't know of any at that time. If she does favor you by referring you to one or more of her acquaintances, ask permission to use her name as a recommendation. If she does not refer you to someone, tell her that you would appreciate her recommendation of you to her friends at any time she hears of needed radio service. More will be written about the use of gifts to customers for this service.

Do not stop your daily telephoning of customers whose radios you recently repaired until you have exhausted your list for that day. Also phone those who were not home the day previous when you called. It is *constant* use of the telephone which results in effective telephone selling.

Another point. Do not use the telephone for outside calls more than fifteen minutes at a time. Someone may be calling you on a repair job and if

you use the phone for any continuous length of time, they may become impatient and call someone else.

Phoning the New Prospects

In phoning the names which have been given by your customers, you must get certain points across at the very first. These are (1) an apology for disturbing the prospect, (2) your name and business, (3) the recommendation by your customer, (4) the question regarding the present operating condition of the prospect's set. Let's take it that far:

"Good afternoon, Mrs. Brown! Please pardon me for disturbing you. This is John Dough of the *Active Radio Repair Service*. I was just talking to Mrs. Jones about how much pleasure her radio has been giving her since we recently repaired it and Mrs. Jones suggested I call you regarding *your* radio. Is it operating as satisfactorily as when you first purchased it?"

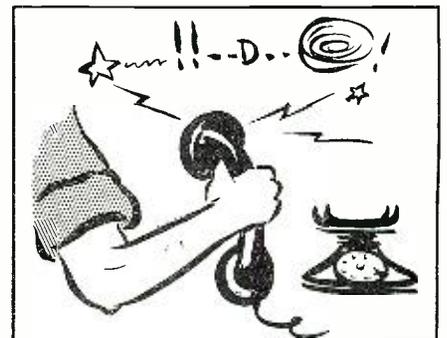
Note the comparison. Don't say "Does it work O.K.?" or the worst form of all, "It doesn't need fixing, does it?"

If the customer says that it appears to work as well as when they first purchased it, say:

"How long has it been since you last had it examined or repaired, Mrs. Brown?"

If she replies that it has never been repaired, ask her how long she has owned it. Remember to be very tactful about these questions. She might feel they were none of your business. If she states the set was purchased less than a year ago, close the conversation as follows:

"That's fine, Mrs. Brown, and I know you are enjoying the fine programs we are now receiving. I'll call back in another so-and-so months which will be when you have had your radio for a year because every radio set requires a periodic adjustment for maximum enjoyable reception, just the same as automobiles or human beings. We have a very reasonable yearly inspection and re-adjustment service in which I know you will be interested



It must be something he "et." Don't emulate him by losing your temper!

at that time. Thank you for your time, Mrs. Brown. If I can be of any help to you in finding out the time or station in connection with any program you desire to hear, just phone me at Ace 1234. Good day, Mrs. Brown."

If you can, obtain the make and

model of the radio (a very unlikely possibility) and file this with the customer's name, address and the original recommending customer's name in a monthly file. When the time elapses, phone her again and sell her a yearly service as explained previously.

If the customer says her radio is operating correctly, but has not been serviced for over a year, immediately go into the yearly service talk.

If the customer replies that the radio is dead, noisy or "just won't work," obtain as much information as you can over the phone (just the same as a doctor might try to determine a patient's ills). Then immediately try to sell her on an early appointment to examine the set. If she asks prices tell her that your work is reasonably priced and that you always give an estimate if the cost is over two dollars. Remind her that Mrs. Jones was sufficiently well satisfied with the service you rendered and the fee charged that she recommended you to her friend, Mrs. Brown.

Now, this should keep you busy until next month when I shall tell you of other forms of advertising. Keep the two funds increasing. You're going to need them. Try your own sales pattern on the phone, molding it after the examples in this article.

And, if you should desire to, drop the RADIO NEWS a line giving a report on the results obtained by putting effective telephone advertising to work in YOUR business.

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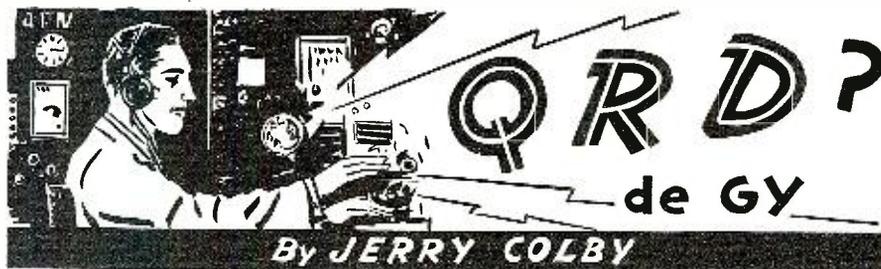
TECHNICAL BOOK & BULLETIN REVIEW

"Practical Television by RCA," a 40-page book outlining the RCA Television System, particularly receiving circuit designs, antenna installation, and reception, has been published for servicemen, dealers, schools, etc., by the Service Division of the RCA Manufacturing Company.

"Practical Television," which seeks to dispel some of the mystery of television in a practical fashion, includes 62 illustrations (38 of them RCA-NBC television test patterns for the most part never before published), and is printed on heavy-coated paper in easy to read type.

The book is divided into sections, as follows:

1. A general discussion of the RCA Television System as based on the RMA Standard Television Signal.
2. Outline technical description of receiving circuits, with particular attention to the new wide band IF amplifying circuits, special AVC, DC restoration, synchronizing separator and other circuits new to television.
3. Details of television receivers, antenna and transmission line installation.
4. A section devoted to general service problems, including test patterns to assist the observer in recognizing receiving conditions and faults.
5. A group of television definitions.



HOW fortunate we Americans are was brought home to this columnist by an epistle received from Opapa, New Zealand. Anything costing up to \$35.00 must have a license issued for it before it can be imported into the country. Which wouldn't be so bad if the majority of radio gear was not banned. Meaning only New Zealand stuff must be bought, willy nilly. So that a small demand article won't be manufactured there at all and the one who wants it will just have to content himself with a makeshift. And, also, RADIO NEWS mag costs 65 cents now, which overshadows even the war news down there. God Bless America! And we sincerely mean that!

RIGHT now there seems to be more than the usual activity to organize operators. ARTA-ACA, in their recent national marine conference, agreed to accept into membership any rank and file, employed radiop without penalties or reservations upon payment of one-quarter dues and international strike assessment of twenty-five cents. Radiops will be accepted without formal action by any membership meeting. Publicity is being given to the organizing campaign with slogans, etc. . . . CTU-Mardiv continues its even tenor of organizing radiops as it has since its inception. In other words, brasspounders, either Union'll get you if you don't watch out. Which is as it should be.

KARL BAARSLAG, radiop on the Yacht *Vagabondia*, and General Chairman of the CTU-Mardiv, whose books have been praised by the country's outstanding critics, has just published an article in the *CTU Journal* which carries a message to union men, regardless of affiliation with CIO or AFL organizations. Although Brother Baarslag has the interests of organizing CTU-Mardiv members at heart, he brought out one point which should be considered by all radiops. If a union has had internal strife—if a union is not treating the members right, using their money for purposes other than specified—or should any other reason make him wish to forsake unionism forever as a "racket," the member should always keep in mind that a company union would never get him anything but grief. A union-conscious worker must join some union and, if he thinks there is no union good enough to put up with, then the thing to do is to start his own union. But a union there must be! It wasn't so many years ago that radiops were paid \$50.00 per month and made to do everything from scullery to bright work polishing. And as for recognition, there wasn't any. Regardless of a radiop's technical ability, he was considered so much extra gear aboard ship. Today, with better wages and better living conditions, the story is a little different. But all this not without a struggle. Would the men have been able to gain all this singlehanded? We doubt it. Therefore, union is but another name for strength, hence, union there must be! QED.

ANONYMOUSLY written. . . . The FCC should not enforce the law to the letter. I've had some funny citations. Once the *RI* came aboard and saw a bank of 60 volts in wet batteries used for emergency power for a gyro compass and which had nothing to do with radio installation. He found the sp. gravity low and issued a citation. The bank, however, was the type of battery that had a low gravity reading even at full charge. Another time, in Balto, the *RI* came on and tested the Auto Alarm. There was a thunder

storm and lots of lightning outside. Just when he let up on the test buzzer button a crash of static broke loose and kept the relay down. Naturally, this ruined the test. I advised him to remove the antenna off the AA so set wouldn't pick up static from outside, but it took an hour to convince him I wasn't kidding. Since he had already started to write out a citation on the AA and didn't want to throw the slip away, he finally gave me a citation for not having a nail file in the tool chest. This was because I had said I used sandpaper to clean the contacts on the AA and he insisted a nail file was the thing. . . . Oh, well. . . .

TIS said that a radio mechanism is being installed by *General Electric* in the locks of the Panama Canal which will detect any bombs tossed off ships and sound an alarm. The gadget follows the ships thru the locks and is controlled electrically. Now if a foreign vessel wants to lay an egg it'll be just too bad for them. Deucedly clever, what!

IT IS indeed unusual, sez one of our correspondents, to hear an American ship on the circuits. This DX fan who logs many ship and Ham signals, asks a question which can find its answer only in business conditions or the minds of our congressmen. For one evening's work he logged *FNBA*, *LJST*, *SLNA*, *LJAG*, *HPPC*, etc. and etc., but no US vessels. Of course, he was not on all day, nor every day. But with American bottoms being used for shipping again, there would be no dead spots any day.

STEAMSHIP companies are lending a willing ear to salesmen for radiophone equipment organizations. There are many reasons for this, the main ones being ease of contact with their particular vessels and the saving of money on messages which have been handled thru *RMCA* or *Rackay*. There may also be the thought of dispensing with radiops' services, but fear not, because with all this added technical equipment, not only will the present personnel be necessary to handle the traffic, but an added radiop of exceptional technical ability will also have to be included in the radio staff.

ANENT the new license exams here's what one reader has to say, quote . . . Answering inquiries as to what will constitute the examination for license renewal of the new five year license when the applicant can show only an aggregate of three months service, it will consist of the usual code test and a written examination on Element Six (Advanced Telegraphy). Glancing over a list of the new questions which may be had on request from the FCC, I think that no one besides a mathematical genius will ever be able to get a license in the future. It may seem that in this way the future supply of radiops may be effectively and completely cut off. Maybe, however, I am being unduly pessimistic, but I have my private doubts that the answers to some of those questions actually exist. I now look forward to a new "Questions and Answers" manual. . . . Unquote. [Ed. note: Personally, we believe that a great number of radiops are qualified to answer those mathematical questions because of the type of applications received from numerous men in answer to a position mentioned in a recent column.] . . . So with progress being continually made, it is the men who have been keeping up with the times who will profit therefrom . . . with 73 . . . gc . . . GY.

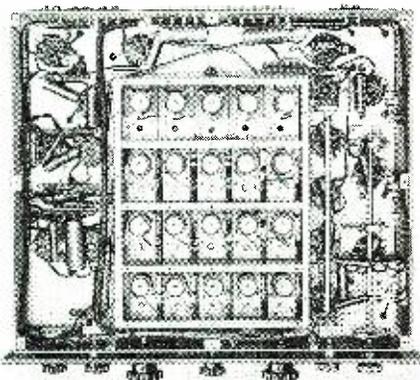
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A NEW COMMUNICATIONS RECEIVER

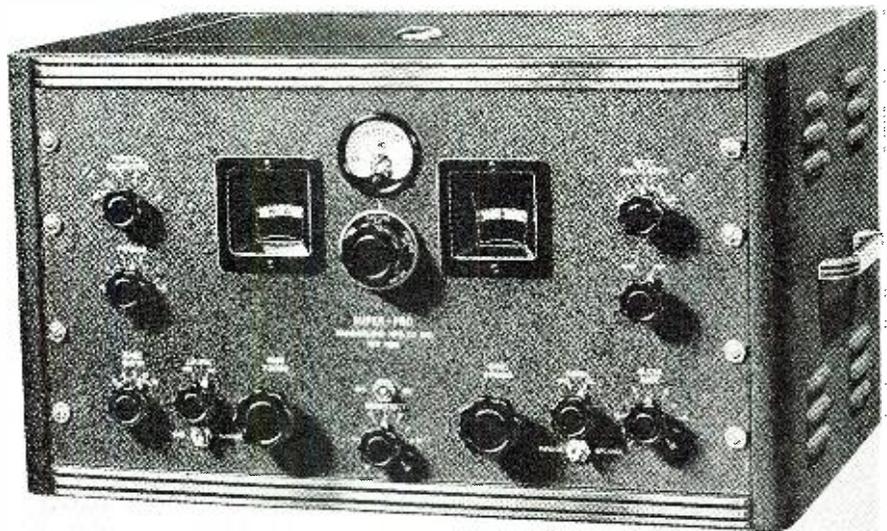
THIS new "Super-Pro" has everything that goes to make up a modern communications type receiver and is available in two tuning ranges—15 to 560 meters and 7½ to 240 meters. In this 18-tube receiver have been retained all of the well-known developments that made the original "Super-Pro" an outstanding engineering accomplishment, and in addition, a number of improvements have been added. These improvements include the new variable selectivity crystal filter which was first introduced in the "HQ-120-X"; a new and vastly improved noise limiter designed and adjusted to provide maximum suppression without affecting the normal performance of the receiver; and an entirely new "S"—meter arrangement that permits the operator to make adjustment for receiving conditions in order to give more accurate reports.

The new crystal filter needs little explanation because it is undoubtedly well-known to all who are familiar with latest developments in communications receivers. Its main features are, variable selectivity; constant gain; and simplicity of operation. There are five ranges of selectivity available—three are for reception of voice and music, and the remaining two are for c. w. or code reception. Phone-men, as well as short wave listeners, find this new crystal filter to effectively double the width of crowded phone bands.

The "S" meter is something entirely different. It is well known that a standard, fixed and calibrated "S" meter will vary in readings, depending almost entirely upon receiving conditions as well as the type of antenna installation with which the receiver is used. This new type of "S" meter has a single variable control that can be set to accurately report signals under almost any condition. Suppose, for example, two receivers are operated side by side on different antenna systems. One has a resonant antenna and the other, just a short length of wire. The



The coil and condenser assembly are easy to service and hold their setting.

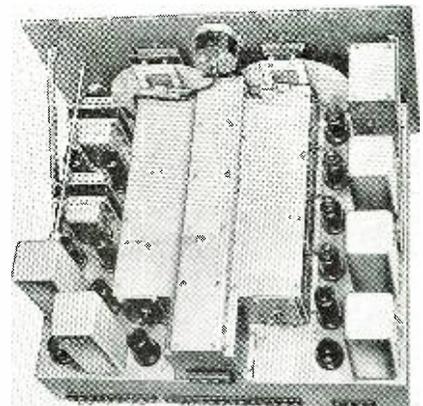


The receiver has the general appearance of its forerunners.

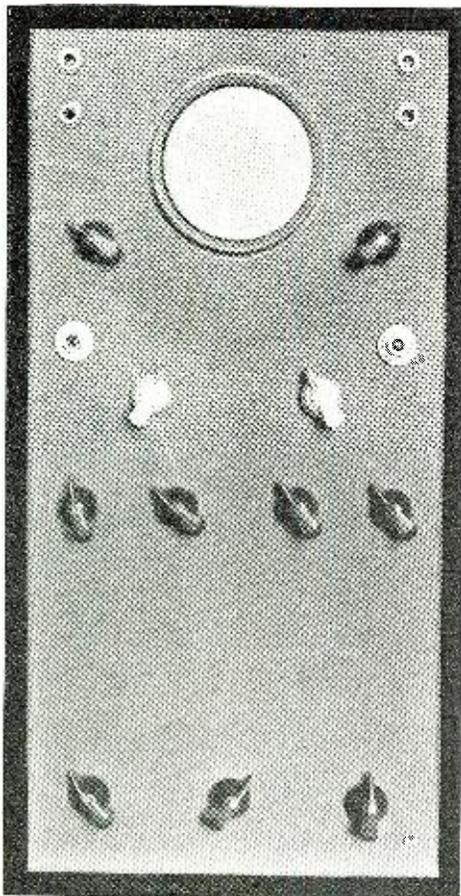
receiver operating on the resonant antenna will provide a much higher "S" meter reading than the other one on the same signal. If one indicates "S-9" and the other "S-4," the impression would be that the signal was weaker in one set than the other, which would be true, but actually the transmitter would be sending exactly the same signal to each receiver and the reports would be entirely false. With the "Super-Pro" the operator merely picks up the average loud signal and adjusts the control so that the "S" meter reads whatever he is accustomed to reporting that type of signal and from there on, all other signals are read in proportion to the strength of the signal on which the meter was set.

The tube line-up in the new "Super-Pro" includes two 6K7's as first and second r.f. amplifiers; 6L7 first detector; 6K7 first i.f. amplifier; two 6SK7's as second and third i.f. amplifiers; 6H6 second detector; 6N7 noise limiter; 6SJ7 beat frequency oscillator; 6SK7 AVC amplifier; 6H6 AVC and meter rectifier; 6C5 first a.f.; 6F6 second a.f.; 6J7 oscillator; and two 6F6's push-pull output audio amplifier. The power supply has two rectifiers, one type 5Z3 high voltage rectifier, and one type 80 low voltage rectifier for the C-bias supply.

The two carefully designed tuned r.f. stages result in exceptional sensitivity with a very low background noise level. The gain in the first stage is sufficient to override noises originating in the tubes that follow, and the gain in the antenna circuit, or first tuned circuit, is great enough to definitely establish a high signal-to-noise ratio even on the weakest signals. The antenna coil is designed to operate with a low impedance feeder or lead-in system. (Pse QSY to page 50)



The gang condensers are completely enclosed in an efficient dust cover.



The portable oscillograph does not look any different from an AC model.

A PORTABLE CATHODE-RAY OSCILLOGRAPH

by **J. G. KEARBY**

Standard Laboratories
Dallas, Texas

There comes a time when every serviceman has wished his oscillograph was portable so that he could carry it along and use it on 6 v. auto and portable receivers. The author tells how to build such a unit.

A NEW adaptation has been made in constructing a Cathode-Ray oscillograph, one offering more flexibility and wider range of uses. Thus far oscillographs have been constructed to operate only from 110-v. a.c. lines. Herein is described the new Cathode-Ray oscillograph which has been designed to operate directly from either 110-v. a.c. sources or 6-v. battery. The information given here relates to the RCA 906 tube, and a similar adaptation can be easily made for the 913 or such other tubes as may be desired.

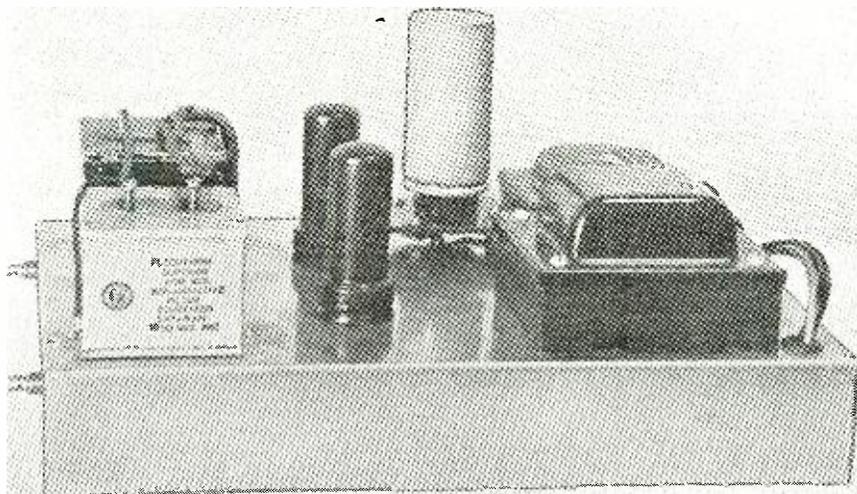
Need for this instrument arose from the necessity of using an oscillograph in making experimental determinations in a program of field investigation of radio transmissions, where the weight and the quantity of equipment had to be kept at a minimum. In this work it was necessary to use the same instrument, first for setting up standards in the laboratory and later in making the actual measurements in the field. Inasmuch as we did not wish to be limited to operating the oscillograph from a 6-volt battery in the laboratory it developed that by a few changes in our original design of the circuit, it could be made to operate also from the 110-v. a.c. source. It was impossible for us to use a gasoline-driven generator supplying 110-v. a.c. and thus employ a commercial 110-v. oscillograph.

After using this oscillograph several

months and having received numerous inquiries concerning its operation we concluded there would be many other engineers and technicians throughout the radio and electrical industries who would find such a flexible test instrument of equal advantage to them.

The unit operates equally well on both 110-v. a.c. and 6-v. d.c. This means, for instance, that the radio service man can use the oscillograph in his shop simply by plugging into the a.c. line. And then just as easily,

should he have to make adjustments or repairs on a radio set for a customer where the a.c. power is not available, he can clip the leads from the oscillograph directly to the 6-volt battery and proceed with his work of locating trouble or adjusting the receiver. The amateur radio operator will find the oscillograph invaluable adapted to his needs in studying the operation of his portable transmitter while making actual field tests and measurements. In fact, a complete new field is opened



The portable power supply is rigidly mounted for easy moving.

up for using the Cathode-Ray oscillograph in checking field equipment.

The design of the power transformer requires a little ingenuity on the part of the builder in changing some of the windings on the transformer. We recommend for this purpose a *Thorndarson* transformer T-7021 or the equivalent. This transformer is originally equipped with the following windings:

- (1) 110-v. Primary
- (2) 750-v. Secondary (c.t.)
- (3) 5-v. Secondary (c.t.)
- (4) 6.3-v. Secondary (c.t.)
- (5) 2.5-v. Secondary (c.t.)

The windings needed on the transformer for the new power supply are as follows:

- (1) 110-v. Primary
- (2) 750-v. Secondary (c.t.)
- (3) 8-v. Secondary (c.t.)
- (4) 2.5-v. Secondary (c.t.)

The filament windings of the transformer are conveniently placed on the outside of the Primary and high voltage windings, which makes the re-winding of this transformer a very simple job.

The following suggestions will be helpful in adapting this transformer to the new power supply: First, strip the core iron from the transformer. Then with equal care remove the three filament windings from the coil assembly, being very careful not to damage the insulation of the high voltage secondary coil which lies beneath. The windings which are now to be put back on are as follows:

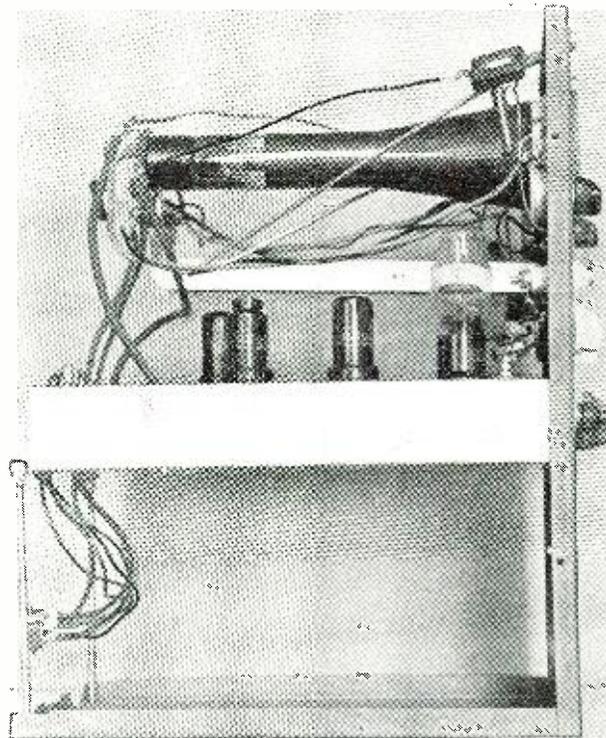
(1) 8-v. center tapped, which acts as the vibrator supply primary winding when operating from 6-v. battery. This winding consists of 22 turns of No. 17 S.C.E. magnet wire. When the original filament windings have been disconnected and removed there will be five bare lug connectors on the transformer. The two new windings which are applied to the transformer will conveniently require these five-lug terminals for connections.

(2) 2.5-v. Secondary for the filament of the 906 Cathode-Ray tube. This consists of 8 turns of No. 20 S.C.E. magnet wire. This winding is at a high potential with respect to the rest of the transformer and should be well insulated from the other coils and core by at least two layers of .007 v.c. cloth.

If the transformer T-7021 is to be used, the black lead which is the center tap of the high voltage winding may be fastened to the next adjacent lug connector on the transformer. While the remaining two lugs on the same side of the transformer are to be used to connect the leads of the 2.5-v. winding. This now leaves three lug connectors on the opposite side of the transformer and adjacent the 110-v. primary leads. Fasten the three leads from the 8-v. (c.t.) winding to these three lugs.

For satisfactory operation of the 1,000-v. absorption rectifier it is imperative that the Cathode be well heated before the plate potential is applied to the 6X5; thus a.c. operation

Side view of the oscillograph proper. It shows the mounting of the cathode-ray tube and the components. The power supply can be inserted in the room left on the lower chassis. Operation is the same for 6 v. as for 115 volts AC.



necessitates an auxiliary 6.3-v. transformer for this purpose as shown.

These coils should now be given a good coating of shellac, beeswax or rosin, or other suitable moisture proofing material which is usually found in any repair shop. The whole coil assembly when dry, should then be taped over by at least two thicknesses of .007 v.c. cloth or fibre as insulation and protection from the core iron. Then the core iron should be assembled with the coil group. The transformer is now ready for mounting on the power supply chassis.

The Power Supply

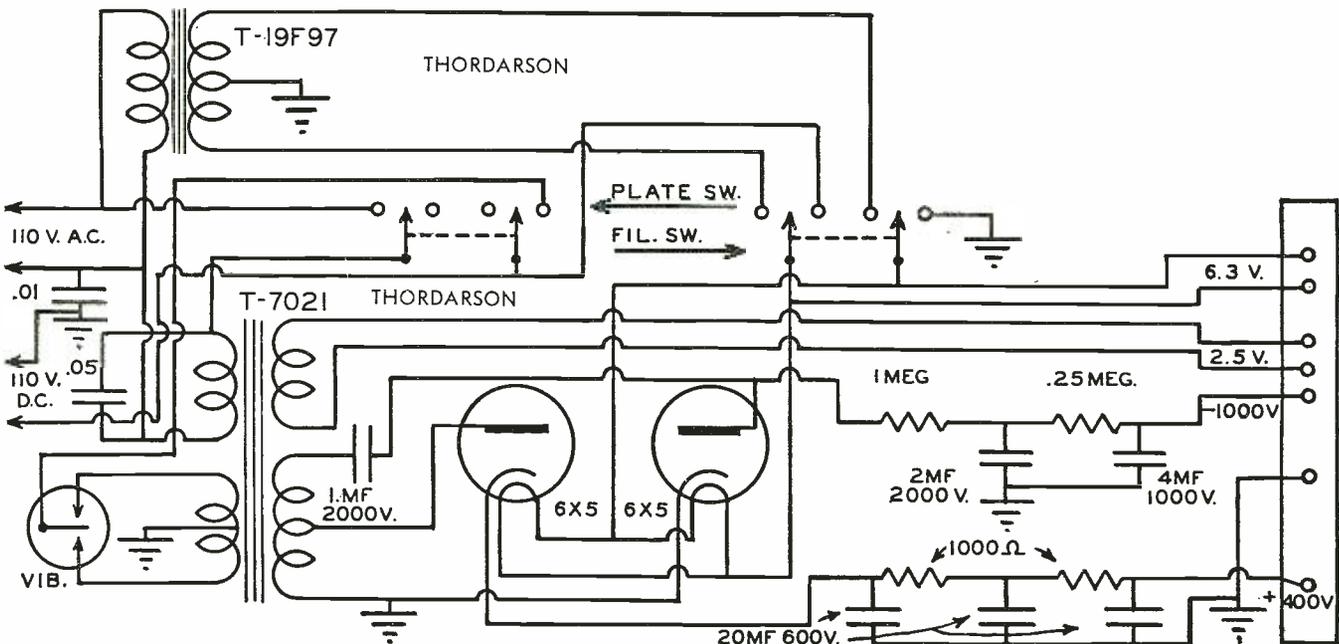
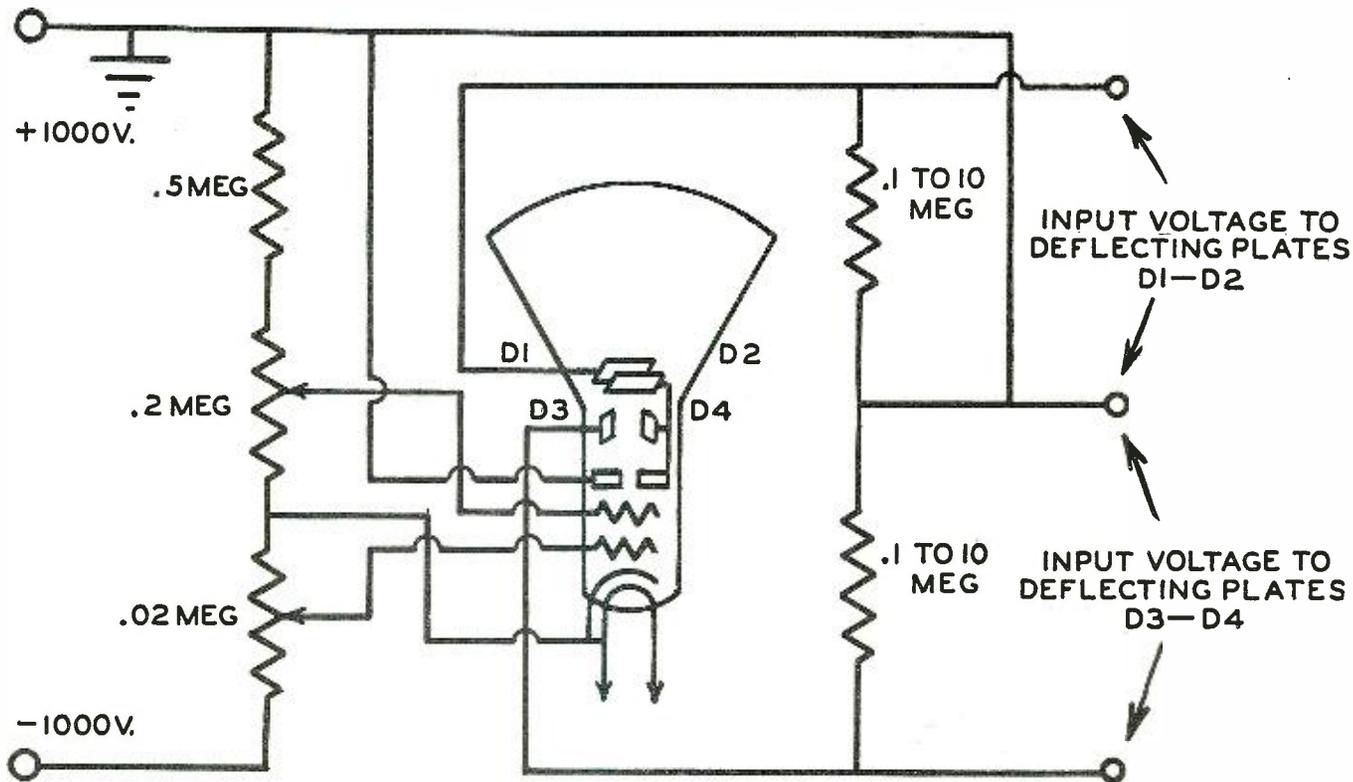
A study will disclose a convenient means of obtaining 400-v. d.c. and 1,000-v. d.c. from the same transformer winding. Although the total transformer secondary is rated at 700-v. it is to be remembered that the absorption rectifier which supplies the high voltage d.c., furnishes a potential nearly equal to the peak value of the applied a.c. or approximately 1.4 times the 700-v. It is desirable to use the 6X5 rectifier tubes as shown because of the insulation between the filament and the Cathode of this particular tube. This allows rectifier filament supply from the same 6-v. battery source and all at ground potential. A heavy duty vibrator is recommended for this particular use due to the additional load of the filament of the Cathode-Ray tube. A *Mallory* type 825 or the equivalent should be used. It has been thought advisable, in connecting the power switches (both of which are d.p.d.t. Cam-type) that they should turn to the left for a.c. operation and to the right for d.c. operation with the center being the off position. The *Yaxley* Junior Jack switch serves

this purpose well. Further consideration of figure 4 discloses that the original center tap of high voltage winding now becomes the high potential side of the low voltage power supply to the amplifier system, while the total secondary furnishes the high potential for the Cathode-Ray tube anodes. It will be noted that no filter chokes are used in the circuit; that filtering is accomplished by use of high capacities and suitable resistors, thus eliminating magnetic hum pickup by the chokes.

Ac. and d.c. power leads are brought into the power supply chassis by means of two male flush receptacles mounted in the back of the chassis. One for a.c. operation the other for d.c. They should be well identified so as to prevent accidentally confusing them when plugging in the power. It is advisable to use the polarity type receptacle for d.c. use, and the regular unpolarized type for a.c. These give the added convenience of not having a long cord permanently attached to the test instrument.

The circuit used for the Cathode-Ray tube potential control network is that recommended by *RCA*, for the 906 tube. In the event a different tube is used, modifications of the circuit can be made easily, for adapting the power supply to the tubes used. The load leads of the power supply chassis to the Cathode-Ray tube and amplifier chassis are, for convenience, brought out to a plug receptacle. Note this suspended plug which plugs into the power chassis below.

Perhaps the only critical part of the circuit is the condenser *C*, which is for the purpose of correcting the power factor when operating the oscillograph on direct current. To determine the



Circuit diagrams of the oscillograph (top), and the portable power supply at bottom.

capacity of this condenser remove both rectifier tubes and connect a 6-v. battery as for d.c. operation. Connect an ammeter in the line. Try various values of capacity at C_1 until the current drawn from the battery is a minimum. The value of C_1 will be found to be near .05 mfd. a good mica condenser should be used for this purpose as the potential peaks are frequently rather high.

The Amplifier Chassis

The sweep oscillator and amplifier, and input amplifier are together located in the mid-section of the cabinet on the chassis, as shown. In the interest of brevity circuits for these am-

plifiers are not given here because several have been previously published in this magazine.

The input to each amplifier is through the two insulators located one on either side of the front panel just below the focus and intensity control knobs which in turn are located near the lower edge of the Cathode-Ray tube face.

It is to be noted, also that additional jacks located in pairs near the top of the cabinet lead directly to the deflecting plates. This still further increases the flexibility of the instrument by permitting the use of either or both sets of deflecting plates with-

out the amplifier.

The Cabinet

The front panel and face of the cabinet are made of one piece of metal. The cover is also of one piece and fits into the place outside the base but inside the front panel. Over-all dimensions are, width 8", height 16"; depth 13". The elevated base upon which the amplifier chassis rests is mounted 6½" above the base of the cabinet. This allows ample space for the 6X5 tubes below. The Cathode-Ray tube is mounted by means of a bracket supporting the tube socket as shown while the screen end of the tube should rest

(Check to page 62)

The VIDEO Reporter

by SAMUEL KAUFMAN

SOME weeks ago, the Video Reporter ran into William Schudt, manager of Station WKRC, Cincinnati, and one-time manager of CBS's old mechanical television transmitting station in New York.

Meeting Bill again brought to mind the full realization that television studio programs have not advanced greatly since 1931 despite the huge strides made in the technical end of the video art. Bill put on the same variety of songs, novelty acts, dramatizations, character bits and even boxing bouts way back in days when television was wearing diapers. Today, television is wearing long pants but it still needs a safety pin to hold them up. The video art is dolled up but there's no getting around the fact that it's still a youngster. And we don't have to look beyond the program schedule for proof of its immaturity.

Not one word of this is intended as adverse criticism of present day video program directors. But they are prone to admit that they haven't yet discovered the best manner in which television can be put to use for entertainment purposes. They're doing a good job in experimenting—but it's still experimenting. And it's the laboratory angle of their efforts that seems to register with the public rather than the general entertainment viewpoint they'd like to see sink home.

All the pioneer programs on NBC's "regular schedule" have impressed viewers as "interesting." But the sales impetus was lacking. Few persons would care to make an investment in a receiver "to participate in an experimental stage of a new art." There's a thrill to pioneering—but it's not much fun to plunk down several hundred dollars for a skinny television schedule.

A television set can be a beautiful piece of furniture and an ingenious instrument. But it can't yield any better entertainment than the stations put on the air. Of course, schedules will grow larger and there will be more stations on the air in various zones, thus providing a *choice* of programs. This will undoubtedly improve the sales prospects for receivers. But the chief objective of telecasters should be to produce a few good programs rather than a flock of bad ones.

OUTDOOR events have registered exceptionally well as video program fare. NBC did an excellent job with a long series of summer remote control jobs and most of them clicked in a big way. Sporting events, particularly, scored very well. The climax of the summer sports programs was the telecasting of a double-header baseball bill from Ebbets Field, Brooklyn. This was the first attempt to televise a big league ball game and the result was very pleasing, indeed.

There's no doubt that remote control telecasts are greatly instrumental in selling sets. But the studio presentations which get the least publicity are the things buyers must and do consider. Most outdoor programs—except where special lights are available—must occur in the daytime. And that, of course, is the poorest look-and-listening time. The double-header ball program happened to take place on a Saturday afternoon and was available to a larger audience than a weekday bill. But the big potential nighttime audience can't be ignored and it seems that studio presentations are the only way to attract real masses to the new art.

TELEVISION'S first summer season revealed that there was a staff replacement shortage on both the technical and program

sides of telecasting. An NBC spokesman explained that due to the unavailability of substitutes for various studio and transmitter jobs it was necessary to eliminate studio transmissions for several weeks while the staff "regulars" went on vacation. The schedule was filled by special event and motion picture productions.

The special event programs went off quite smoothly, as we said before. But the choice—or rather the lack of choice—of film material was sad, indeed. Foreign-made films and antique American celluloid offerings came into use. It's always been said that movies will play an important part in television. Technically, they can. Practically, they cannot. The good new films just are not available. Television stations can't afford to pay big prices for them and theatre exhibitors would object to their video use under any conditions. This is one of the big problems telecasters are facing and it is the guess of many that, unless some outlet for television is made by the big movie companies, telecasters will launch their own film production units. If this occurs, the movie companies will face a double loss. They'd pass up the chance of collecting sizable rental fees from telecasters and they'd face the possibility of a new competition arising from the placing of television-produced reels in theatres.

TWO applications have been made for television licenses for New York and Newark department stores. It is interesting to note that retail establishments are on the alert in recognizing the commercial possibilities of telecasting. All indications point towards the sale of time being a strictly local proposition with dealers rather than manufacturers paying the video program bill. This condition is brought about by the technical limitations of signals, restricting reception to little more than the metropolitan zone in which the transmitter is located. Hence, only those dealers in the strong reception areas will benefit by the sale of television-ballyhooed wares. There's little justice in making the rural and small town dealer—and, in turn, the rural and small town consumer—pay for entertainment he doesn't receive. And there are no bones about the fact that the advertising cost of nationally-advertised products is contained in the list price of the wares themselves. It's the local dealer in the television area who stands to make the greatest profit out of a commercial telecast and the Eastern department store television transmitter applications suggest the likelihood that the bulk of commercial video shows will be dealer-sponsored.

MOST department store executives the Video Reporter met are clever fellows indeed. And when television popped up on regular schedule in the New York area they weren't caught napping. They were quick to recognize its promotional value as well as its merchandising importance. The American Television Corporation is one of the firms that pioneered in the use of wired television for large stores and the RCA "Jeep" can fill the bill for the same purpose.

Undoubtedly, the thought of demonstrating and displaying general merchandise over such self-contained video systems in large retail establishments is excellent promotion. But we wonder whether the store executives are giving thought to the harm they can do to television receiver sales through the use of the method. Of course, it all depends on

the way the demonstration apparatus is used.

Confining the demonstration to displays of merchandise and sales spiels will give many store visitors the idea that that's the kind of home entertainment they can expect if they buy a receiver. Many shoppers won't grasp the fact that the images are confined to the store proper and that the 100 per cent commercial programs they witness are different than the kind of sight-and-sound entertainment available for the home.

THERE are indications that television program listings in newspapers may come under the heading of paid advertisements. Some papers are listing the video schedules in editorial columns, but it is anticipated that as the schedules grow larger, newspapers will be reluctant to contribute added space. A sizable amount of television receiver advertising, though, may strengthen the hold on free program listings.

RCA Victor has already bought good-sized newspaper space to ballyhoo such outstanding telecasts as the British royal couple's American visit, the Cincinnati Reds-Brooklyn Dodgers double-header ball game and the Max Baer-Lou Nova fight. RCA's angle was to attract prospects to dealer's stores. It is likely that other manufacturers, too, will follow this technique for a while. The big potential advertisers are the firms that will sponsor the hit television shows.

NBC's long head start in television means that CBS will have considerable catching-up to do. The Radio City video lads have registered a great many "firsts". And still they spring added surprises from week to week.

Football seems quite definitely "in the picture" this season but it is believed that rights to the real big games will be difficult to obtain inasmuch as granting permission to televise a gridiron clash might conflict with broadcasting contracts let to radio stations or networks.

Sports played an important part in the summer video schedule and this heading will necessarily be curtailed during the fall and winter. There just aren't enough outdoor events to draw from. There's a possibility that W2XBS may televise such winter sports as skiing, ice-skating and tobogganing. Even though the scenes of such activities are a considerable distance from New York, NBC has great faith in its mobile television transmitter's ability to span long distances. Last summer, the distance record of twenty-four miles was set for the video relay station when it covered the Eastern Grass Court Tennis Championships at the Westchester Country Club. Still greater distances were effectively spanned in experiments that were not rebroadcast to home audiences. One NBC spokesman claims the unit can cover a fifty-mile radius. Hence, for winter sports, such a snow resort as Bear Mountain may be the scene of television pickups.

ONE of the biggest drawbacks to television receiver sales is the cost of the cathode-ray tube. Dealers, manufacturers and all persons concerned in the new industry must agree on this point.

The replacement cost, even on the very smallest types, is pretty stiff. And this is especially true when there is no guaranty covering a specified term. In England, where television has been public-participating for a considerable time, the industry not only recognized this detriment to sales but decided to do something about it.

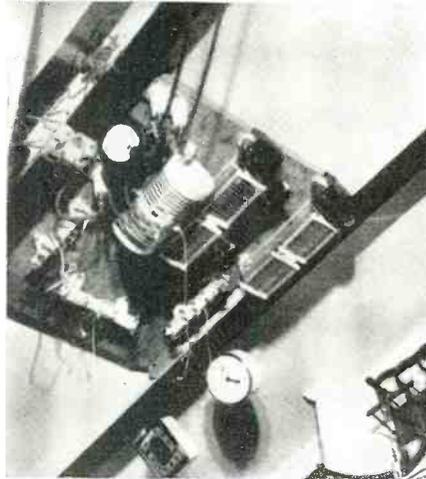
And, as we write these lines, we hear that the British television tube makers will place a one-year guaranty on their cathode-ray units. If a picture tube fails in less than that period a free replacement will be made. But the replacement will be insured only for the remainder of the original guaranty period. In other words, if a tube fails after nine months of use, the replacement will be guaranteed for only three months.

Just how practical the plan will be remains to be seen. Anyway it should boost television receiver sales.

SPEAKING of British television brings to mind the imposing array of receivers (*Televise further on page 62*)



W3EQX's Jr. Op. seems to enjoy a rig as long as it features 4 bottles!

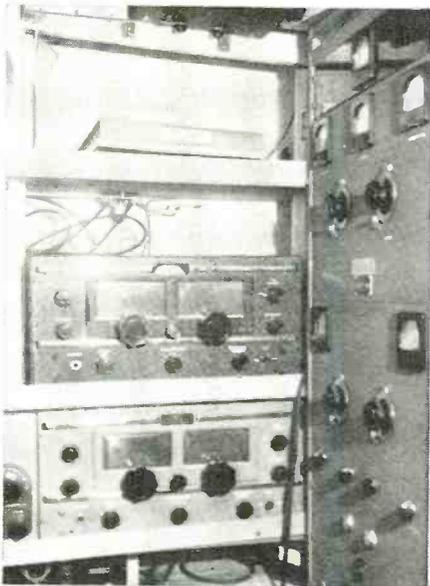


The roof of the cabin of mobile 6AM. This was what went in Honolulu race.



The mobile W3EQX which looks somewhat like a milk truck (hi). It's fb.

H A M C H A T T E R



The rig aboard the Yacht *Contender* consisted of RME 70's, Temco No. 350.



YL W3BAK receives a cup for winning the "Class B" code receiving contest.

THE summer has taken its toll in the matter of news for this column. The ham just cannot be made to stay at home and give us (or for that matter anyone else) any news so long as fishes jump and the deer run. Vacation is just about over, though the snow may be flying when you read this, and we plead guilty to not having much to report. However, for what it is worth, we go to press with the following:

We are sorry to say that Owen Callin's *Ham Corner* which used to appear in the Sunday Edition of the *Ohio State Journal*, is no more. Reason? That edition of *The Journal* folded. So long, OC, we sure enjoyed your stuff. But how's about it sending us a few items now and then for this rag? Watsa?

The burning question nowadays is: "What will happen to the U. S. Hams?" Use your beam. As long as the ham is an asset to this country, there is little chance that anything will be done during our neutrality. Should he become a problem he'll be off the air just like that!

THE "Diplomatic" of 9QEA has been demonstrated at Columbus, Ohio, with success. Funny thing though, 9ETI ES 9QEA caught themselves a "bus" twenty minutes before lecture time. With sweat and cussing, they got it out in time. Everyone breathed a sigh of relief; when, doggoneit, right in the middle of the lecture a jack burnt out and the set went on the fritz. Proves that good jacks are worth the jack—if you get what I mean.

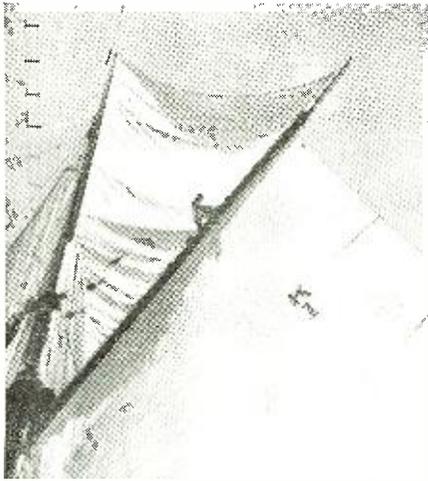
They really went to town there, 100. That "Downward Modulation" was sompin! Ask Rex W9LIP Munger what he meant by "Biased to cutoff" when you see him. The floor show was versatile and—believe it or Rip—very, very funny. Everyone had themselves a super fb time. We hope that the next Central Div. Convention can equal—let alone surpass that Colum-



George W9CSY Culbertson, who has devised a portable sound carryall for home movie makers, at his wk rig.



Horace S. Greenwood, W6MEA, who contributed to the column with bits of information from the 6th Dist.



Antennae aboard the *Contender* were hard to reach, but worked very fine.



Don W6AM Wallace at the key during the Honolulu Race. He wasn't seasick!



More about Honolulu. A 1908 transmitter used to contact U. S. Mainland.

bis meeting. Try it and see what a hard job you will have! Special orchids (with apologies to Walt Winchell) to Jim Bayes who was superlatively as a Convention Manager. We can use more of the same all over the States.

That "bootie" of the Chicago South Side is outta business. Reason? His Pop cotched him es tuk him to the wood shed. Nw the bootie can't sit long enough for even one measly CQ! IH! Seems Pop believes in obeying the Law, es taught junior a lesson!

WGLZY, who has been on all bands, according to W6MEA, is bedded in "Olive View Sanitarium." Drop him a line, fellers. He'll be there abt. a yr. His handle is, Jean Le Borgne.

FROM the "hook":

Here's a gud one for you. Why not get the names and publish a list of all the twin amateurs? I'd like to know, cuz my bud and I, W6RMI, W6RMI, are twins, and it'd be interesting to know a few of the hams in our class. Signed—Alfonso Loto, W6RMI.

"If you see 9DBE tell him I'm certainly glad he finally got his brain storm finished as he was showing or starting to work on it two or three years ago when he was 76CH at Glasgow, Manitoba. Tell him hello from an old pal of his, W9WWL."

FOURTH DISTRICT RAMBLINGS:

FBI gives the list of stations in Georgia Army Net as follows—ERS, ARX, FDJ, FDE, GFP, FFP, FCW, FGD, EZU, and FFL. Wants more 160 Georgia Phone men to join.

The Atlanta, Georgia, Hams—which rumor says is to the number of 250—got a nice writeup recently in the *Atlanta Journal Magazine*. We betcha the Atlanta BCLs have a swell time. Hi!

Aside to Editor of Hamchatter: "We are being Winchelled to death every time we get in a QSO wid some hams which ain't got much manners or else they don't quite realize that we ain't got no receiver and how come it all started is what we want to know? And added to insult GFP says he betcha we don't even know what a mill is. Will you confirm? [We do, Ed.] And then that certain W9 which has three (countem) RME receivers says that he bets that we, after all, told the truth about not having a good receiver. Heck man, we are married and

that orter answer your question. . . ."

Note to W5ADJ: What chance have we on the good ole 160 meter band when you are using our 1925 frequency. We have always wanted to know why we don't get out and then good ole RN advised us that you had a kilowatt. Woe is us!

W4DWQ, Valdosta, Georgia is still active, so we hear, but he must ignore our sies. How bout some news from your mansion Tommie?

Due to dead line on getting this chatter in we can't list all hams attending the Athens, Georgia hamfest but visiting hams say that all had a FB time. Swell bunch of fellows in Athens and keep up the good work.

Will W4CYZ at Elizabet, Tenn, let us know if he is still active or in the dog house or what? W4FVS at Montgomery, Ala., must be rebuilding because his sigs are dead over this way.

With his duties in BC station in Dothan, Ala., W4FXN is a busy guy.

AJO, after visiting the NY Worlds Fair, says he enjoyed it fb including television but on the way home in Va. he wrecked his car and had to buy a new one. No injuries except the pocket book.

CCJ is sojourning on ten meters and his buddies are accusing him of neglecting them on 75 and 160. Foggy, that miserable ten watts might get out if you would put it on a decent band.

Why not a chatter col'm on what servicemen are doing—most of em are hams anyway. [Send 'em in. We'll run it. Ed.]

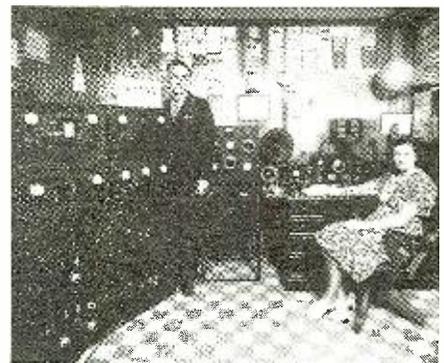
As most hams are interested in television why not a sponsored demonstration in logical locations so we can see if it really works. Good publicity for somebody is going to waste.

W4EL at Wetumpka, Ala., is active on 160. Horace, W4FBM, reports he is inactive at this time. Hope he gets back on soon.

A nice ham is W4DMZ at Marion, Ala. We need 'em like him.

Will W4BXP mail us his present QRA? Gene W4EZF at Liberty, S. C., puts out a wicked signal at a pair of Sol's. At least that's what it was on our last QSO.

Any of you 4th district hams which has some chickens that can be fried can always count on us to accept an invite. Also if you wanta see your activities in print drop us a card. We can't write you up unless we hear from you. (We



W1AKY es his XYL in their very completely equipped hamshack. He's WAC!

betcha the ED don't know what Southern Ham fried chicken is like.) [Ok, yeah? Ed.]

W4EBD was 160ing the last time we heard from 'em at Parrish, Ala.

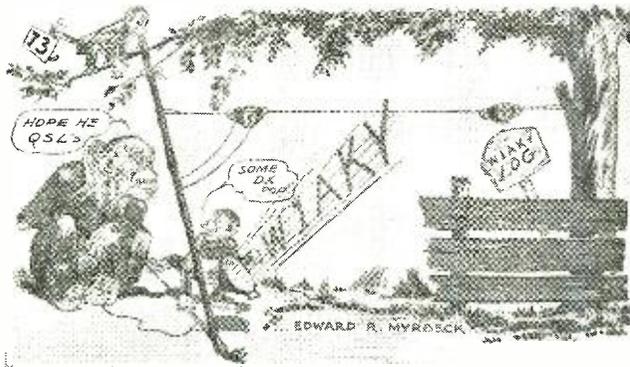
W4BWK at Dinsmore, Florida, used to put out a swell sig. How about some news from you Dou?

W4DLO at Cherry Lake, Fla., ain't been heard in so long that maybe the XYL made him blotto. W4DIP at Ocala, Florida, must have moved or be rebuilding as he ain't on no band. Get active, boy!

Well, if we ain't Winchelled to death, maybe next month, like death and taxes, we will be back.

[Aside to Keith C. Mathis who sent in the above. Thank OB, it's sure a relief to know at least one newspaperman is on the job—summer or no summer. We enjoy your stuff no end, and have many letters from others who said that you

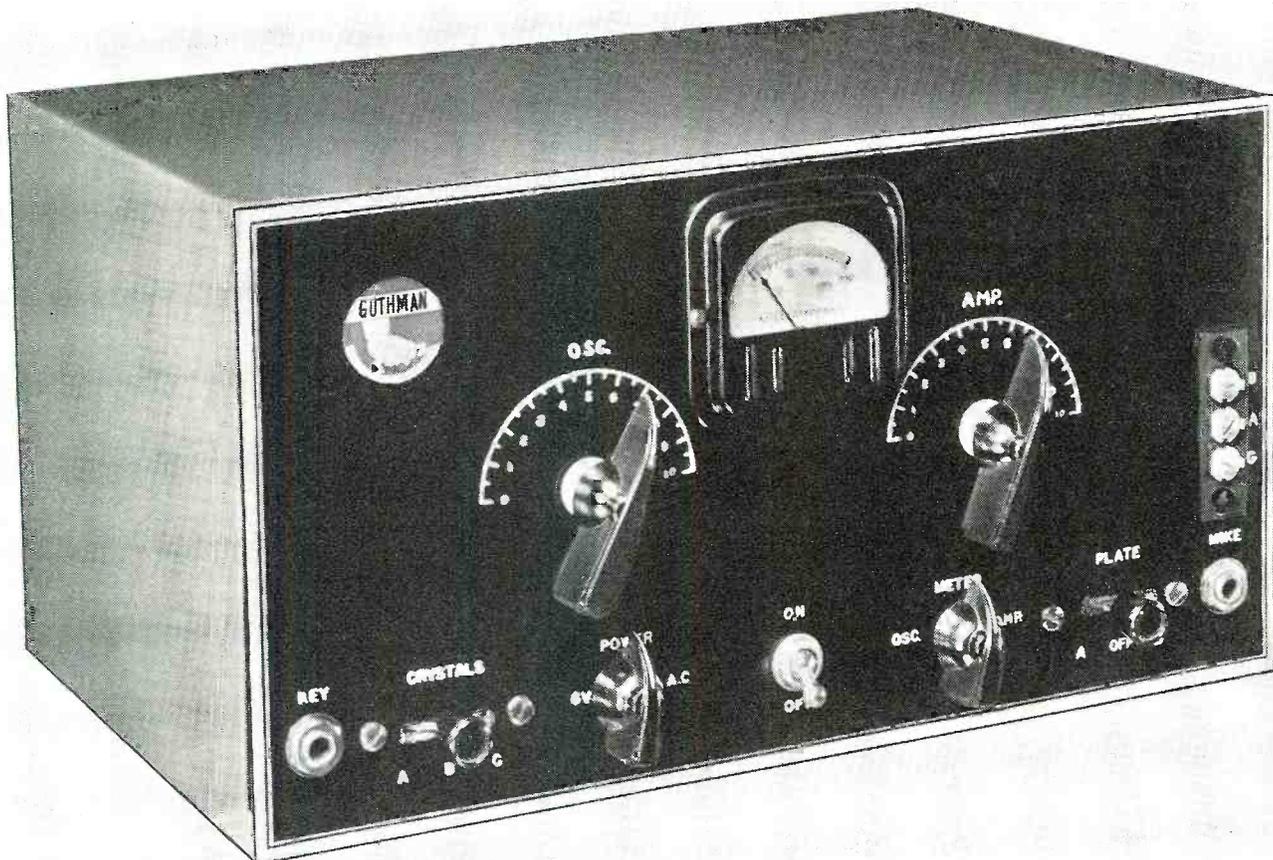
(More Hamchatter on page 65)



Vaguely reminiscent of the famous *Collier* covers, is this individual QSL card of W1AKY. Wats the pwr?



A quiet afternoon aboard the Yacht *Contender* during the Honolulu Race. "Sparks" Wallace, W6AM, at right.

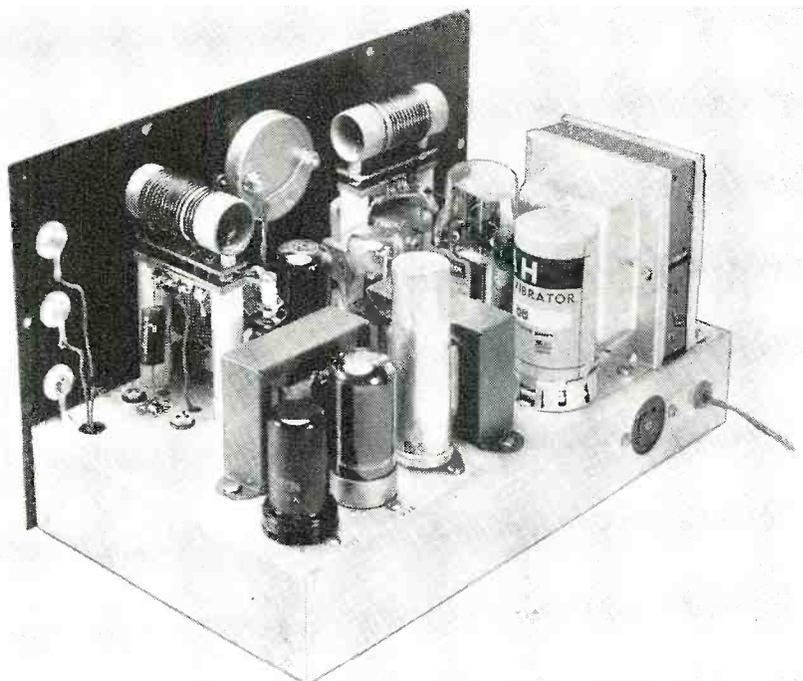


The completed unit has all the ear-marks of a commercial transmitter, yet it is easy to build and operate.

10ktal Tube Transmitter

by I. L. GLERUM

Chief Engineer, Edwin I. Guthman & Co., Inc.
Chicago, Illinois

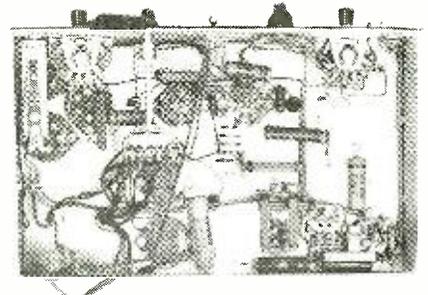


Behind the panel, everything is orderly. Short leads are the rule.

BOTH commercial and amateur radio have seen numerous cycles, where the old is reborn again, usually with greater favor and greater success. A commercial example is the old battery portable which was a fair seller in 1927 despite its excessive weight and juice-hungry tubes. Today it's back again, smaller, cheaper, and more efficient than ever—and look what it brought back with it, the old loop antenna.

It is no wonder then that amateurs, who after years of building up to the maximum of one KW, have recently turned to the lure and sport of small low power rigs. It is true that economy has played no little part in popularizing this field, but there is another reason for hams who can well afford high power equipment now concern themselves with the flexibility and portability of "midget" transmitters. We might compare it with the true fisherman who likes to catch the big ones with "splinter rods." At any rate if you haven't been bitten by "Work all States on 10 watts" bug, chances are you will feel the urge soon, and that gets us down to the facts about

One of the most neglected persons in the "ham" game, is the neophyte. Here is a fb unit for him to build and operate. It can be added to at a later date, thus eliminating wasted parts when the time comes for the usual trek to higher power cw or lone.



Underside the chassis shows the easy wiring job that is needed.

an effective rig layed out from scratch for this use.

To follow the unwritten rules, such a transmitter must be small in size, light weight, mobile, operate on 6 and 105-125 volt supplies, cover all bands, and be economical in material costs. That's a large order for one rig, and a lot of changes and field work took place before we evolved the unit now to be described in detail.

In order to eliminate the usual clutter of wires associated with units having separate power supplies, both the 110 and 6 volt rectifier and filter supplies are included in the same chassis, and all included in a case measuring 7x7 1/4 x 12 1/4", making it completely powered by insertion of the line cord into an a.c. outlet or by connecting to a storage battery.

A single power transformer used in conjunction with a synchronous vibrator, and an 83V tube make it possible, by merely throwing a switch, to use either 6 or 105-125 volts. When used on 105-125 volts a suitable primary is switched in, and the 83V tube is used as the rectifier, on 6 volts the primary and the 83V circuits are opened, and the synchronous vibrator comes into play. The common filter consists of a choke, two fifteen mfd. 450 volt, dry electrolytics, and an additional filter consisting of a 20,000 ohm and 10 mfd. condenser "resistance capacity filter" for the audio pre-amplifier. All the switching is accomplished by means of a two position six circuit switch. The lower center toggle switch cuts out the 6 volt supply when set on a.c. and the a.c. supply when set on 6 volts, acting as the on-off switch in both cases, and making for simplicity and a minimum of parts.

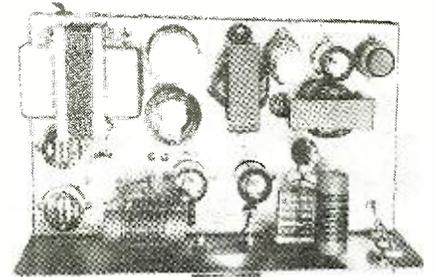
The transmitter circuit is fundamentally a two tube crystal osc.-p.a. r.f. unit, and a two tube amplifier modulator unit. A 7A4 all-glass Loktal tube—the exact equivalent of the 6J5 tube is used as the oscillator. A selection of three crystals can be used by throwing the lower left selector switch. Sockets are provided so that the crystals may always be left plugged in. A Guthman ceramic insulated condenser having a capacity range of 10 to 165 mmfd. is used to tune the plate coil to either of two amateur bands for each coil. Plug-in coils are provided. These are so designed that in conjunction with the Guthman Condenser, the 5-10 meter bands are taken care of with

one coil. The 20-40 and 80-160 meter bands are used with a second and third coil.

The power amplifier is capacity coupled to the oscillator for simplicity and obtains drive on the fundamental and 2nd harmonic of the crystal frequencies. The power amplifier tube is a 7C5 all glass Loktal equivalent of the 6V6 beam power tube—equivalent in all respects except that the absence of long stem leads result in lower grid-to-plate capacity, thus enabling us to keep circuit capacities at a minimum and allows us to use one coil for two bands.

The power amplifier plate circuit is essentially the same as the oscillator in that the 10-165 mmfd. condenser and each plug-in coil covers two amateur bands.

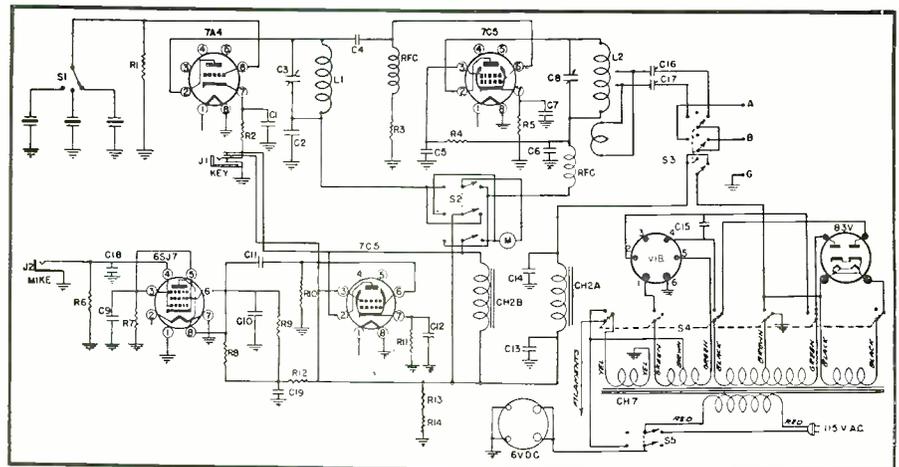
Heising plate modulation is employed with a 7C5 modulator and plate choke. This tube is driven by a 6SJ7 (metal for best shielding) pentode pre-amplifier having a 2 megohm input circuit terminating at the lower right hand microphone jack, for use with a



Topside the chassis shows the simple mounting layout of the components.

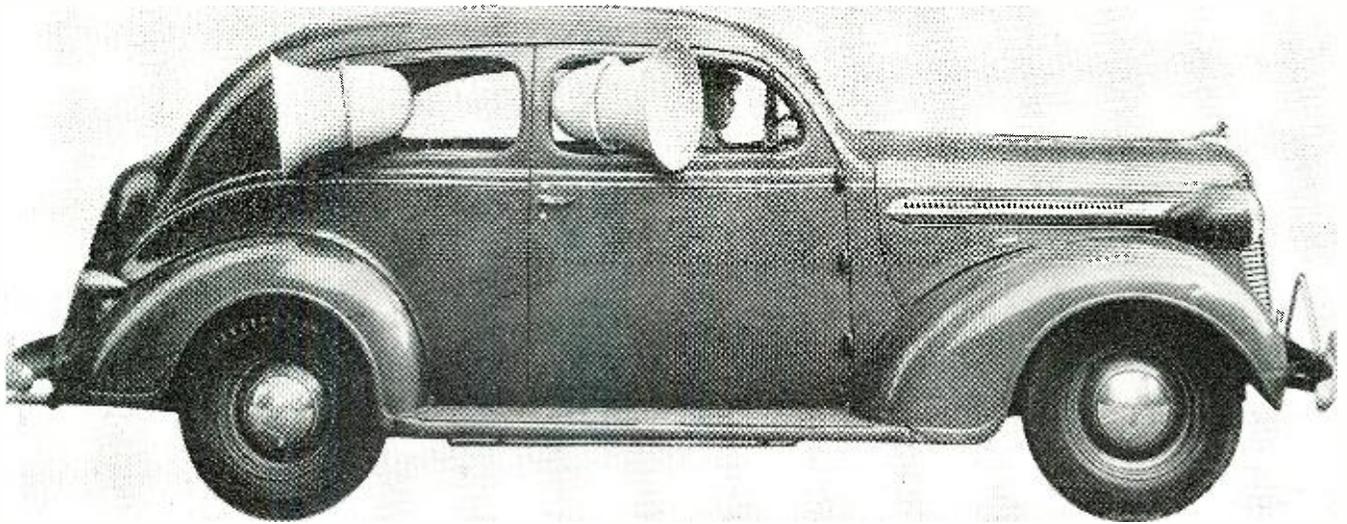
high level communications type crystal microphone, or with a carbon microphone and input transformer. Two additional contacts on the key jack short out the modulation choke for c. w., eliminating "chirps." Because of the high by-pass capacity across the pre-amplifier bias resistor, a rising low-frequency audio characteristic is intentionally provided for maximum speech modulation capabilities.

Contrary to general belief, power (Pse QSY to page 50)



L₁—5-10 meter plate coil, Guthman No. B-217.
L₂—10 meter plate coil, Guthman No. B-217.
RFC—R. F. Chokes, Guthman No. 4269.
CH₇-A—Modulation, Guthman.
CH₇-B—Filter, Guthman.
M—Milliammeter 0-100, Guthman.
CH₇—Power transformer, Guthman.
R₁—50,000 ohms, 1/2 w. Centralab.
R₂—200 ohms, 2 w. Centralab.
R₃—50,000 ohms, 2 w. Centralab.
R₄—7,500 ohms, 2 w. Centralab.
R₅—200 ohms, 2 w. Centralab.
R₆—2 meg. 1/2 w. Centralab.
R₇—2,000 ohms, 1/2 w. Centralab.
R₈—500,000 ohms, 1/2 w. Centralab.
R₉—2 meg. 1/2 w. Centralab.
R₁₀—250,000 ohms, 1/2 w. Centralab.
R₁₁—300 ohms, 2 w. Centralab.
R₁₂—20,000 ohms, 2 w. Centralab.
R₁₃—20,000 ohms, 2 w. Centralab.

R₁₄—20,000 ohms, 2 w. Centralab.
C₁—0.01 mfd. 400 v. Cornell-Dubilier.
C₂—2000 mmfd. mica, Cornell-Dubilier.
C₃—32 plate midjet var. Guthman.
C₄—100 mmfd. mica, Cornell-Dubilier.
C₅—1000 mmfd. mica, Cornell-Dubilier.
C₆—1000 mmfd. mica, Cornell-Dubilier.
C₇—0.01 mfd. paper 400 v. Cornell-Dubilier.
C₈—32 plate midjet Guthman.
C₉—10 mfd. electro 25 v. Cornell-Dubilier.
C₁₀—1 mfd. paper 400 v. Cornell-Dubilier.
C₁₁—2000 mmfd. mica Cornell-Dubilier.
C₁₂—10 mfd. electro 25 v. Cornell-Dubilier.
C₁₃—15 mfd. electro 450 v. Cornell-Dubilier.
C₁₄—15 mfd. electro 450 v. Cornell-Dubilier.
C₁₅—0.008 mfd. 1500 v. Cornell-Dubilier.
C₁₆—15-100 mmfd. Guthman.
C₁₇—15-100 mmfd. Guthman.
C₁₈—100 mmfd. mica, Cornell-Dubilier.
C₁₉—10 mfd. electro 300 v. Cornell-Dubilier.



This type of speaker mounting not only attracts attention, but gives the maximum coverage to crowds.

ELECTIONEERING a la MOBILE

by **GORDON FRASER**

Radio Wire Television, Inc.
New York, N. Y.

With fall elections not too far off, the enterprising serviceman can make money renting out P.A. equipment to the politicians and government officials. The unit described is excellent for this use.

WITH election again upon us, perhaps more attention is centered on public address equipment than at any other time of the year. Not only are radio dealers, servicemen and P.A. specialists giving thought to the matter from their particular and rather closely related standpoints but so are their prospective customers, the local political campaign managers.

Let us consider for a moment just what advantages P.A. equipment for electioneering purposes offers the campaign manager.

Logically, his first thought is that by amplifying a speaker's voice a larger crowd can be covered in one assemblage. Also, with loudspeakers operating at high levels, street-corner meetings are made practical at the busiest intersections, where traffic noises are such that the unaided speaker's voice would lose itself within a few feet. Here again more people can be reached.

The street-corner meeting will collect its own crowd; the busier the corner, the more crowd. But with amplifiers at indoor meetings intended to

cover larger audiences, the problem arises of getting the voters to come out to the meetings in larger numbers. Here again P.A. equipment does its own job in the form of a mobile installation which, traveling around the streets, provides the ballyhoo.

There is another angle to all this, however, that is of extreme importance and yet receives too little attention. That is the human element, the staff of speakers.

Suppose a campaign manager finds himself with a hundred speakers who have volunteered their services. Certainly he will not find more than one William Jennings Bryan in the bunch. But he will find perhaps ninety who could not by any stretch of the imagination be considered orators, or even good speakers. Perhaps these latter will be well equipped by nature with stentorian voices. Their intentions will undoubtedly be of the best, but they lack the command of language, the logic and the vital spark to enable them to sway an audience.

So, what happens! Either the ten good speakers are burdened with such heavy schedules that they are ex-

hausted long before election, their voices worn ragged; or the poor speakers, quite without the ability to influence their audiences and make "converts" are nevertheless employed in wholesale numbers, with negligible results.

From the standpoint of human efficiency; of net results per unit of effort, such campaigns bear scant fruit. This condition has in times past been unavoidable. Today, however, amplifiers and loudspeakers offer highly effective remedy, at a cost which is negligible as compared with the returns.

Take the former example again. The ten good speakers find themselves easily able to carry the burden because their speeches can be delivered at normal voice-levels and, with the voice strain eliminated, they can carry on throughout the campaign. Moreover, there may be others in the local party organization who have the logic and the spark but have lacked the leather lungs and wrought-iron throats required under the old conditions. Enabled to carry on at conversational voice levels they may considerably increase the original ten with the overall result that the campaign manager finds himself with a more wieldy, dependable and effective speaking staff. Certainly the public will not suffer with the passing of the old brazen mouthpieces, sputtering, drooling and sweating, whose mountainous laborings often did not even produce the proverbial gnat!

Thus far we have referred to Public Address equipment in a general way. To the layman this term signifies fixed amplifiers, great clusters of built-in

SHORT WAVE FLASHES

BY CHARLES A. MORRISON
and JOHN D. CLARK

By Charles A. Morrison

Frequency in megacycles Time is Eastern Standard

Special Good-Will Programs

SUNDAY, November 12, and Sunday, November 19, at 10 a.m. EST, over YL2CD (28.08), operated by A. Vitollins of Miera Isla 52-5, Riga, Latvia . . . Wednesday, November 15, from 4 to 6 a.m. EST, over ZP14 (11.721) of Villarica, Paraguay . . . Sunday, November 19, from 1 to 2 a.m. EST, over TG2 (4.19) of Guatemala City, Guatemala . . . Sunday, December 17, from 1 to 2 a.m. EST, over YNDG (7.46) of Leon, Nicaragua.

South Pacific Expedition

The National Geographic Society—University of Virginia Expedition to the South Pacific Islands, sailed from San Francisco on September 19, aboard the U. S. Coast Guard cutter, Hamilton. The expedition will study fundamental questions about the Pacific, magnetism and magnetic changes and toward this end will establish base-camps on Pitcairn, Easter and numerous other remote islands within a 5,000 mile radius south of Honolulu. NBC Field Engineer John Larson and elaborate short-wave equipment is accompanying the party of explorers. According to present plans frequent broadcasts will be made from remote points of interest for relay broadcast by the NBC network in the United States. The short-wave transmitters and receivers will also be used to keep the exploration party in constant touch with civilization. No details as to call letters or frequencies to be used are as yet available.

Frequency Modulated Radio Broadcasting—“Frequency modulated” radio broadcasting will be available from several stations soon. This new type of transmission is practically static, and interference free and furnishes a much higher degree of fidelity in reproduction than has heretofore been possible with the currently used “amplitude modulated” broadcasts. The new type of transmitters are much cheaper to install and operate than the older type and are ideal for local coverage purposes. Frequencies used for “frequency modulated” broadcasting will be above 40 megacycles, and inasmuch as this will restrict the primary coverage area to a radius of a few miles, it will be possible to operate almost an unlimited number of stations on the same frequency. [Why? Ed.] It is this writer's prediction that within a few years “frequency modulated” broadcasting will be used exclusively for local purposes, which will in turn release numerous frequencies in the broadcast band for national and regional stations.

HAMS ATTENTION!

The New 40 Meter Broadcast Band

Short-wave broadcasting is, under certain conditions, now being permitted in that portion of the 40 meter amateur band extending from 7.2 to 7.3 mcs. The following stations have already reserved frequencies and calls in the new band: 7.206, YNOD, Managua, Nicaragua; 7.21, India; 7.21, PFR, Kootwijk, Netherlands (under construction); 7.21, YDX, Medan, Sumatra; 7.22, 2RO, Rome, Italy; 7.23, GSW, Daventry, England; 7.24, 2RO, Rome, Italy; 7.24, LLR, Oslo, Norway; 7.24, India; 7.24, Belgrade, Yugoslavia; 7.25, Melbourne, Australia; 7.25, 2RO, Rome, Italy; 7.25, PJCI, Willemstad, Curacao; 7.257.5, JWV, Tokio, Japan; 7.26, OZU, Skamlebak, Denmark; 7.26, GSU, Daventry, England; 7.26, CSW8, Lisbon, Portugal; 7.27, DXM, Zeesen, Germany; 7.27, 2RO, Rome, Italy; 7.27, India; 7.27, Belgrade, Yugoslavia; 7.28, Melbourne, Australia; 7.28, TPB11, Paris, France; 7.28, 2RO, Rome, Italy; 7.285, JLG, Tokio, Japan; 7.29, DJI, Zeesen, Germany; 7.29, India; 7.295, YDA, Tandjounpriok, Netherland Indies; 7.295, JIE, Taihoku, Taiwan; 7.3, VIG, Port Moresby, Papua; 7.3, Belgrade, Yugoslavia.

New Calls for United States International Stations

Short-wave broadcasting in the United States has finally progressed beyond the purely experimental stage and in official recognition of this fact the Federal Communications Commission has issued the following new calls: WSLR, formerly W1XAL; WBOS, formerly W1XK; WGEA, formerly W2XAD; WGOE, formerly W2XAF; WRCA, formerly W3XAL; WNBI, formerly W3XL; WCAB, formerly W3XAU; KGEI, formerly W6XBE; WPIT, formerly W8XK; WLWO, formerly W8XAL.

New Short-Wave Stations

(On the Air)

CANADA—Using the new call CFXK, Vancouver's old two watt transmitter VE9CS is back

on the air again on a frequency of 6.08, where it is being heard daily from about 1 to 3 a.m., according to Ashley Walcott of San Francisco, Calif.

CHILE—A Santiago station, believed to be CB1174, is being heard irregularly on 11.74 mcs.

CHINA—Harry Honda of Los Angeles, Calif., reports a new Chungking station on approximately 8 mcs., daily from 8:30 to 9 a.m. . . . A new station whose call starts with XHH, last letter and location unknown, is being heard on a frequency of 7.97 mcs., daily from 4 a.m. to 12:30 p.m. Programs are entirely in Chinese and reproduction is of a poor quality.

CUBA—R. B. Orxieder of Corozal, Canal Zone, writes he is hearing a new Havana station, call COBS or COBF, on a frequency of 7.8.

GOLD COAST—ZD4AA (7.05), 10 watts, at Accra, is relaying programs of the Gold Coast relay system, irregularly for experimental purposes preliminary to the establishment of a regular short-wave broadcast station there.

JAPAN—The new shortwave transmitters at Tokio have been assigned the following calls and frequencies: JLG (7.285), JLG2 (9.505), JLG3 (11.705), JLG4 (15.10), JLP (9.605), JLP2 (15.325), JLP3 (7.835), JLP4 (21.59), JLR (6.015), JLR2 (15.115), JLS (9.655), JLS2 (17.845), JLS3 (21.62), JLT (6.19), JLT2 (9.645), JLT3 (15.225), JLT4 (21.61), JLU (6.185), JLU2 (9.525), JLU3 (15.135), JLU4 (17.795), JLV (11.815), JLV2 (11.825), JLV3 (9.695), JLV4 (7.257), JLV5 (9.675), JLV6 (11.725), JLV7 (15.235) and JLV8 (17.83). It is reported that JLV2 (11.825) is broadcasting daily from 8 to 9 p.m. for North America and JLV7 (7.257), daily from 2 to 4 p.m. for Europe.

JAWA—Mrs. R. S. Roche of Alwal North, South Africa, reports hearing a new Java station on 4.85 mcs., closing down at 10:30 a.m.

LUXEMBOURG—“Radio Luxembourg” is on the air testing at various hours on any one of the following frequencies: 6.09, 11.782, 9.527 or 15.35 mcs. The following test transmissions have been arranged for the period from October 10th to November 26th inclusive: on 9.527 mcs., October 10-11-12, 11 p.m. to midnight; 13-14-15, midnight to 1 a.m.; 16-17-18, 1 to 2 a.m.; 19-20-21, 2 to 3 a.m.; 22-23-24, 7 to 8 p.m.; 25-26-27, 8 to 9 p.m.; 28-29-30, 9 to 10 p.m.; Oct. 31, Nov. 1-2, 10 to 11 p.m.; on 11.782 mcs., October 10-11-12, 7 to 8 p.m.; 13-14-15, 8 to 9 p.m.; 16-17-18, 9 to 10 p.m.; 19-20-21, 10 to 11 p.m.; 22-23-24, 11 p.m. to midnight; 25-26-27, midnight to 1 a.m.; 28-29-30, 1 to 2 a.m. and on Oct. 31, Nov. 1-2, 2 to 3 a.m.; on 15.35 mcs., November 3-4-5, 11 p.m. to midnight; 6-7-8, midnight to 1 a.m.; 9-10-11, 1 to 2 a.m.; 12-13-14, 2 to 3 a.m.; 15-16-17, 7 to 8 p.m.; 18-19-20, 8 to 9 p.m.; 21-22-23, 9 to 10 p.m.; 24-25-26, 10 to 11 p.m.; on 6.09 mcs., November 3-4-5, 7 to 8 p.m.; 6-7-8, 8 to 9 p.m.; 9-10-11, 9 to 10 p.m.; 12-13-14, 10 to 11 p.m.; 15-16-17, 11 p.m. to midnight; 18-19-20, midnight to 1 a.m.; 21-22-23, 1 to 2 a.m. and on 24-25-26, 2 to 3 a.m. All reports should be sent to H. N. Kempen, Wireless Publicity Ltd., Electra House, Victoria Embankment, London, W.C.2, England.

MAURITIUS—An amateur on approximately 7.19, call unknown, is broadcasting experimentally from time to time, according to Mrs. R. S. Roche of Alwal North, South Africa.

NORWAY—Additional calls and frequencies for the new Norwegian short-wave station have been assigned as follows: LLA (25.9), LLC (28.35), LLD (9.55), LLE (6.185), LLJ (6.195), LLK (11.85), LLM (15.175), LLN (17.825), LLO (17.805) and LLR (7.24).

PHILIPPINES—KZIB (6.04), in parallel with KZIB (9.492) broadcasts daily from 7 to 9 a.m. . . . KZRM (6.13), with the same program as KZRM on 9.57, is being heard daily from 6 to 9 a.m.

SOUTH WEST AFRICA—Bob Hetzel of Milwaukee, Wisconsin, has received a letter of verification from ZUN (7.25) at Windhoek, South West Africa. This station under the control of the Director of Posts and Telegraphs, is used for the dispersal of traffic to isolated points.

U.S.S.R.—Ashley Walcott of San Francisco, reports a new Soviet broadcaster operating on 5.72, mornings near 8 a.m.

YUGOSLAVIA—YUG (15.24) Belgrade, is testing Monday nights from 6 to 7 p.m. for South America and from 8 to 9 p.m. for North America. Other Belgrade transmissions on Mondays are radiated as follows: over YCA (6.1), from 11 p.m. to midnight; on 11.74 mcs., from 9 to 10 p.m. and over DJA (9.56) from 7 to 8 and from 10 to 11 p.m.

Under Construction

ALGERIA—Construction will start soon on a powerful new station for Alger, which will commence transmissions before the end of 1940.

ANDORRA—It is reported that a powerful new short-wave station is being erected in Andorra.

AUSTRALIA—The new Perth, West Australia, transmitter which will commence operations soon will transmit as VLW on 6.13; as VLW2 on 9.56, and VLW3 on 11.83 mcs.

CUBA—Amado Trinidad Velasco, is installing a new 5000 watt transmitter at Santa Clara, to operate on the 25-meter band.

FINLAND—The new transmitter under construction for the primary purpose of relaying next year's Olympic Games to the world, will have a power of 100,000 watts.

HAWAII—According to Earl Roberts of Indianapolis, Indiana, a 25,000 watt transmitter is now under construction at Port-au-Prince. When completed it will operate on 6.2, 9.62, 11.82, 17.85, and 21.67 mcs., under the call HHR.

IRAN—The two short-wave transmitters under construction near Teheran, will be completed about April, 1940. EQB (6.155), will transmit with a power of 2000 watts for Europe, while EQC (9.68), will transmit with a power of 20,000 watts to the rest of the world.

MENTAWI AND NIAS ISLANDS—Before the end of 1939 short-wave broadcasting and receiving stations will be established on these islands.

NEW ZEALAND—According to the Newark News Radio Club, the National Broadcasting System of New Zealand, is planning a 500 watt short-wave station to operate as ZL1 on 6.08; as ZL2 on 9.54; as ZL3 on 11.78; as ZL4 on 15.28, and as ZL5 on 17.77. The location would be Wellington.

UNITED STATES—According to R. J. Rockwell of WLWO (W8XAL), Cincinnati, Ohio, this station's new 50,000 watt transmitter should be on the air this fall. The new transmitter will operate on 6.06, 9.59, 11.87, 15.27, 17.76 and 21.65 mcs., with beam aerials capable of concentrating signals in any direction desired.

Notes of Interest

CANTON—KABN is the call for Pan American Airways station on Canton Island that operates on 6.57; KVZC is reported to be the call used when the station operates on 8.1 mcs.

CHINA—XGOK (11.82), Canton, is heard irregularly from 6 to 8:35 a.m. The English announcer is a woman. The Central Broadcasting Station XGOY/XGOX of Chungking, China, has been sending special experimental transmissions to the United States from 8:35 to 9:30 a.m. and from 6:30 to 7:40 p.m. XQJD, Hankow, was heard signing off on a frequency of 6.85, at 8:35 a.m.

COLOMBIA—R. B. Orxieder of Corozal, Canal Zone, writes that HJ4DZ, “Ecos de la Montana,” Medellin, is now on 4.795, relaying HJ4ABA. This call will probably become H0DX in conformity with the new system of calls adopted recently.

FRENCH INDO-CHINA—“Radio Saigon” (6.116), Saigon, broadcasts an English program daily from 6 to 6:45 a.m.

IRAN—The Iranian Ministry of Posts and Telegraphs has called for bids on approximately \$5,000,000 worth of radio receiving sets, presumably in anticipation of the opening next spring of two powerful short-wave stations at Teheran.

IRAQ—Following the untimely death on April 3, of King Ghazi I of Iraq, all transmissions from Y5KG and HNF were supposed to have been suspended indefinitely. However according to reports HNF is not only still on the air but being heard with fair signals on the West Coast from approximately 8 to 9:30 a.m. EST.

ITALY—2RO12, one of the experimental frequencies of the Rome Short Wave Station, is being used irregularly from 4 to 5:30, 6 to 7:25 and from 7:30 to 9 p.m.

LITHUANIA—Desmond Callan of Readville, Mass., informs me that the officials of station LYR (9.29), Kaunas, are very anxious for reports on reception and these should be sent to Trumpu Bangu Stotis LYR, Kaunas, Lithuania.

NETHERLANDS—August Balbi of Los Angeles, Calif., writes that PGJ2 (15.22) of Huizen, is being heard Tuesdays from 1 to 3 a.m.

PERU—OAX4Z (6.077), is being heard evenings with RT to 9 signals.

POLAND—R. B. Orxieder of Corozal, Canal Zone, states that SP19 (15.12) comes in rotten to good, depending upon YV5RN's harmonic which falls on the same frequency; SP25 (11.74), comes through well depending upon CB1174; SPD (11.535) comes through well when not covered by CW, and SPW (13.635) is generally the best of the lot.

SAN FRANCISCO SETTLEMENT—A short-wave telephone link between San Francisco and Singapore has been inaugurated. ZHJ, Penang, now on its correct frequency of 6.08, is being heard irregularly both before and after its published operating schedule which is weekdays from 6:40 to 8:40 a.m.

SWEDEN—SM5SX ceased to function last May when SBT (15.155) came on the air. SBT is being heard with fine signals on its regular transmission for North America, Wednesdays and Saturdays from 8 to 9 p.m.

SWITZERLAND—The Swiss Government transmitter at Schwarzenburg, destroyed by fire some months ago, is being rebuilt as rapidly as possible, and is expected to be on the air again before the end of this year.

U.S.S.R.—The mystery station on 15.41 which broadcasts daily from 8:30 to 11 a.m. and from 8:55 to 10:30 p.m., opening and closing all transmissions with the “Internationale,” is definitely in the U.S.S.R., probably in Siberia, although the exact location is still unknown.

UNITED STATES—WIXAL has a new transmitter site at Hatherly Beach, near Scituate, Mass., right on the ocean about thirty miles from Boston. On account of the enormous expense involved in moving and enlarging the amplifiers the station is urgently in need of additional finance. The new 100,000 watt amplifier for station WGEO (formerly W2XAF) of Schenectady, New York, is now said to be in use and a great increase in signal strength is being reported. A more faithful reproduction of programs is also claimed. . . . Howard Hughes, has been granted authority to operate W10XKH, a 100 watt transmitter aboard plane NX-1994H, for the purpose of experimental communication between aircraft and ground station during a proposed sub-stratosphere flight from Los Angeles to New York, New York to Paris and return.

Revised Schedules

IRELAND—The latest schedule of EIRE at Athlone follows: on 17.84, daily from 7:30 to 9 a.m.; on even days of the month from 11:30 a.m. to 3:30 p.m. and from 4:30 to 5 p.m.; on odd days of the month from 11:30 a.m. to 1:30 p.m. and on 9.595, odd days of the month from 1:30 to 3:30 and from 4:30 to 5 p.m.

JAPAN—JW3 (11.73), relays the Japanese network, daily from 4 to 8 a.m. The schedule of overseas broadcasts from Tokio has been completely revised as follows: For the Pacific Coast of North America, from 12 midnight to 1 a.m., over JZK (15.16); for China and the South Seas, from 7 to 9:30 a.m., over JZK and JZL (11.8); for Europe, from 2 to 4 p.m., over JZJ and JZK; for South America, from 4:30 to 5:30 p.m., over JZL (17.785) and JZL (9.535); for Eastern Districts of North America, from 8 to 9 p.m., over JZL.

JAVA—PLP (11), PMN (10.26) and YDC (15.15), have extended their evening schedules, the new period being from 6 to 9 p.m. instead of 6 to 7:30 p.m. as formerly.

NETHERLANDS—The Huizen transmitters PCJ/PEI now operate as follows: over PHL2 (17.77), Sundays from 6:40 to 10:05 a.m., Mondays and Thursdays from 7:40 to 9 a.m. and Tuesdays, Wednesdays, Fridays and Saturdays from 7:40 to 8:45 a.m.; over PCJ2 (15.22), Sundays, Mondays and Thursdays from 7:40 to 9 a.m., Tuesdays, Wednesdays, Fridays and Saturdays from 7:40 to 8:45 a.m.; Tuesdays from 1 to 2:30 a.m. and Wednesdays from 9:30 to 11 a.m., and over PCJ (9.59), Sundays from 1:40 to 3 and 7:15 to 9:50 p.m.; Tuesdays from 1:45 to 3:30 and from 7 to 10:15 p.m.; Wednesdays from 7:15 to 8:40 p.m. and on Fridays from 8 to 9 p.m.

SWITZERLAND—Transmissions for Swiss nationals abroad being effected by the League of Nations Station at Prangins, during the reconstruction of the Schwarzenburg station, are as follows: To South America, Mondays from 6:45 to 8:15 p.m., over HBO (11.402), and Wednesdays from 6:45 to 8:15 p.m., over HBJ (14.538); to North America, Mondays from 8:45 to 10:15 p.m., over HBO, and Wednesdays from 8:45 to 10:15 p.m., over HBJ; to Africa, Tuesdays and Saturdays, from 12:45 to 2:45 p.m., over HBO; to the Orient, Fridays from 8:45 to 10:45 a.m., over HBF (18.45), and to Australia, the 1st Sunday of each month, from 12:45 to 2:30 a.m., over HBJ and HBO.

U.S.S.R.—RV96 (15.18), now has an additional schedule daily from 11:55 p.m. to 2 a.m.

UNITED STATES—Effective September 24, General Electric's stations in Schenectady, New York, adopted the following revised schedules: WGEA on 21.5, from 8 to 11 a.m.; on 15.33, from 11:15 a.m. to 6 p.m. and on 9.55, from 6:15 to 9:15 p.m., and over WGEO (9.53), from 4 p.m. to midnight.

Frequency Changes

CHINA—XGOY, Chungking, now varying in the vicinity of 11.93.

DOMINICAN REPUBLIC—HIGH, Trujillo City, to 6.89.

FRENCH INDO-CHINA—"Boy Landry" is now on 9.675 and slowly slipping down. Stations on 11.885 and approximately 6.215, operating in parallel with "Boy Landry," are occasionally audible.

MADAGASCAR—"Radio Tananarive" has shifted its old frequency of 5.8.

MEXICO—XEDQ has shifted to 9.517.

MOZAMBIQUE—CR7AA, Lourenco Marques, is now on 6.02. . . . STRAITS SETTLEMENT

—ZHL, Penang, has shifted to 6.10.

VENEZUELA—YV4RP has finally shown up on 4.93.

Transmissions of Interest

SUNDAYS—From 7:25 to 8:40 p.m., a service of Evangelical Church with announcements in English, over H9B (6.38).

MONDAYS—At 5:30 p.m., Modern Radio Course, over WSLR (6.04); and at 9 p.m., over WSLR (11.73).

TUESDAYS—At 4:30 p.m., The Listener's Post Box, over WSLR (11.79); at 5:30 p.m., The Mail Bag, over WGEA (15.33) and WGEO (9.53).

THURSDAYS—At 5:15 p.m., "Edward Tomlinson from the Other Americas," over WPIT (11.87) and various South American stations; 7:40 p.m., Evangelical Church services, with announcements in English, over H1N (6.243) of Trujillo City.

SATURDAYS—At 7:30 p.m., program from Honolulu, Hawaii, over KQH (14.92).

Data

ALBANIA—Station "Radio Tirana" (7.89), operates daily from 6:30 to 8:30 a.m., and on a frequency of 6.08, daily from 12:20 to 6 p.m.

ARGENTINA—LRA1 (9.69), Buenos Aires, also has two special frequencies, namely LRA2 (6.18) and LRA3 (11.73). LRA2 operates weekdays except Saturdays from 5:30 to 9 p.m., and Saturdays and Sundays from 7 to 9 p.m.

AUSTRALIA—According to a QSL card received from VLR at Melbourne, Australia, by Shokichi Yoshimura of Moji, Japan, that station operates as VLR3 (11.88), until 3 p.m. and as VLR (9.58) after 3:15 p.m. daily.

BELGIAN CONGO—The new 250 watt transmitter at Leopoldville is said to be operating as follows: over OQ2AA (9.525 and 15.17), daily from 5:25 to 7 a.m.

BRITISH GUIANA—VP3BG of British Guiana, issues an attractive QSL card which states the station operates daily from 3:45 to 7:45 p.m.

CANADA—CJRO and CJRX, Winnipeg, QSL with the same very plain black and white card.

CHINA—Shokichi Yoshimura of Moji, Japan, has received a cream colored QSL card from XMHA of Shanghai, China. In the center is a colonial pen drawing of a Chinese native musical band of three players and just beneath it the slogan of the station, "The Call of the Orient." XMHA (11.855) came on the air last January 12, and operates daily from 7 p.m. to 11 a.m. XGOY (now about 11.93) is issuing cream colored QSL cards with spaces for the calls and frequencies to be typed in. XGOX (17.8), operates daily from 9 to 10:30 p.m.; XGOX (15.18) operates daily from 8 to 9:30 a.m.; XGOY (11.93) operates from 9:30 to 11 a.m.; from 2 to 3:20 and from 4:30 to 6:20 p.m.

FINLAND—The Finnish Short-Wave Broadcasting transmitter at Lahti, issues a blue and white QSL card the left half of which depicts a photo of the transmitting station. The address given is Oy. Suomen Vleisradio Ab, Lahden Vleisradioasema, Lahti, Finland.

FRENCH INDO-CHINA—Shokichi Yoshimura of Moji, Japan, reports receipt of an attractive cream colored QSL card from "Radio Saigon." The Voice of France in the Far East. In the center of the card a native dancing girl is pictured. The schedule for this 12,000 watt transmitter is given as follows: On 6.116 mcs., daily from 6 to 8:30 a.m., from 6:45 to 7:15 p.m., and from 12:15 to 12:45 a.m.; on 11.78 mcs., daily from 8:30 to 9:45 a.m. and from 11:15 p.m. to 2:15 a.m.

HONG KONG—ZBW, power 2,500 watts, operates on a frequency of 9.525 mcs., but is also licensed to operate on 6.09, 15.19 or 17.755 mcs.

JAVA—Broadcasting is carried on by the N.V. Nederlandsch Indische Radio Omroep Maatschappij (NIROM), and a number of private local broadcasting societies. The company now has 28 stations in operation, 8 of which broadcast Oriental programs exclusively. The small stations were originally amateurs, but outgrew that status some years before a formal broadcasting concession was established. These stations exist on voluntary contributions, while the company operates on license fees collected from the listeners within range of its stations.

LITHUANIA—LYR (9.29), Kaunas II, power 500 watts, relays Kaunas I (1.53 kc/s), weekdays from 12 midnight to 12:40 a.m. and from 2:30 to 3 p.m., and on Sundays, from 1:20 to 2:15, from 6 to 7:45, from 11:30 a.m. to 1:15 and from 2 to 3:30 p.m. The station employs both men and women announcers.

MANCHOUKHO—MTCY (11.775), "The Voice of Manchoukuo," Hsinking, broadcasts an all-English program directed to Hawaii and the Pacific Coast of North America, daily from 1:30 to 2:20 a.m. MTCY (6.125) broadcasts daily from 4 till after 9 a.m. The power of the transmitter is 20,000 watts.

MOZAMBIQUE—Gremio Dos Radiofilos Da Colonia De Mocambique, Lourenco Marques, Caixa Postal 594, issues similar cards for reports on reception of CR7BH and CR7AA, except the former is green, the latter is orange. The cards picture a map of Africa.

NICARAGUA—R. B. Oxrieder of Corozal, Canal Zone, has received a verification from YN1P of Managua, which states the station operates on 7.284 mcs., Sundays from 10 to 11 a.m. This transmitter is also used for amateur contacts on 20 and 40 meters.

NORWAY—The latest information from Oslo gives the current operating schedule of the Short-Wave Station as follows: over LKQ (11.735), daily from 4:30 to 6:40 a.m. and over LKV (15.17), daily from 6:40 a.m. to 5 p.m.

PHILIPPINES—KZIB, Manila, is now operating on dual frequencies of 6.04 and 9.49 mcs., daily from 6 to 10 a.m. An interesting cabaret program can be heard after 9 a.m. The interval signal is three chime notes which are sounded on the hour.

POLAND—SPW (13.635) has a new QSL card, which depicts a tower surmounted by a statue in brown against a blue sky background.

SPAIN—EAO (9.86), Transradio Espanola, S.A., Apartado 953, Madrid, operates daily from 5 to 7:30 p.m., Saturdays from 1 to 3 p.m., and on Sundays from 8:30 to 9:30 p.m. Radio in Spain has been completely reorganized under the Department of Press and Propaganda. This agency lists the following active short-wave transmitters: Radio Nacional (7.5), operates daily from 3 to 3:30, 8 to 9 a.m. and from 1 to 5:45 p.m.; Alcazarquivir (7.125); Ceuta (7.134); Cordoba (7.117); Huelva (7.027); Jaca 7.117-14.115); Las Palmas (7.931-14.115); EAR (9.48); EAO (9.86); Malaza (7.22-14.44); Melilla (7.190-7.151-7.184); Oviedo (7.135); Saint Sebastien (7.2); Santander (7.16); Tenerife (7.5); Tetuan (7.194); Trianan-Rio-Martin (13.992-6.994); Valladolid (7.006); Villa Sanjurjo (7.147); Victoria (11.991).

STRAITS SETTLEMENT—The new telephone

circuit between Singapore and San Francisco, is in use daily from 10:20 to 10:50 a.m., from 7:20 to 7:50 and from 10:50 p.m. to 12:50 a.m.

SWEDEN—John Larsen of Geneva, New York, reports that SDP (15.155) is being heard with loud signals on its program for North America, Wednesdays and Saturdays, from 8 to 9 p.m. The carrier comes on the air about half an hour before 8 p.m. with a 12 note interval signal repeated over and over (similar to the Zeceen signal), then church bells sound at 8 p.m. and the first words are "This is Sweden."

U.S.S.R.—On the 7th, 13th, 19th, 25th and 31st days of each month, RV96 (15.18) opens its transmission at 3:15 a.m. instead of 3 a.m.

UNITED STATES—WIXAR, Boston, Mass., is now authorized to use an additional frequency of 25.6. . . . The QSL card issued by WPIT, Pittsburgh, Pennsylvania, is a light tan with large call letters in orange.

Ultra-High Frequency

The Midland Broadcasting Company of Kansas City, Missouri, has been granted a license for a new 500 watt, ultra-high frequency broadcast station to operate on 42.46. The Travelers Broadcasting Service of Hartford, Conn., has been granted a construction permit for a new ultra-high frequency broadcast station to operate on 43.2, with a power of 1000 watts. A. H. Belo of Dallas, Texas, has been granted a license for the operation of a 1000 watt facsimile broadcast station on 25.25. WBNS, Inc. of Columbus, Ohio, has been granted a license to operate facsimile station W8XUM on 25.2 mcs., with a power of 100 watts. General Electric's ultra-high frequency stations W2XDA and W2XOY of Schenectady, New York, have been granted temporary authority to conduct amplitude and frequency modulated transmission experiments on frequencies of 39.42, 39.46, 39.5 and 39.54 mcs. WLVC (30.8), portable transmitter of the Crosley Corporation at Cincinnati, Ohio, may often be heard testing in the mornings. W8XIK (31.1 and 34.6), 50 watt portable-mobile transmitter of the Crosley Corporation, tests and relays pick-up programs almost every day. W9XPD of St. Louis, Mo., formerly on 30.6, has shifted in frequency to 25.9 mcs. W2XWF (42.18), a new station at 1819 Broadway, New York City, broadcasts afternoons to 4 p.m. and solicits reports. W2XHG of New York City is broadcasting on a new frequency of 42.06.

Television

The EIAR (Italian Broadcasting Corporation) of Rome, Italy, has inaugurated television programs on a regular daily basis. The first demonstration ever to be given of television in natural colors was held in the experimental laboratories of the Baird Television Corporation at Sydenham, England, before an invited audience of the press Wednesday, August 2. The color photograph of King George was received on a large screen in full color and with perfect definition. Television images from NBC station W2XBS atop the Empire State Building in New York are being picked up regularly and clearly on Cape Cod, a distance of 185 air-miles from New York City. General Electric's new television station near Schenectady, New York, will operate on a revised frequency band of 288 to 294 mcs. W6XAO, owned by Don Lee Broadcasting System of Los Angeles, will shift location to 1 Lee Drive, Hollywood, and frequency to the 44-50 mcs. band. The following groups of channels have been officially allocated for assignment to television broadcast stations: Group A; Channel No. 1, 44-50; No. 2, 50-56; No. 3, 66-72; No. 4, 78-84; No. 5, 84-90; No. 6, 96-102; No. 7, 102-108; Group B; Channel No. 8, 156-162; No. 9, 162-168; No. 10, 180-186; No. 11, 186-192; No. 12, 204-210; No. 13, 210-216; No. 14, 234-240; No. 15, 240-246; No. 16, 258-264; No. 17, 264-270; No. 18, 282-288, and No. 19, 288-294 mcs.

Amateur Reception Notes

According to the World DX Alliance, the Hurricane Network in the West Indies consists of CO7VP and CO6OM in Cuba; H17G in the D.R.; VP7NS in the Bahamas Islands and VP6YB in Barbados.

BAKER ISLAND—John W. May of Wilkinsburg, Pa., reports logging KP6QKH (14.21) on Baker Island from 6 to 7 a.m. Power is 8 watts. Mail should be sent C/o Lieutenant Commander Frank C. Kemner, Dept. of Interior, Honolulu, Hawaii, marked "To go to Baker Island." The next mail will arrive at Baker in November.

BELGIAN CONGO—The World DX Alliance reports that OQ5AA (14.04), Unevangelized Fields Mission, Ekoko via Bumba and Bunduki, is on the air daily from about 5 to 7:30 p.m. All mail should be sent to Dr. G. W. Westcott at the above address. It takes approximately 82 days for a letter from America to reach Dr. Westcott. . . . Amateur station OZ5ZZ (14.35), operated by the 10th Gatti Expedition, operates Wednesdays and Fridays from 5:30 to 8 p.m. Reports should be sent to Commander A. Gatti, C/o Poste Restante, Stanleyville, Belgian Congo. If you desire to send your report by air-mail specify via Sabena-Aeris de France. QSL cards are being sent direct from the Gattis.

CHOSEN—One of the most active amateurs in Chosen is J8CI (14.2), owned by Katsumi Ninomiya, 66 Tojincho, Keijo, who is on the air usually from 2 to 4 and from 8 to 10 a.m. He issues a very attractive home-made QSL card.

DUTCH BORNEO—PK5KF is rebuilding his rig and will soon be on the air with 100 watts output.

(More S.W.F. on page 48)

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BOSCH—All 1937 Models

Inoperative ... 1) common trouble is broken voice-coil leads. The wire with which the voice-coil is wound is simply cemented to the cone at the point of its emergence from the coil, a length of insulation slipped over it, and then led up about 4 or 5 inches to the output transformer terminals. The wire is not flexible enough, and eventually breaks inside the tubing, causing non-operation. The trouble is simple but if not properly corrected will soon re-occur. To correct, remove the cone from the speaker (using "thinner" to loosen the rim) then cement to the cone, new leads of special flexible voice-coil lead wires. Replace and recenter the cone

BOSCH 812CK

Motorboats ... 1) replace the condenser having upon starting, a brown lead from the can, then develops a shrill whistle. Cut the lead close to the can, and connect a new 4-mfd. unit from the voltage-divider strip to ground

BRANDES

See listings under "KOLSTER-BRANDES"

BREMER TULLY (Brunswick) 88

Volume control erratic 1) fibre in volume control projects too high at places, causing the rotor arm to miss contact with the resistance element. Push fibre down in place—or, replace control

BREMER TULLY 881

See also the Case Histories listed for Bremer Tully 882 receiver
Scratchy noises ... 1) replace the purple 1-megohm grid leak on the first a-f tube with a ½-megohm unit
Distortion 2) check the 0.01-mfd. coupling condenser for leakage
Hum, ... 1) replace the three control-grid leads to the caps of the three r-f tubes—using good flexible wire

BREMER TULLY 882

A. C. Hum ... 1) breakdown in the 0.275-mfd. condenser used to tune one of the filter chokes to the ripple frequency. To check it, disconnect the condenser when set is in operation. Hum will decrease if it is broken down. Replace with a condenser of similar value
Weak reception 1) one of wires to the ballast tube "open"
2) r-f cathode by-pass condenser "shorted". Replace with a 0.5-mfd. unit
Oscillation ... 1) unsolder both wires from "local-dx" switch at the antenna loading coil. Remove bakelite strip supporting this coil. Unsolder the two fine wires from the coil at the terminal lugs, reverse their connections to the lugs, and re-solder them

BREMER TULLY 640, 641

Inoperative ... 1) if ohmmeter indicates a "short" between the plate of the 71A tube and the chassis (and inspection shows that the socket is not at fault), the trouble is likely due to receding of the insulation on the plate lead of the output transformer (which is housed in a metal container under the chassis with other audio transformers). The bared lead is likely "shorting" to another normally bare wire at ground potential. Though short occurs within container, the following procedure will likely clear trouble without breaking can open.
Apply hot soldering iron to lug which connects to the transformer lead (coming up through hole in lug) with external lead going to 71A plate. When solder starts to melt, grasp transformer lead with pliers and gently draw as much of it from inside of can as possible. Wind wire brought out around lug and solder to prevent wire from slipping back. The remainder of lead within container is now likely insulated throughout its entire length and the "short" removed
Oscillation ... 1) if oscillation persists after interchanging the old tubes in the r-f stages, installing new '26 type tubes in them, adding to the length of aerial ... turn adjusting screw of compensating condenser (connected between plate and grid of first r-f tube) counter-clockwise until oscillation ceases
Volume control does not function properly 1) volume control resistance element worn in spots. Replace properly

BROWNING 35

Inoperative ... 1) "shorted" 0.05-mfd. by-pass condenser connected from plate supply to cathode of

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.

350-ohm first-detector tube. This puts high potential across the cathode resistor which will burn out if the current is left on very long. Replace condenser. Check resistor

BRUNSWICK PANATROPES

Low volume ... 1) replace damping rubbers on pick-up head with new "live" rubbers
2) poor contact at phono-switch points. Clean with alcohol

BRUNSWICK PR-17-8

Hum, ... 1) volume control arm not making contact
No bias on first r-f tube
Oscillation ... 1) "open" '26 tube filament by-pass cond.

BRUNSWICK 8-14, 8-21, 8-31, 8-81, 8-82

Same Case Histories as those listed under Brunswick 14

BRUNSWICK 3-NC-8

Inoperative ... 1) snapped tabs on oscillator series condenser
Dial settings incorrect
Weak reception 1) carbonized 20,000-ohm carbon bleeder resistor—change to wire-wound unit
Insufficient sensitivity 1) shunt 400-ohm section of flat wire-wound voltage divider near volume control with a 509-ohm unit
Insensitive at high or low frequencies 1) oscillator trimmers out of adjustment
2) r-f compensator condenser out of adjustment
Distortion ... 1) open-circuited a-f transformer primary
Weak reception 1) broken spider on speaker cone
Distortion at low volume
Unstable ... 1) open-circuited oscillator grid lead
Hum ... 1) partially shorted speaker rectifier stacks
2) remove speaker frame ground connection
House fuse ... 1) "shorted" speaker rectifier stacks

BRUNSWICK 3-NW-8

Inoperative below 600 kc. 1) partially short-circuited speaker rectifier stacks
Dial settings incorrect
Intermittent ... 1) snapped tabs on oscill. series cond.
Weak reception, 1) open-circuited 1-megohm AVC grid resistor
Inoperative 1) oscillator trimmers out of adjustment
Insensitive at either high or low freq. 2) r-f compensator condenser out of adjustment
Tuning meter ... 1) shunt a 0.0001-mfd. condenser across meter
Distortion ... 1) open-circuited a-f transformer primary
Weak reception

BRUNSWICK 5-KR, 5-KR0, 5-KR-6

Weak reception, 1) volume control arm not making contact
No bias on first r-f tube
Poor selectivity, 1) adjust r-f compensating condenser
Low sensitivity
Oscillation ... 1) open-circuited type '26 tube filament by-pass condenser
Oscillation on high frequencies 1) adjust r-f compensating condenser
Oscillation over entire dial 1) open-circuited by-pass condenser across split primary winding of second and third r-f stage
Distortion ... 1) open-circuited detector-plate limiting resistor

BRUNSWICK 5-NC-8

Same Case Histories as those listed for Brunswick 3-NC-8 receiver

BRUNSWICK 5-NO

Distortion ... 1) open-circuited a-f transformer primary
Distortion at low volume 1) broken spider on speaker cone
Weak reception 1) carbonized 20,000-ohm carbon bleeder resistor—change to wire-wound unit
Insufficient sensitivity 1) shunt 400-ohm section of flat wire-wound voltage divider near volume control

Insensitive at high or low frequencies 1) with a 500-ohm unit oscillator trimmers out of adjustment
2) r-f compensator condenser out of adjustment
Inoperative above 600 kc. 1) snapped tabs on oscillator series condenser
Dial settings incorrect

Unstable operation 1) open-circuited oscillator grid leak
Oscillation "Birdies" ... 1) open-circuited oscillator grid leak

BRUNSWICK 10-AC

No reception at low-frequency end of dial 1) several plates in gang condenser "shorting" together
Weak signals, Oscillation 1) voice coil in speaker "open"
2) det. plate resistor (0.5 meg.) carbonized
3) 4,100-ohm screen-drop resistor carbonized
Scratchy sound (similar to defective audio transformer) 1) defective "Candohm" resistor. Cut wires in each section for a considerable distance with a sharp knife and solder a 10,000-ohm 10-watt resistor across the high-voltage section and a 5,000-ohm, 10-watt unit across the low-voltage section. The original terminals of the unit are excellent for connecting lugs
Failure of the tuned filter system 1) replacement of entire block is necessary. If this is difficult to secure, the following may serve as a substitute: Connect a 0.0005-mfd. (similar to de-chassis, a 0.01-mfd. condenser from one side of switch to chassis, a 12-mfd. electrolytic condenser from the high-voltage end of the "Candohm" resistor to chassis and an 8-mfd. condenser from the type '80 tube filament to the center tap of the high-voltage winding. If necessary, a tone condenser may also be connected between the tone switch and the chassis (capacity 0.02-mfd.)

Other common troubles 1) "open" volume control
2) faulty 1-mfd. condenser
3) faulty screen by-pass condensers
4) faulty 0.0005-mfd. condenser from cathode to plate of the '24 detector

BRUNSWICK 11, 12

Inoperative, (positive control-grid bias on 1st detector tube) ... 1) short-circuited coupling condenser
Inoperative over part of tuning range 1) broken porcelain turret condenser brackets
Low volume, 1) charging and change in value of the 14,000-ohm, 2-watt resistor connected in series with a ½-watt, 5,000-ohm resistor (in the case of the type '24 oscillator) and another ½-watt, 5,000-ohm resistor as a bleeder to ground. Very often these resistors burn out entirely. Replace with 2-watt, ½-watt and 1-watt units respectively
Intermittent reception 1) loose internal connection of oscillator plate by-pass condenser
2) broken porcelain turret condenser brackets, causing "shorted" tuning condensers
3) short-circuiting first detector coupling condenser (fastened to stator of first detector tuning condenser)
4) lugs on r-f coil forms shorting to chassis within shields
5) coil leads snapped at lugs—making contact intermittently
Distortion, Hum, Oscillation ... 1) capacity of 6-mfd. electrolytic filter condenser below normal
2) carbonized 5,000-ohm resistors in voltage-divider circuit
3) screen voltage drop resistor carbonized
Slipping condenser drive 1) raise volume-tone control assembly by insertion of small washers
No control of volume 1) grid returns in r-f, mixer, and i-f stages short-circuiting to ground
Poor high-frequency response 1) remove the small 0.001-mfd. condenser connected to the second detector plate. Replace with a 0.00025-mfd. unit
Weak (or no) reception 1) check for "open" 910-mmf.

reception) on low-frequency end of dial
 Fading, 1) condenser located between stator of oscillator tuning condenser and "high" side of oscillator plate coil
 Poor selectivity or sensitivity
BRUNSWICK 14
 Inoperative . . . 1) lugs on coil form shorting to chassis or shield
 2) broken turret cond. porcelain brackets
 Inoperative (low plate voltages) . . . 1) short-circuited 1-mfd. condenser across the output of the filter circuit. Replace with new unit
 2) "shorted" plate by-pass condenser
 3) "faulty" local-distance switch
 Inoperative, . . . 1) high positive control-grid bias voltage on first detector tube
 Inoperative-distorted reception
 Insensitive on high frequencies
 Inoperative below 650 kc
 Weak reception 1) (voltages and resistances check O.K.)
 Weak reception 1) leaky condensers across the two #45 power tubes (this does not show up in a point-to-point test). Replace with new 0.00025-mfd. units
 2) wind a 3 to 5 turn "capacity-coupling" coil at grid end of each r-f secondary coil. Connect one end to plate of preceding tube. Leave other end "open"
 Full volume for 1) minute or so after receiver is switched on
 Fading, 1) intermittently open-circuiting a-f transformer secondary. Replace with new transformer
 Intermittent reception, (analysis of analyzer plug in socket or pulling out type #45 push-pull tubes, returns set to normal operation) (tubes and voltages check O.K.)
 Intermittent reception, 1) loose internal connection to 0.5-mfd. oscillator plate by-pass condenser
 Fading 2) lugs of coil forms shorting to chassis
 3) broken turret cond. porcelain brackets
 4) snapped coil windings at lugs of coils
 5) short-circuiting first detector coupling condenser
 6) defective or loosely connected 0.1-mfd. screen grid-by-pass condenser in the detector condition, replacing if de-riveted connections
 7) intermittently open-circuiting 0.001-mfd. condenser connected between the grid and plate of the type #24A detector tube. Replace with new unit
 8) high-resistance connection to control-grid of second r-f tube
 Fading, 1) short-circuiting of small black by-pass condensers located next to each 5-prong socket. Test each by substituting with a 0.25-mfd. condenser
 Low secondary 1) voltages accompanied by slight glow in ballast tubes (Model 14 or S-14 receiver)
 No control of volume 1) leakage between first electrolytic filter condenser insulation and chassis
 2) leaky 0.02-mfd. r-f or first detector tube secondary return by-pass condenser
 3) leaky 0.1-mfd. 1-f secondary return by-pass condenser
 4) speaker leads shorting to frame of speaker or terminal cover
 5) carbonized screen voltage dropping resistor
 6) vol-control shaft "shorting" to chassis
 Distortion at low volume level 1) screen drop resistor carbonized to lower value
 Speaker field overheats 2) two 5,000-ohm carbon resistors in plate voltage divider circuit carbonized to lower value
 3) 3rd electrolytic cond. capae. below normal

Noise and motorboating . . . 1) replace leads from tuning condenser-stators to tube grid. Increase the tension on the phono switch blades, and clean the contacts if necessary
 Hum, 1) open-circuited section of filter condenser black—especially faulty small fixed capacitors which tune the filter choke
 2) unbalanced, gassy, or otherwise faulty power tube
 3) loose power transformer laminations
 4) in Models 31 and S31, it may be due to magnetic coupling between the pickup coupling transformer and the phonograph motor. Shift position of the trans-f.
 Hum at rest, . . . 1) r-f amplifier out of neutralization
 Oscillation
 Noisy tuning . . . 1) burrs on plates of tuning condenser (burn off with high voltage—all leads disconnected)
 Noisy reception 1) poor contacts on "local-distance" switch
 2) raise volume-tone control assembly by inserting small washers
 3) increase tension of cable drive spring by moving screw, to which spring is attached, forward in slotted hole
 4) apply drop of oil to tuning gang shaft bearing and pulleys
 Intermittent . . . 1) loose terminal of tubular condenser connected to terminal of transfer switch (for Brunswick S-31 only)
 Improving . . . 1) the r-f coupling system may be greatly improved by substituting transformer coupling for the present choke-condenser r-f coupling system. Remove the r-f chokes and wind 25-turn primaries on each grid coil in order to get out of them. The coupling condensers are automatically removed with the choke coils. This change will greatly improve the volume
BRUNSWICK 15
 Inoperative receiver, (high positive control-grid voltages on r-f tubes) 1) corroded condenser gang rotor contacts. Bond rotors to chassis with flexible wire pigtails
 No reception, . . . 1) shorted screen-grid by-pass condensers
 Weak reception 2) on lower end of dial readjust trimmers on tuning condenser
 Reception dies out after set is on a while 1) 25,000-ohm orange resistor in screen-grid supply circuit "open"
 Weak reception 1) (low detector plate voltage) check all r-f coupling condensers and replace all "leaky" or otherwise faulty ones found (they are mounted directly on the gang condenser housing)
 Intermittent reception 1) poorly riveted contacts on audio coupling condenser
 2) open-circuiting 0.25-mfd. screen or cathode by-pass condensers in r-f stages
 3) check by-pass condenser just behind #45 tubes against rear wall under chassis
 4) unsolder the pigtail from the second r-f variable condenser stator, remove the rubber sleeve, blow out powder-like substance found in pigtail, replace sleeve and resolder
 Weak reception, 1) speaker output condenser "shorted"
 Choked and distorted 2) poor connection to 4-meg-ohm resistor in detector secondary-return circuit
 Distortion . . . 1) (reception otherwise O.K.) short-circuited detector screen by-pass condenser. Check it with a neon lamp or condenser tester, as this condenser often "shorts" without affecting receiver voltage readings enough to detect it
 2) audio distortion is usually accompanied by lack of C-bias on the power tubes. Ohmmeter check between one of the #45 filament terminals to the chassis should give reading of approx. 800 ohms—the value of the bias resistor. Lack of any reading indicates an "open" bias resistor—a "zero" resistance reading indicates a "shorted" bias resistor
 Oscillation . . . 1) 0.1-mfd. condenser across speaker socket "open". This condenser is in the condenser pack and has green leads
 Noisy tuning, 1) (Squealing) corroded condenser gang rotor contacts. To get at contacts, drill a hole large enough to permit insertion of a screwdriver through drum and chassis in line with the contacts
 Noisy volume control 1) poor or corroded connection of copper strip to plunger of volume control
 Station "hi-s" 1) remove 0.00025-mfd. con-

(switch in "local" position)
 Rushing noise 1) (like escaping steam). Strongest at lower end of dial remove shunt condenser across local-distance push-pull type switch. No replacement is necessary
 Noisy reception, 1) (intermittent reception) defective 0.02-mfd. coupling condenser in a-f circuit. Replace with new unit
 2) inspect set thoroughly mechanically
 3) check the 35,000-ohm orange-colored r-f screen grid resistor. Replace if necessary
 4) check the red 60,000-ohm screen bleeder resistor—especially if set oscillates
 5) check for faulty cathode bias condensers
 Resonant hum 1) (loud) and fading remove the 0.00025-mfd. condenser soldered to "local-distance" switch. If fading is found, lost (by substitution) the small black oblong by-pass condensers located next to each "Y" type socket. These often cause rapid changes in volume—especially under vibration
 A. C. hum . . . 1) "shorted" 0.14-mfd. shunt tuning condenser across filter choke. Often a 0.1-mfd. condenser proves a satisfactory replacement. If not, remove this tuning condenser entirely, and use larger condensers in the main filter system

BRUNSWICK 15S

Weak reception, 1) Intermittent reception often caused by high-resistance connections developing in the control-grid circuits. Go over all connections in these circuits with hot soldering iron

BRUNSWICK 16

See also all Case Histories listed for Brunswick 11, 12 receivers
 Inoperative . . . 1) (normal) oscillator screen resistor changed value, and tube not oscillating. Replace with a 5,000-ohm 1/2-watt unit
 Fading, or . . . 1) (all voltages normal) abrupt interruption of reception (all voltages normal) find and check the 10-mfd. coupling condenser mounted on the bottom of one of the turret condensers with a machine screw. Tighten this screw. This condenser connects between the r-f tube and first detector detector plate resistor carbonized
 Weak reception 1) 2) by changing the screen bleeder resistor from 14,000 to about 10,000 or even 7,500 ohms
 Weak, or no . . . 1) (low-frequency end of dial) reception at check for "open" 910-mfd. condenser located between stator of oscillator tuning condenser and "high" side of oscillator plate coil
 Noisy volume 1) (control) dirty contacts inside of volume control. Take apart and clean
 Distortion . . . 1) (voltages below normal) check 3,000-ohm oscillator screen resistor for abnormally low value, practically "shorting" screen to ground
 2) replace all faulty carbon resistors

BRUNSWICK 17 SERIES

See also all Case Histories listed for Brunswick 11, 12 receivers
 Inoperative, . . . 1) (tubes light up) high-voltage "short" to speaker frame
 2) grounding of 14,000-ohm screen-grid resistor located in the right half of the chassis between the two coil shields
 3) change in value of the two 5,000-ohm resistors in oscillator stage. Replace
 4) short-circuited 0.5-mfd. condenser in the plate circuit of the oscillator stage
 Intermittent reception 1) check for ends of coils snapping at the lugs and making intermittent contact thereof
 Fading 2) check lugs on coil forms for "shorts" to chassis within the coil shields. Place insulating paper between the coil and the shield
 3) open 0.5-mfd. oscillator plate by-pass condenser—due to broken connection inside the shield housing of the condenser. Replace
 4) breaking of the porcelain insulators of the "turret" condenser gang, causing stators to shift and "short" to rotor
 Intermittent reception, set becomes operative when someone walks across floor 1) peeling of tuning condenser plates, causing intermittent short-circuits between them. Burn with high voltage—all terminals disconnected
 Weak reception 1) open-circuited r-f and i-f control-grid return circuits
 2) open-circuited by-pass condensers

MANUFACTURERS' MANUAL

The Fall-Winter edition of the THORDARSON TRANSFORMER CATALOG No. 400 just released introduces many new and important transformers for the serviceman amateur, and public address engineer. Also included are the new Automatic Voltage Regulators which feature control limiters capable of holding the supply or output voltage within 1% of the desired value.

Copies of this Catalog are available from your distributor—FREE—or write Thordarson Electric Mfg. Co., 500 West Huron St., Chicago, Illinois. (RADIO NEWS No. 11-111.)

Two new bulletins, showing many new items, are just off the press and are issued by the Crowe Name Plate & Mfg. Co. Bulletin No. 230 shows their complete line of Remote Controls, Panel Kits, Colored Knobs, etc., for auto radios, together with full control specifications for several hundred auto radios. Bulletin No. 225 shows the Crowe line of components for receivers, transmitters, television, sound equipment and experimental work. Copies are obtainable by addressing the Crowe Name Plate & Mfg. Co., 1746 Grace St., Chicago. (RADIO NEWS No. 11-112.)

Many test instruments require dry batteries for replacement and service men find it difficult to choose the correct sized replacement unit. To answer these questions, a new "Battery Replacement Guide for Radio Test Instruments" has recently been published by the Burgess Battery Company. It is a companion to their "Battery Replacement Guide for Portable Radio Receivers." (RADIO NEWS No. 11-113.)

Cornell-Dubilier released to the trade Catalog No. 166-A describing and listing in detail the entire C-D line of Quietone Radio Interference Filters. The catalog is neatly prepared in two colors with index listing the most effective types of filters and spark suppression devices for various applications. Replete with photographic illustrations and diagrams, this catalog will be of considerable assistance to the engineer, serviceman, electrician and experimenter in selecting the proper type filter.

Copies of Catalog No. 166-A available free on request at the main offices of the Cornell-Dubilier Electric Corporation at South Plainfield, New Jersey. (RADIO NEWS No. 11-114.)

An eight page, two color catalog describing the line of C-D Capacitor Analyzer, Bridge and Decades has been released to the trade.

The new design of these instruments received the approbation of jobbers and servicemen at the National Radio Parts Convention in Chicago this year. The Analyzer proved of particular interest to servicemen and engineers. Employing a Wien Bridge circuit for accuracy the Analyzer will check capacities from .00001 to 240 mfd. Other outstanding features of this Capacitor Test Instrument are:

- Measures Power-Factor.
- Indicates Insulation Resistance.

Indicates Leakage.
Detects Defective Capacitors.
Direct Reading Linear Scale Calibration.

Push Button Switching.
Self Contained—Portable.
Copies of catalog No. 167-A listing all the advantages of the Analyzer, Bridge and Decades free on request. Inquiries should be addressed to the Cornell-Dubilier Electric Corporation, South Plainfield, New Jersey. (RADIO NEWS No. 11-107.)

Radio Wire Television, Inc., (formerly Wholesale Radio Service Co., Inc.) announces that its "Master" Catalog for 1940 is now ready for distribution, with 188 pages crammed full of items to meet every radio requirement. This is said to be a most comprehensive radio buying guide, with 40 pages of home, portable and auto radios and accessories; 35 pages of public address equipment; 50 pages of equipment, parts and tools for the serviceman; and 30-odd pages for the "Ham" and television experimenter, as some of its major sections.

The post-card addressed to the above company at 100 Sixth Avenue, New York City, will bring this catalog to any of our readers, without charge, or a copy may be obtained by a personal call at this or at any of the following branch stores: 265 Peachtree Street, Atlanta, Ga.; 110 Federal Street, Boston, Mass.; 901 W. Jackson Blvd., Chicago, Ill.; 542 E. Fordham Rd., Bronx, N. Y.; 90-08 166th Street, Jamaica, L. I.; and 24 Central Avenue, Newark, N. J. (RADIO NEWS No. 11-109.)

Stancor's New Hamannual will be released to the trade October the 1st. As usual, it is printed in two colors, and has contained in it many unusual features of special interest to the amateur and P. A. men. There are seven excellent transmitters ranging from 10 to 100 watts, and four amplifiers from 14 to 60 watts, all of which are completely described with diagrams, complete parts list, bottom, top, and front view and complete descriptive matter on each.

All transmitters were "air-tested" on each band, and the amplifiers were laboratory checked for frequency response and overall performance. They are all available in kit form, using standardized punched chassis developed by Stancor.

Other features of the Hamannual are: complete catalog section, formulae for the amateur, power supply circuit, and many charts. (RADIO NEWS No. 11-103.)

A six page folder giving the characteristics of the Hytronic products has been announced by the Hytronic Laboratories Division of the Hytron Corporation, 76 Lafayette Street, Salem, Massachusetts. This bulletin lists transmitting tubes, diathermy types, high-frequency "Bantams" with ceramic base and also high-frequency types and will be sent free upon request. (RADIO NEWS No. 11-104.)

Installed entirely in its Bayonne, N. J. plant, Solar Mfg. Corp., makers of Radio and Television Capacitors,

present a new catalog No. 10 which elaborately illustrates and describes the complete line, with special pages devoted to Solar's highly popular testing instruments.

Included are various new capacitors expressly designed for Television.

This catalog is now being distributed. Copies may be had by writing the manufacturer direct. (RADIO NEWS No. 11-105.)

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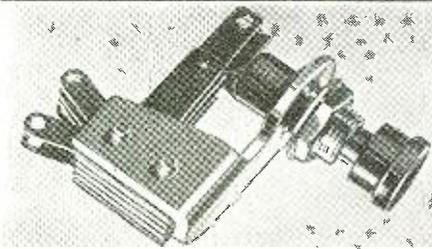
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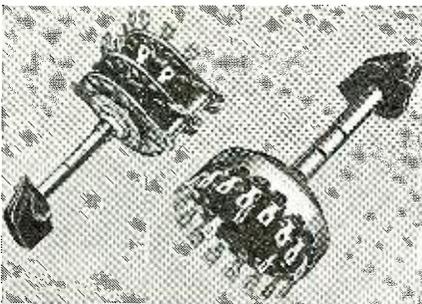
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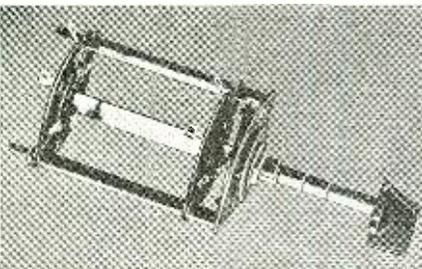
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Serviceman's Experiences

(Continued from page 20)

the repartee which endears me to all my customers.

"The set's over there," Bolton said, hanging up his coat and waving to a five-tube super on an end table. "Take a look while I mix a few highballs."

We drank together, and I borrowed the family screwdriver and went to work on the set in the middle of the floor. It squealed, all right. The whistling brought in Penny, the family pup, which sat down suspiciously to watch me. I don't know *yet* what that dog had against me.

Of course, I knew I could have lined up the job with our shop equipment in about twenty minutes, but it was such a beautiful chance to demonstrate to Al the advantages of work in the home that I couldn't resist taking a crack at the trimmers.

Time passed, and the set got noisier. I took the chassis and speaker from the cabinet, and every time I turned them over, I came across another adjustment. Conversation was impossible, so the whole group clustered about to watch me. I saw, after an hour's work, that I had mistaken the tube succession, and that what I had taken for the oscillator was really an i-f adjustment; and that the thing I had been turning for the oscillator padder was a hum control, or maybe it was a tone control. One adjustment was particularly difficult, and I found later it was a screw holding a bypass to the side of the chassis. It was pretty tough to guess, and I began to perspire rather freely.

During the quiet intervals, while I was trying to think, they all asked questions.

"My husband knows radio," remarked Aunt Gertie. "He works in a canning factory, and he fixed the boss's set one day. It only took him twenty minutes. The plug had fallen out of the wall."

"How long did it take you to learn wireless?" asked Sonny.

"What kind of make-up do they use in television?" Suzy inquired.

"Is work on this set especially difficult?" Mrs. Bolton wanted to know.

"Not at all," I replied, very discouraged and confused, "it's simply a matter of knowing how!"

Bolton filled the quiet intervals with a disconnected story of how he got St. Louis one Tuesday in 1924 with nothing for an aerial but a bedspring. They were all being very polite in order to cover my obvious confusion, but it didn't make me feel any less unhappy about not getting the set under control.

It was the dog that bothered me most. There he sat, attending my every motion as closely as a guilty conscience. If you ever come across a cynical bone-chaser, avoid it. They can be very disconcerting.

Aunt Gertie went home at one a.m.,

and I was still tenaciously making round after round of trimmer adjustments. I couldn't get rid of the squeals, although I managed to change their pitch.

One by one they went off to bed—except the dog, who looked just like *His Master's Voice* would if it ever sneered. I determined to show Al and the dog *both* that I knew what I was doing, even if it took all night.

Finally Bolton entered the room wearing slippers and a dressing gown, and told me I'd have to stop work because the neighbors had complained about the howling.

"I'll come again tomorrow," I suggested.

"Don't bother," he said, "I'll call in a regular repairman who has a shop and some equipment." He reached into his pocket. "Here's something for your work."

"Aw—that's all right," I protested, "I don't expect payment if—"

"Here—take it," he insisted, stretching his arm, and dropping something into my hand. It wasn't silver, either. I thanked him and made up my mind to rub it into Al the next morning. As I walked out, Bolton said:

"Don't be surprised that I gave you something after you failed to get the set running. You'll need it if you ever start up in the radio business!" He interrupted a yawn with a chuckle, and the remark made me very curious about how much money he'd given me. Of course, it wouldn't have been polite

(Continued on page 48)

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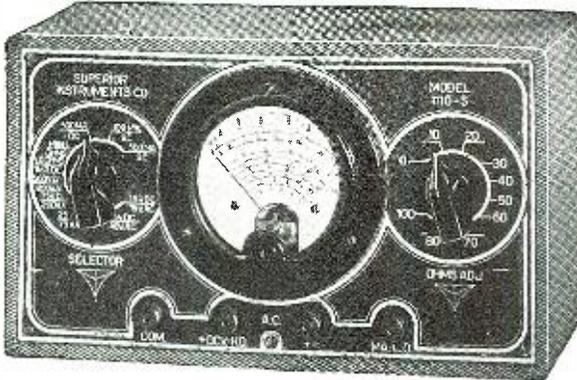
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We could have priced this instrument for \$1.00 or even \$2.00 less by taking advantage of certain economies, which would not have made much difference in the performance of this instrument. However, we realize that this type of instrument must be built to withstand an unusual amount of abuse. We, therefore, used the very best of parts in designing and building this instrument. For instance, we use the same type of jeweled d'Arsonval type of meter as in our larger units, precision multipliers and shunts, positive contact switches and tip jacks, wirewound ohms adjuster and an attractive etched aluminum panel. Thus at \$7.85, a low price for a pocket-size A.C.-D.C. Volt-Ohm Milliammeter, we offer an instrument which compares favorably with the same type of instrument selling at twice the price.

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0-25 volts D.C.	0-10 ma. D.C.	0-75 volts A.C.
0-75 volts D.C.	0-100 ma. D.C.	0-200 volts A.C.
0-500 volts D.C.	0-500 ma. D.C.	0-1200 volts A.C.

Model 1110-S supplied complete with batteries, test leads and instructions. Size 8 1/2"x5"x3 3/4". Shipping weight 5 1/2 pounds. Our net price.....

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D.C. Voltage: — 0-15, 0-150, 0-750 volts	
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D.C. Current: — 0.1, 0-15, 0-150, 0-750 ma.	—10 to +19, —10 to +38, —10 to +53
A.C. Current: — 0-15, 0-150, 0-750 ma.	Inductance: 1 to 700 Henries
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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 1/4". Our net price.....

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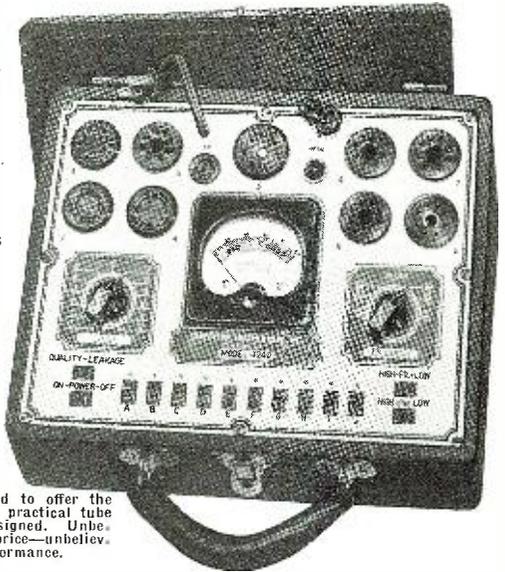
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- ★ Latest type voltage regulator.
- ★ Features an attractive etched aluminum panel.
- ★ Works on 90 to 125 volts 60 cycles A.C.

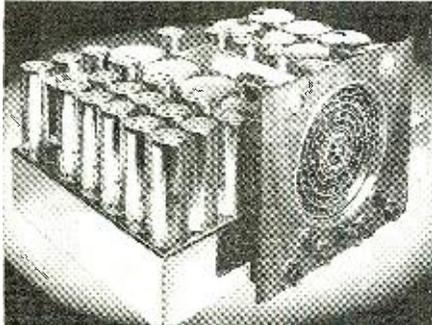
Model 1240 comes complete with instructions and tabular data for every known type of receiving tube. Shipping weight 12 pounds. Size 6"x7 1/2"x10 3/4". Our Net Price.....

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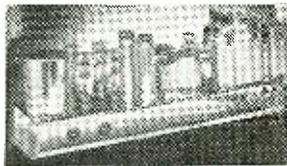
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to look before I got out of the house.

I sneaked a preview at my hand while I was passing the first lamp-post. Bolton had given me—a shoe-string!

I didn't mention the call to Al, because it wasn't a fair trial of work in the home. How can a man do a good job while a wire-haired terrier leers at him? —30—

Short Wave Flashes

(Continued from page 41)

DUTCH NEW GUINEA—W2IXY reports that PK6XX has received a radiogram from the Dutch Government to close down so is now off the air.

FIJI—VPD2 (14.302) sometimes contacts VR6AY at Pitcairn on this frequency.

FRENCH INDIA—John DeMyer of Lansing, Michigan, has logged FN1C (14.084) several times recently in the early morning.

GBRALTAR—Roger Lege of Binghamton, New York, writes that ZB2B (14.135), 20 watts, has verified with a red and white card. This is the only ZB2 station and it began operating last April. The transmitter is located on the West side of the fortress.

MAURITIUS—A very unusual amateur catch, namely VQ8JM (14.11), was heard recently by Earl Roberts of Indianapolis, Indiana, at 7:37 a.m. and by John DeMyer of Lansing, Michigan, at 7:45 a.m. The station is reported to have strong signals but very poor modulation.

PITCAIRN—W2IXY reports that the VR6AY transmitter which has been at NY2AE's at the Canal Zone for repairs has now been shipped back to its remote island home.

VATICAN CITY—Robert Pybus of Manchester, England, reports hearing HB1A (14), the first ham in Vatican City.

SHORT WAVES FOR DX'ers on the WEST COAST

by JOHN D. CLARK
All Times Are PACIFIC STANDARD

China

THE Central Broadcasting Station in Chungking, China, has been carrying on extensive experimental transmissions during the past month. Special programs directed to New York were released from 3:30 to 4:40 p.m. During the week of August 18 these broadcasts were carried out through XGOY on 11.9 meg. The following week XGOX on 15.2 meg. was used. The week of September 1 found XGOX on 17.8 meg. carrying the transmissions, and seven days later XGOY on 9.5 meg. was substituted. The programs were divided into ten-minute sessions, consisting of Chinese Music, News in English, Military Bands, News in Chinese, Chinese Opera, and Comments on Current Topics in Chinese.

Further experimental broadcasts have been directed to San Francisco on both 15.2 and 17.8 meg. These usually take place at 7:55 a.m. when the regular programs are interrupted on 11.9 meg., and the frequency changeover is immediately effected. After a twenty-five minute broadcast consisting of news in English, Comments on Current Topics, and Patriotic War Songs, the test transmissions are concluded and the frequency is shifted back again to 11.9 meg.

It is not known how long these special programs will continue, but with such frequent shifts in wavelengths, listeners may find XGOX or XGOY on the air at almost any hour of the day and night during the next few months. The morning broadcasts on 11.9 meg. will be continued on the regular schedule. (2:30 to 9 a.m.)

Japan

Despite the fact that its monthly program sheet still shows 9:30 to 10:30 p.m. as the schedule for the daily overseas program directed to the Pacific Coast, the Broadcasting Corporation of Japan continues to operate station JZK as early as 9 o'clock nightly on a frequency of 15.16 meg. It is expected that this program will shift to JZJ (11.8 meg.) at almost any time now.

The mysterious Nipponese transmitter which so many fans have reported on 7.29 meg. has been identified as JIE located in the special programs of Japan, but with such frequent shifts in wavelengths, listeners may find XGOX or XGOY on the air at almost any hour of the day and night during the next few months. The morning broadcasts on 11.9 meg. will be continued on the regular schedule. (2:30 to 9 a.m.)

An unidentified Japanese phone station has been reported by several listeners on about 4.62 meg. near 5 a.m. As we go to press, JVV3 is still carrying the daily 10:40 to 11:20 p.m. and 1 to 4:40 a.m. relays of the JBC network programs, but this will probably be shifted to JVV (7.257) or JVV2 (9.675) meg. in the near future.

Miscellaneous

Our listeners tell us... that a Chinese station, evidently XNHA of Shanghai, has been heard as early as 7:30 p.m. Sunday evening on approximately 11.86 meg. ... that HSSPJ of Bangkok, Siam (9.51 meg.) is testing irregularly near 6 a.m. in addition to its regular Thursday 5 to 7 a.m. transmissions. ... that a new Australian broadcaster has been logged on approximately 11.84 meg. near midnight. This may be the new VLR6 of Wanneroo.

Last Minute Flashes

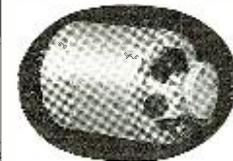
A new station is on the air in Saigon, Indo-China. Call letters are as yet unknown, but the newcomer operates on two frequencies—3.41 meg. and 4.94 meg. It is usually heard between the hours of 3 and 6 a.m.

"Radio Saigon" of Saigon, Indo-China, is shifting its frequency from 6.12 meg. to 11.78 meg. at approximately 5:30 a.m. every morning, continuing on the latter frequency until 6:30.

A new Siberian broadcaster whose call is believed to be RV99, has been reported by several listeners on about 15.40 meg. near 6:30 a.m.

Japanese stations have definitely extended schedules, as predicted in this column last month. JZK (15.16 meg.) now works from 9 to 10:30 p.m. daily, an increase of 30 minutes; JZK and JZJ (11.8 meg.) work from 4 to 6:30 a.m. daily, an increase of one hour; JZL is on the air from 5 to 6 p.m., using 17.78 meg., an increase of 30 minutes; JZK and JZJ are also on simultaneously from 11 a.m. to 1 p.m., an increase of one hour. —30—

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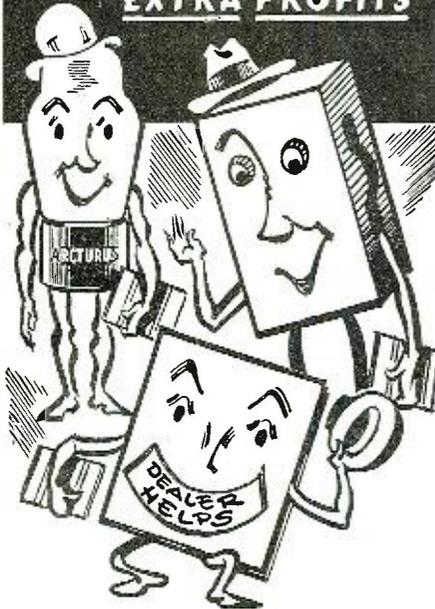


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 I am a dealer I am a serviceman. My
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For your convenience this coupon can be pasted on a penny postcard

A Loktal Tube Transmitter (Continued from page 37)

pentodes give better quality when used as a modulator than when working at audio into a speaker, because an r.f. final acts as a constant load, whereas there is a great variance even in speakers of the best design.

Antenna coupling on the 5 and 10 meter coils is obtained through separate taps in the amplifier plate coil. In each tap lead, brought out through the 3-position antenna coupling stand-by switch located at the lower right corner of the front panel, is included a Guthman compression type variable mica condenser of 18-100 mmfd. These condensers both insulate the antenna from the d.c. plate voltage and serve as a means of adjusting antenna coupling. Coupling links are provided on the 20-40 and 80-160 meter coils, terminating at the same base pins as the 5-10 meter plate coil taps. Thus the variable series antenna condensers may be used for series antenna feeder tuning (where not over 100 mmfd. is required per feeder), or an untuned feeder line, or antenna tuner may be connected directly to the amplifier plate coil socket for 20-40 and 80-160 meter coils. —30—

New Communications Receiver (Continued from page 29)

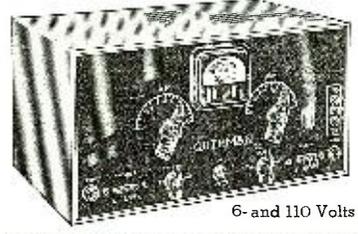
tem. The use of low impedance lead-ins greatly reduces possibility of noise pick-up and provides a simple means for using resonant and directional antenna systems.

Band changing is accomplished by a multi-section cam-operated knife switch with silver plated contacts. No moving parts in this switch carry current and, therefore, there is little danger of this switch becoming noisy or introducing instability. Changes in i.f. band width are accomplished by mechanically varying the coupling between the primary and secondary of the i.f. transformers. By means of a control knob on the panel, the operator can adjust the band width of the receiver to provide highest possible fidelity with a minimum of interference. Special i.f. transformer design and the use of three stages, provide an abundance of amplification with no risk of instability. Hammarlund engineers have always believed in using one more tube rather than pushing a small number of tubes to the limit and thus jeopardizing the overall stability of the receiver. In the a.f. amplifier, this same practice has been followed. There are three stages and the maximum output is approximately 16 watts. The new "Super-Pro," of course, has all of the other necessities such as AVC, send-receive switch, phone and phono connections, etc., that make the receiver complete in every detail. Throughout the entire receiver quality is the key note. —30—

{This article is from information furnished by Hammarlund Mfg. Co.—Ed.}



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2 tube xmitter. Switch choice of three xtal frequencies. Selects between standby or either of two ant. matching coils. Out put 10 watts. Controls: Key-jack, 3 pos. xtal switch, 6-110 volt selector, oscillator tuning, on-off, meter-selector, amp. tuning, output couplings, standby, mike jack, 6 volt socket on chassis rear. Uses 7A4, 7C7, 8A7, two 7C9s. Ship weight 16 lbs. Size 12 1/2" x 7" x 7 1/2". 20-160 meters can also be covered.
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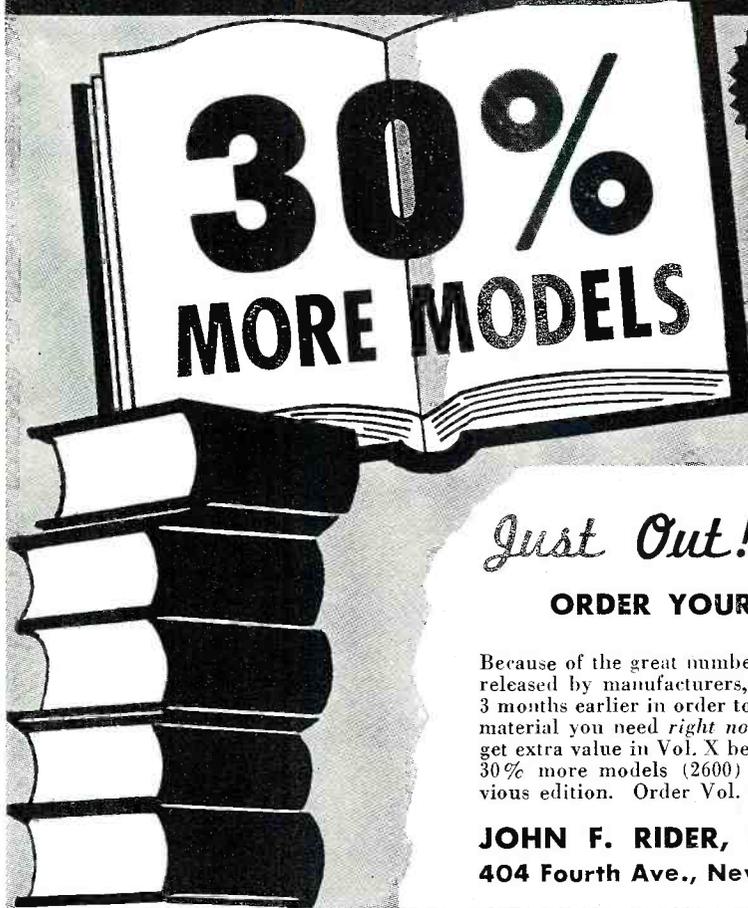
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25 Years of Code

(Continued from page 21)

eye reveals that McDonald is losing his timing but that McElroy, with an almost imperceptible pause, as if to adjust his typing speed to that of his opponent, once more gathers momentum and makes a rhythm of his own typing. The clatter of the "mills" now sounds like music in two keys instead of the even tempo of a moment before.

The speed of the machine moves up a step, approaching 80 wpm. McDonald gradually brings the movements of his fingers to a stop, rises, removes his fones and by a gesture, concedes victory to his opponent. But the machine does not stop, neither does McElroy. And the fingers, which a moment or so since were literally flying over the keyboard, seem to have now lost their magic. There is an occasional desultory click, then one staccato sweep as if he were translating one familiar passage and the sound from his "mill" becomes piano, then pianissimo, gradually ceasing altogether.

The operator shuts off the drone of the machine, the last echo of sound dies around the operating table and the gallery which had observed a silence almost eerie, breaks into a tremendous wave of applause.

The final count shows that McElroy copied at the almost unbelievable speed of 75.2 wpm and that McDonald's copy showed a speed just under 75 wpm. Both contestants, the winner and the loser, performed the seeming paradox of shattering a world record, and achieving another.

During the contest I found myself marveling at the speed and ease with which these champions seemed to copy Code. I observed the man who trained them. He hovered in the background, never once by word or gesture giving encouragement to either contestant. He seemed to be in a world apart, far removed from the scene of this event. This question forms itself in my mind: "How is it possible for this man to train others, as he has trained these two champions, to read code at this record-breaking speed?" I became so curious that I took it upon myself to investigate, to find out. My investigation led me to ask innumerable questions and I uncovered some almost startling facts.

Thirty-five years ago Walter Candler applied for a job as operator in the Western Union Telegraph Office in Atlanta. One day was the extent of his sojourn there; he was fired at the close of the day for lack of skill. Wounded in pride, he obtained a lighter job on a railroad, whose 12-hour night watches did not include much telegraph work. There he began studying and experimenting. He failed to understand why, after two years experience as a Morse operator with continuous daily practice, he could not hold an ordinary job in a commercial relay office. Something was lacking

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and this something was a mystery to him. He proceeded to endeavor to unravel this mystery.

During his long nightly vigils in this railroad telegraph office, he occasionally would lean over on the telegraph table and doze. During these periods he discovered he could read the fastest code, clicking through on the sounders, without effort. When fully awake, however, he could only catch a word now and then.

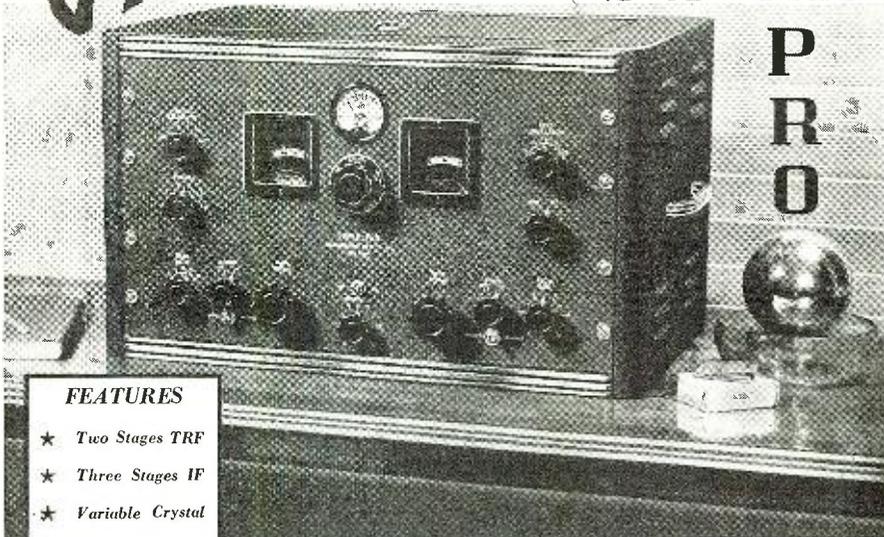
Such experiences led him to suspect that telegraphing is largely a subconscious process and that he, during his long, futile periods of practice, had ignored the part played by the mind, not only in learning but also in acquiring skill and speed. In other words, he had failed to realize, as all others fail to realize, that telegraphing is primarily a mental and secondarily a physical process that naturally necessitates co-ordination. He had been heretofore trying by purely physical means rather than by mental means to induce this necessary co-ordination. He had tried by attrition the wearing down of what appeared to be natural resistance; now he would try to overcome this resistance and achieve this co-ordination by mental processes. The physical aspects of telegraphing follow as a natural sequence the utilization of the mental processes. He proved this by the utter ease with which his subconscious mind read code.

It also occurred to Walter Candler that he could not become a skilled operator through practice alone. Two years of practice had failed. He knew, as all of us know, that practice is necessary but inadequate of itself. When he had reached this stage in his reasonings he felt that he was approaching the solution to the age-old problem. But there must be a working basis; he must establish certain fundamental procedure necessary to systematic training. There must also be practice consonant with this procedure.

During those long winter nights in the little railroad station down in Georgia, Walter, still wincing under the humiliating sting of having been fired because of lack of skill, worked and studied and experimented with what seemed, at times, a hopeless task. He was his own "guinea pig" and he turned out to be a very good one, for with the advent of Spring 1906 he had evolved his system of telegraphing. He then gave up his job with the railroad and went back to the Western Union in Atlanta and applied for a job. The chief operator was dubious but tolerant. He gave Candler a test and discovered, to his amazement, that this one-time inefficient Morse operator could "hit the ball" with the most skilled operators in the office. Needless to say that he landed the job.

Every one with whom Walter worked marveled at his high degree of skill and speed, and his reputation rapidly spread. Hundreds of other operators who could not make the grade by

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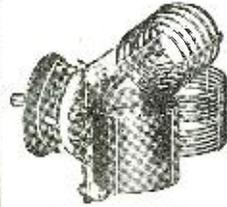
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practice alone came to him for advice and help which he gave freely and gladly and the results were so remarkable that within a couple of years the work of training and helping operators, for which he received no remuneration, was demanding more of his time than was demanded by his job as operator. He knew that he must discontinue one or the other. This was a serious problem; his entire future would hinge on the decision he was now called upon to make.

Believing that he had a system of teaching telegraphy which would be of immense help in making good operators out of poor ones and make them good operators in a much shorter time, Walter Candler in 1911 made his decision and in that year put on the market the first Candler System Course. This course was named by the many operators he had previously helped. For several years before the publication of the first course, skilled operators everywhere referred to their mode of operating as "The Candler System."

The growth and expansion of this system of teaching telegraphy did not flower into bloom overnight but came about gradually upon a fundamentally sound basis. In those early years all his students were being taught the Morse Code. At that time almost all commercial operators were land line workers. The spark transmitter in radiotelegraphy was having its day amidst all the bedlam of its own created interference on the long waves. But the experiments with continuous waves just prior to the outbreak of the World War, experience during that war and immediately after the war period convinced radio operators of the usefulness of c. w.

It is a far cry from that day thirty-five years ago when Walter Candler lost his job as a Morse operator for inefficiency to the present day when his daily mail brings letters from his thousands of students throughout the United States, Latin and South America, Europe, Australia, Asia, China, Japan, Palestine and a hundred other foreign ports. He is TAS, TAC, TAZ, which, being interpreted, means, Taught All States, Taught All Countries, Taught All Zones.

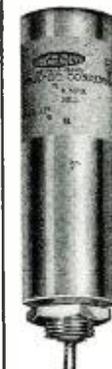
Radio Salestalk
 (Continued from page 9)

sales-floors, I have noted that sales-people, even the highly rated ones, resort to a fixed and non-varying set of stock phrases, none that could or would create desire for an initial set or to change over from one manufacturer to another, or for the acquisition for a more refined instrument.

Now let us demonstrate—also dissect—the stock phrases used by many. It's a safe bet that after so doing you will quickly discover almost all radio merchandise is sold, not by the aid of these time worn stock phrases, but by reason of the fact the urge is strong on the prospect's part—so strong that he sells

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himself in spite of what is given as a selling figure of speech. Getting down to brass tacks and analyzing the remarks we hear, also bearing in mind that a too technical exploitation is as harmful as those which express no meaning, here is the list:

BEST RADIO SET IN THE WORLD—The world is a very large place, thus the salesperson who uses this shop-worn phrase leaves himself open to argument and doubt. In addition to this fact, the statement carries no element of *desire, exploitation or interest* and the same meaningless phrase can as well be applied to a box of tacks or what have you. Better by far to state, "This is the best radio receiving set which, in all our experience, we have offered for sale."

IT'S A WONDERFUL SET—This is a very much overworked phrase and means little unless proof can be offered that *wonderful* can be made to apply in full importance. This is barely possible, for, to be *wonderful* the merchandise must be *radical, or vastly different* in construction, operation or appearance. To date no one producer can lay claim to a *wonder* of this character. The salesperson may state with confidence that "this set combines the wonders of the latest *Radiotrons* and nearly perfect tone qualities."

ASTONISHING—This is a good word to use in connection with a discovery of vital importance, as a recovery of old ruins, the burial place of *King Tut* or the finding of the world's largest diamond, but an ordinary radio receiving set cannot *astound* one for the instrument is too common and well known. If you must resort to words that "shock" people into buying, *astonish* them with your inner knowledge of the product you are offering for sale. Then they will truly be astounded, for most salesfolks have but a surface knowledge of this most important factor.

SWELL—A glance at *Webster's* will quickly demonstrate how meaningless the phrase is as applied to a modern receiving set. Witness what Mr. Webster has set forth in his accepted works:

"Swell" to "bulge," "enlarge," "distend," "expand," "inflate," "puff," none of which can be applied to radio merchandise or its selling.

Of course the word "swell" has crept into our sayings and most people know what it implies. Bear in mind, however, the retail price of a radio receiving set is of sufficient importance to use a more fitting and less meaningless phrase to extoll the significance of the merchandise. Dwell on the finish, style of lines, period of furniture the cabinet follows and you have a far better inducement to offer your prospect than the blunt phrase, "swell."

IT'S A "WOW"—The other day I heard a salesman use that expression and asked him to define the meaning to which he replied "it's just a saying." Remember, if you please, all you who

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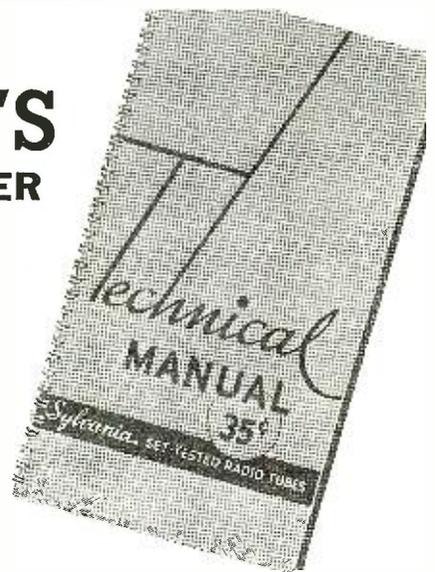
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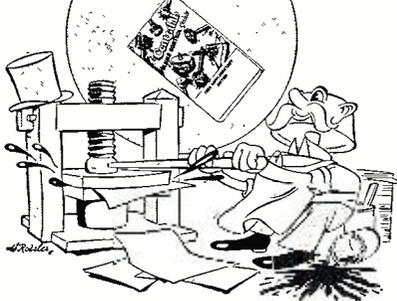
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Milwaukee, Wisconsin

attempt to sell radio merchandise, that "just a saying" will not move people, create interest or awaken desire. Install trust in yourself, confidence in the goods, and a belief in the store keeper. That's what turns the trick.

A STARTLING SET—An explosion, an earthquake or a chap who slaps one on the back is startling, but radio reception today does not startle a listener nor does the general appearance of the cabinet do so. Thus the phrase, "startling," has no place in the general description of a set or any other class of radio merchandise. Better by far to try and convince your prospect than to startle him. Besides, it's safer, for a startled customer is not easy to deal with.

"YOU CAN'T GO WRONG ON THIS SET"—Again, this phrase, used so often and with so many articles in addition to receiving sets, carries no import. No one has ever heard a salesperson say, "You will surely go wrong if you buy this set." No indeed. If one could go wrong on the purchase the salesperson would be the very last one to express this opinion. The stock and overworked expression should be on your omit list of stock phrases, no matter which you use and overwork.

Some time ago the writer heard a salesman use the expression and the prospect retort, "My friend bought one like that and he sure went wrong," and was the salesman's face red?

"SUPERB"—This is a nice little word which you can use to express admiration for a magnificent spectacle as Niagara Falls, or the Grand Canyon. But when we apply the phrase to a commonplace article as the modern radio receiving set, it savors of the superlative. Better explain just what your model will do, also the guarantee of performance, than to gloss over these important details with a thread worn phrase which could be better applied elsewhere.

"SUPERIOR"—This is a good word to use if the item or receiving set is really superior and you can prove it by some detail of construction or mechanical feature not proven by others. Simply to eject the word "superior," and not back up the claim, places this word in the classification of meaningless phrases. Again, in the use of the phrase, the customer gets the wrong slant, and expects too much in performance. Lastly, if the prospect asks, "What makes it superior to others?" the salesperson is in deep water.

"A GOOD BUY"—Every radio receiving set offered for sale is presumed to be a good buy, insofar as mechanical fitness is concerned; but the word can only be used with telling effect in the event of some special sales offering in which the salesman can prove the previous price and point out the saving or that which makes it a good buy. If you must use this phrase, reserve it for an event as described above.

"UNPRECEDENTED VALUE"—The word is too long and too much of a mouthful to make its use worth

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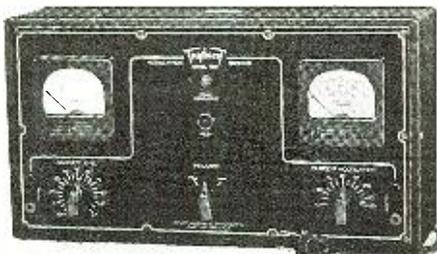
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while; and by sheer reason of its phrase-like sound falls into the list of "don't use," (for like as not, the average salesperson cannot pronounce the word with its true sound—and more likely the customers, if they are of the average like you and I, will not understand the phrase nor sense the meaning); it is better by a long shot to establish a bond of understanding by the use of short words which everyone can digest.

"THIS SET IS A GOOD PROPOSITION"—Of all the overworked stock phrases, this word heads the list. If you will note by whom it is used, you will find mostly slow thinkers employing it as a crutch to lean upon while fumbling about in their mind for a better phrase to impress the prospect. The word does not in any way, shape or manner, refer to the goods you are selling; and, as for applying the phrase to a radio receiving set, that should be out. Referring again to Mr. Webster, the word "proposition" is defined thusly, "A statement of judgment." If you wish to make a test of this overworked phrase just listen to the casual conversation of a salesman in almost any line or field and it's dollars to doughnuts that you will hear it a dozen times hand running and as a rule accompanied by a waving of hands, etc.

"THE LAST WORD IN RADIO SETS"—What a fallacy the use of this phrase is! How ill advised, for if the radio receiving set now in process of demonstration by the salesman was truly the last word it would prove beyond a doubt that improvements in the industry had ceased; and that, we all know, is incorrect. The prospect, when told this is "the last word," either frowns or titters and is subject to the thought that that statement is untrue. When this statement is used it imparts to the prospect the idea that the time has come to make improvements.

"I HAVE THAT SET IN MY OWN HOME"—What if you have? And chances are, you have not. It is well to remember the prospective customer is not buying the set because you have the same kind, but because some urge, inducement or feature imparted by previous experience—the pull of advertising or a practical desire—to say nothing of the urge of economy. Thus, what you have in your home cannot change these principles. And perchance, if you have told that to an acquaintance of the prospect, who, like prospects do, has told a friend, you are set down as untrustworthy simply because you used a stock phrase.

"THIS SET WILL GIVE NO TROUBLE"—Here is where we take up the most harmful and dangerous of the entire list of stock phrases and used as a rule with all the best intentions by the salesperson. He really means the set will not give trouble and honestly wishes to impart that fact.

Somehow or other when the word "trouble" is uttered—if only in an off-hand manner—it sticks out like a sore

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LINE LOSS IN WATTS WHEN 1000 WATTS ARE FED INTO 100 FEET

These Figures Represent Actual Loss.

Frequency	Shielded Ignition Cable	Best Twisted Pair	Best Rubber Co-Axial	AMPHENOL CO-AXIAL CABLE	AMPHENOL COPPER TUBING CABLE
120 MC.....	920	800	700	320	210
60 MC.....	800	645	563	249	162
30 MC.....	637	463	411	186	121
15 MC.....	460	324	308	133	88
7 1/2 MC.....	324	206	208	110	65
3 3/4 MC.....	206	133	135	60	49
1 1/2 MC.....	143	88	92	45	39

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thumb and the prospect thinks of nothing else but that word "trouble," "trouble," "trouble" till it is magnified in their minds and chances are that it would never have occurred to them had not the salesman first used the phrase.

Better by far to say, "This set will give you the best of satisfaction." for then you have imparted the thought you had in mind and hurdled that troublesome phrase, "trouble."

"FULLY GUARANTEED"—What a world of trouble in these two little words! The prospect will take in mind the fact that no matter what happens, the set is "fully guaranteed" even if a lightning bolt smashed it into bits, an earthquake disturb the aerial, a powerhouse distorts signals or the failure of the sending station to get their program on the air in the usual manner. If you want to use a phrase that is sure to act as a boomerang sooner or later, preface your remarks with that "fully guaranteed" and have a continuous headache. No set, no matter how perfect, can fall under the classification of "fully guaranteed" for the phrase is too wide in its scope and too much abused by people, well meaning and honest but misled by the salesman's use of this phrase, stilted and overworked.

"HOW DO YOU LIKE THIS SET?"

—Never, no, never ask the customer to make the direct answer and say, "Yes, I do," for many people who have the urge to buy cannot get themselves over the hurdle of selection and when you abruptly insist they form a decision then and there by the wording of this abrupt phrase and stilted remark, you are placing them under the strain of indecision and an evasive reply will be yours. Take it for granted they do and proceed along these lines.

By following the suggestions outlined herein, you will avoid the pitfalls of sloppy salesmanship. The results will speak for themselves. *Selling* is an art; and, contrary to common belief, a salesman is *made*, not born. Pure salesmanship is the result of careful study of not only the product which you are selling, but a continuous application of practical psychology. A salesman can do no better than to try "it on the dog," i.e. place himself in the position of the prospect and see if he can sell himself. Whenever he can truthfully say, "So what" to any one of his own sales phrases, it's a two-to-one shot that the phrase lacks lift, punch and productiveness. Cultivate a sincere attitude of helpfulness which can do more to put over a sale than can any series of empty words uttered like a parrot—and without about as much sense! —30—

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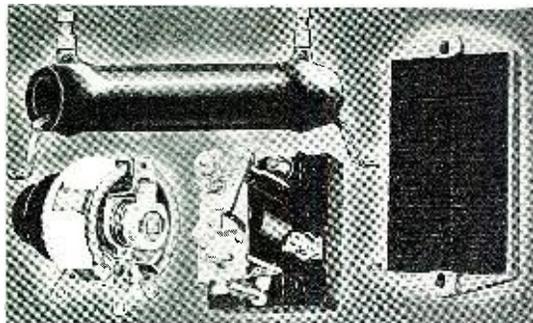
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Broadcasters' Code

(Continued from page 7)

little of events transpiring in other countries. The same was true for news commentators in London, Warsaw, Paris and other capitals. It was for this reason that many of the high-salaried American analysts were recalled from Europe—some even before hostilities had begun! CBS news-expert H. V. Kaltenborn was on his way back to the United States three days before war was declared. In his New York office Mr. Kaltenborn could keep in touch with every European capital with greater ease than he could in any foreign country. NBC's commentator, Baukhage, returned to America within a few weeks after the war began.

These, and other particular news annotators for the American networks were able to give accurate bulletins and summaries on the progress of the war through the prearranged secret communication agreement with the press associations operating abroad.

Although a number of the more important radio commentators returned to the United States, a greater number of lesser figures remained in Europe to broadcast occasional "word pictures" of minor events or subject matter meeting the approval of the strict censorship. In addition to these, regular foreign representatives of American press associations also remained. This would include the United Press, the Associated Press, International News Service, and others. Occasionally these representatives would be heard on a special international broadcast with the United States, but more rarely after the first two weeks of the war. And in every major city in Europe, each of the three American networks retained at least one responsible person—usually an American, or other neutral—to act as their "representative" in transmitting news and other messages to the United States when necessary. The same general type of secret cipher is used by both the radio and press associations, although there are undoubtedly many different codes in use.

Many press messages are sent by radio entirely, using either voice or Morse code. This is due to the reliability of radio, and also because other forms of communication is often impossible with many European cities. All cities in Poland, while under siege, were without telephone, telegraph and cable service to the outside world. This condition also existed in other countries from time to time. When the Atlantic cables are open, any messages sent are carefully scrutinized by several censors.

These conditions led to the use of radio as a more universal means of instant communication. However, censorship is also very strict in radio broadcasting from the European countries. Every sentence and word spoken must be passed and approved by a military censor before it goes on the air. News despatches are often "censored to death"—even the most innocent of messages.

A great number of secret codes were devised by American radio and press experts for the purpose of transmitting complete and unbiased reports. These codes are *not* used continually, as over-use might entail some suspicion. But during the early weeks of the war they were directly responsible for bringing important information into the United States—through the unknowing hands of military censors. The codes are varied, and almost impossible to detect. *Their use is sparingly.*

There are two general types of code, or secret cipher. One is the type where every letter (of the word to be coded) is replaced by another letter, numeral or symbol. For example, taking the sentence:

"TROOPS NOW LEAVING PARIS" and substituting other letters [in this case the next letter of the alphabet] the possible coded result would read:

"USPPQT OPX MFBWJOH QBSJT." Such a sentence would, of course, be easily detected if sent by cable, or if sent by Morse code from a radio transmitter. Furthermore, it immediately creates suspicion and curiosity as to actual meaning.

Code experts and cryptographers are generally agreed that any code of this type can be detected and easily deciphered. For these reasons such a code is impractical for wartime communication.

The second type of secret code employs the substitution of complete words for words of the sentence to be coded. This type of cipher is very difficult, if not impossible, to detect, and, most important, the coded result does not arouse suspicion of the censor. Taking the same sentence:

"TROOPS NOW LEAVING PARIS" and substituting complete words, nouns for nouns, verbs for verbs, and so on, the possible result might be:

"CIVILIANS SOON BUYING GAS-MASKS." Such a code is obviously complicated, and would require a coding and decoding dictionary. But it is practically foolproof, and will pass either a radio or cable censor.

This is the type of coding used by broadcasters and press associations for sending messages of a confidential nature. There are many different codes in use. All are prearranged and, in most cases, are somewhat involved. But the successful results compensate the additional work in preparing the messages. That the codes have served their purpose has already been shown by the complete news coverage of Europe that the United States now commands.

A news commentator, in an international broadcast from Warsaw, might make the following statement in the course of his censored talk:

"THE CIVILIANS OF WARSAW ARE DETERMINED TO FIGHT BESIDE THEIR SOLDIERS. ON MY WAY TO THE BROADCASTING STUDIO TONIGHT I SAW POLISH AIRPLANES FLYING WESTWARD. THEY WERE PROBABLY GO-

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ING TO MEET THE INVADING ENEMY NEAR THE BORDER. I ALSO SAW . . ."

Trained experts in New York—in the employ of the network broadcasting company, or press association—would carefully transcribe the above phrases, and immediately start to decode. By the time the speaker had completed his talk from Warsaw, the news department would be ready to give an instantaneous bulletin on actual conditions in Warsaw. The above message when properly decoded might read:

"THE CITY OF WARSAW IS DOOMED TO DESTRUCTION WITHIN 24 HOURS. ON MY INSPECTION TOUR TONIGHT I SAW GERMAN MILITIA PLANKING IN THE WEST. THEY WILL SOON COMMENCE FIRING THERE NEAR THE CITY LIMITS."

For obvious reasons official codes and translations can not be given here. Most of these codes are very involved, and would require a large book to hold a complete listing of all words, and their combinations, used. However, by judicial use of information which was discovered by this investigator, some of the combinations which might have been used are herewith appended.

Words Spoken	(Read across)	Approximate Meaning
From Paris "All Paris is quiet tonight . . ."		"Troops are consolidating their advances on the Western Front . . ."
"The moon sheds its glorious light here as in the States . . ."		"An advance is planned for the morrow . . ."
"Behind thickly covered doors, the entertainment continues as before . . ."		"A meeting of the heads of the Government is under way to . . ."
"There seems little to tell that there is a war on, if you are to judge by the scene here . . ."		"An aerial raid on German centers has been unofficially rumored . . ."
"Music cannot be heard through the doors which are covered by four thicknesses . . ."		"An attempted enemy air raid was repulsed about 40 miles (400 mi.) from Paris . . ."
"Many of the actors are using their old costumes such as we saw before the World War . . ."		"Colonial troops are being placed in the lines . . ."
From London "Nothing much seems to disturb this determined people . . ."		"The air raid precautions are thoroughly manned and ready for a reported air attack . . ."
"Chamberlain is standing firm on his statement . . ."		"British Airmen dropped pamphlets to try and win over the German people to overthrow Hitler . . ."
"In the suburbs, children are taking up their new residences with their usual casualness . . ."		"British Air and Sea maneuvers are going ahead in the outskirts of the German Reich . . ."
"Postal cards and letters from the children indicate that they are not only enjoying their country stay, but are healthy and well . . ."		"The latest air-raid of the British was eminently successful, and all returned without the loss of a plane . . ."
"The latest styles in gas masks are as follows . . ."		"British advances (losses) were about (blank) thousands, etc., men. Note: the number of different styles will give clue to the number to insert . . ."
"The Bobbies here are wearing their blue helmets . . ."		"Naval reconnaissance has been undertaken to locate enemy subs . . ."
From Warsaw "The Poles are standing firm . . ."		"No air-raid on Berlin is expected tonight . . ."
"In spite of stories to the contrary, the Poles are not disorganized . . ."		"An air-raid will be (has been) undertaken over Berlin . . ."
"The Air-raids do not seem to bother the populace which takes them in their stride . . ."		"The original plans have been adhered to . . ."
"We have not heard from Berlin today . . ."		"We have been given to understand that the Polish mission over Berlin was successful . . ."
From Berlin "In Berlin tonight, nothing has disturbed the placid beer-halls . . ."		"Enemy air-raiders have been over the city . . ."
"I saw some soldiers moving to the East . . ."		"Large numbers of troops moved through the city to the fronts . . ."
"People are taking the war very calmly . . ."		"Riots have been rumored in certain sections of the city . . ."
"The Chancellery was quiet, a few people gathered around to see if they could see the heads of the government . . ."		"The feeling against Hitler is mounting steadily. Steps are being taken to suppress the situation . . ."

These are only a few of the expressions which might mean that we get the news first, and generally before anyone even has an inkling of what has happened. Not only are the actual broadcasts used for this purpose, but there is the possibility that the "cue" channels, which are used to arrange the commentaries are filled with code words giving an accurate word picture of what is going on. The talk over the "cue" channels must of necessity be restricted to such conversation which has to do with the technical details of the coming broadcast. The speech is supposed to be non-rehearsed and have no news significance. It has been filled, at times, with valuable information of a news character. Of course military secrets are not within the power of the commentators to get. They do NOT report military news . . . only news which is of value to newspapers and the like. This is therefore restricted to what they can see, and what they hear. Nevertheless, the information is surprisingly complete. One of the outstanding examples of how accurate it really is, is when the French had taken the forest outside of the Saar, we had the information over 48 hours before the official communication verified our "hunch." The same thing happened with the first Warsaw-German air-raids.

It was 48 hours before the story of the raid was verified. Not all the information forwarded by the correspondents is authentic . . . unless they themselves saw it . . . but a great deal of it, pieced together, can and does give a good background picture of what exactly is going on.

There are undoubtedly many types and variations of this fundamental code in use by radio broadcasters and press associations. For only such a method could account for many recent advance or "scrap" news bulletins which were broadcast by both the broadcasting companies a few minutes after their respective representatives had spoken from the city that "date-lined" the flash bulletin!

By actual comparison between the NBC and CBS American networks, and the BBC [British Broadcasting Co. of London], the two American networks had news releases and bulletins on the air between three and eight hours in advance of the British stations! It is a true fact that many radio listeners in Europe depend on American short-wave stations (since the Munich crisis of 1938) for the most complete and unbiased news coverage of events that are often in their own country! Such a condition as this is due en-

tirely to the strict censorship imposed by most European governments.

International rebroadcasts were quite common during the crisis, and during the early days of the actual war. NBC relayed over 150 foreign broadcasts from Europe, CBS had over 100, and Mutual had over 75. But with the enforcement of censorship these special broadcasts rapidly fell off. By the time the war was a week old there was seldom more than two or three international relays made on any network in a day.

Propaganda

Propaganda has crept into most of the international broadcasts because the speakers consciously feel the pressure of the government behind them. They are not allowed to divulge any military movements or official news, and there is little left for them to talk about. Descriptions of life in the various capitals behind the front lines occupy most of the broadcast programs. But these will be continued, because it is through such contacts that much secret information can be innocently despatched to the United States—under the very eyes and ears of the military censors.

A country at war must bolster the morale of its own people. It must continually sing the hymns of self-glory, and publicize only its great victories—never its defeats. And so propaganda has become a mighty weapon in the hands of the governments of Europe.

Disseminating short-wave propaganda has long been a government monopoly in Germany. They take many devious means of providing ballyhoo for their political ideals and accomplishments. Often they take indirect methods—merely for the psychological effect on foreign listeners. One station, near Zeelen, operating on about 15 megacycles, broadcasts accurate news reports on the progress of the war, even referring openly to German losses and casualties! This would lead listeners to believe that the German government was not afraid to tell its people the truth. But it should be noted that the German people are unable to tune to that frequency, and if they were able to it would be a criminal offense!

Radio operators and technicians lead a hazardous life during wartime. The objects of enemy

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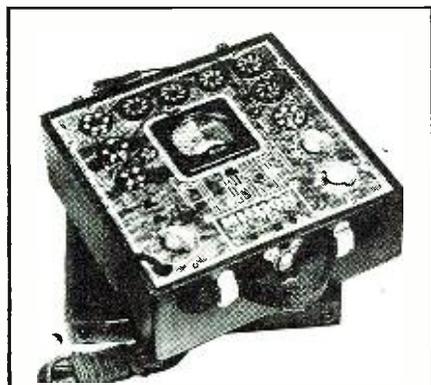
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bombers are not only the studios of the radio companies, but the radio transmitters as well—generally outside the cities and towns. Destruction of enemy radio equipment is almost as important as the destruction of railway terminals, bridges, and other land objectives.

In this respect it is interesting to note that European stations which are located near the front, or those which do not have adequate camouflaging from aerial attack, seldom transmit for periods longer than about an hour at any one time. This has been noted particularly among the French stations, and a few German military stations along the Rhine River. The precaution is taken to prevent enemy aircraft from taking directional bearings on the radio transmitters, and thus accurately locate the stations' transmitting antenna and towers for their bombs. All of the large British and German bombers are equipped with commercial radio direction-finding equipment, much in the same manner as American transport planes. If a radio station operates for a sufficient length of time the bomber can plot and locate the station with an accuracy of less than one-half percent!

The general location of all of the larger radio transmitters are known approximately, and have been known for some time, to all the major powers with adequate espionage systems. But it is very difficult to locate accurately a comparatively small geographical point on the earth from a bomber flying at the great height necessary for safety over enemy territory.

For this reason most of the European radio stations will probably last through the war with little or no damage due to aerial bombardment. The real danger to such equipment is more eminent when the station is in the line of fire or cross-fire from advancing or retreating land forces.

-30-

Within Earshot
(Continued from page 4)

in comparison with such-and-such a unit or gadget.

The words or titles given to many units now on the market end with the phrase "analyst" in various forms. This all seems very mysterious and we actually feel that our testers are not able to accomplish desired results in analyzing things unless they are an "analyst" of some sort. Many a serviceman who never heard of this word has been able to give accurate diagnosis on a set, with but simple meters, a good pair of eyes, a keen sense of smell, and a sense of alertness to the fact that most all radio and electronic troubles can be centered to a definite portion of the unit under observation.

We do not imply that these new testers with some form of the word "analyst" tacked on the end are not in keeping with modern service procedure. We do say and believe that the older testers can be used to a greater extent than most fellows apply them.

Most "analyzers" are made up from a combination of circuits that can be connected to perform the same functions as if separate, independent units were used. We would like to see the manufacturer state exactly how many instruments are available in their "analysts." The big advantage of the "analyst" is the compactness and ease of operation compared to setting up a group of testers over, under, behind, in front of, and around the bench.

Remember that an "analyst" cannot of itself "analyze" anything. If it did, we would order one for our laboratory c.o.d., air-express, special delivery. It is for us to do the "analyzing" and the instrument to do the indicating for us to observe.

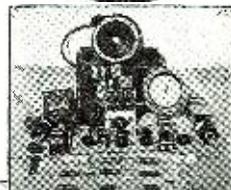
WHAT about all these dressed up rigs that appear under different titles each month in other pubs? Is
(Continued on page 65)

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Video Reporter (Continued from page 33)

introduced for the new season at the Radiolympia show in London. The video sets are much cheaper than comparative American models and the lines are backed by intelligent merchandising campaigns. There's no use kidding ourselves about the fact that England is showing more trade initiative than America on video matters.

British prices are lower, merchandising plans are more consistent and programs are kept on a high plane. There's no disputing the equality in efficiency of American television products. As a matter of fact, some trade observers claim the American television models are much better. But American prices must come down. Set sales would be multiplied considerably if receivers were offered in the U. S. A. at price marks established in London.

It's hard for many to understand why England can undersell the U. S. A. in television after this country was able to undersell British manufacturers in radio for more than a decade.

Bench Notes

(Continued from page 25)

there's something!

In the old days, a set was designed around a few of the dozen or so tube types on the market. But today, when a quickie manufacturer feels set production coming on, he assembles the hired help and says: "Boys, check over our parts inventory and design our next model to use it up." During production tube engineers develop new types to fit in with the warmed-over components, and a clip of new tubes hit the retailer's inventory.

Last month, when Mars brushed so

closely to the south of us, I moved my tube stock to the north end of the bin as a precautionary measure, and counted exactly 219 types.

Portable Cathode Ray

(Continued from page 32)

in a rubber bushing where it projects into the front panel to avoid shocks to the glass. The number and arrangement of control knobs on the front panel, will, of course, depend upon the circuit employed for the amplifier.

Electioneering a la Mode

(Continued from page 39)

another section, the phonograph playing en route, and holds another short meeting. And so on until shortly before the hour of the big meeting, when he heads for the meeting place, the phonograph still going so as not to miss a single prospect.

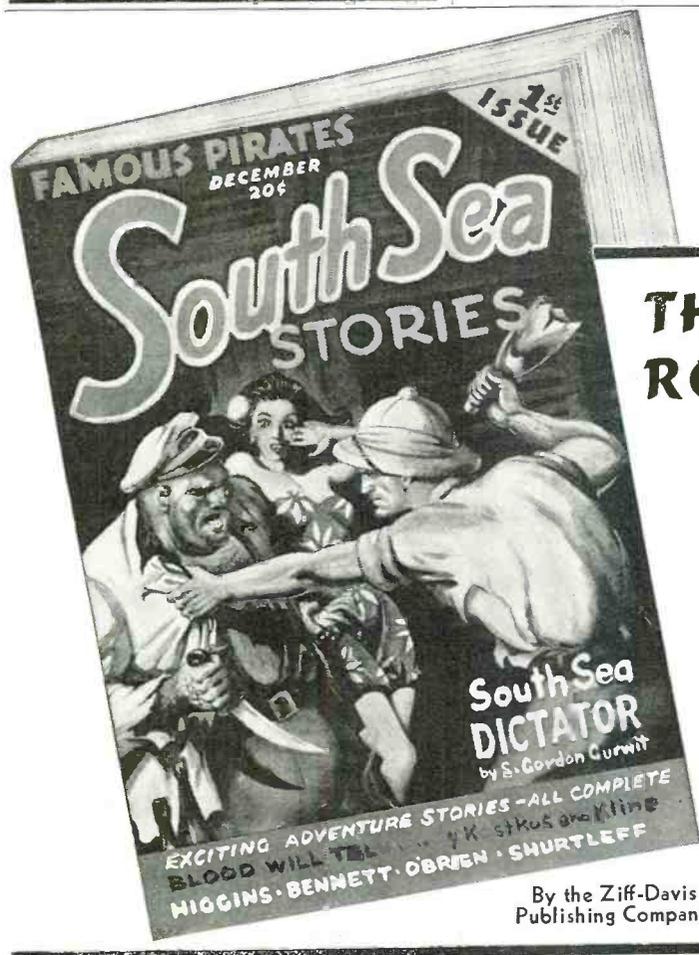
When he arrives at the hall the P. A. System is removed from the car, carried into the hall and there almost in less time than it takes to tell, is set up for operation, with output ample to cover even a large audience.

As I See It!

(Continued from page 8)

Correction

SO THAT some of the members of the R.T.A. in Canada will not form the wrong impression concerning Machim Bros., whose price list was published in a recent issue of RADIO NEWS,



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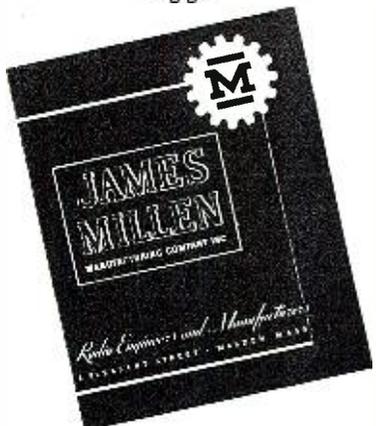
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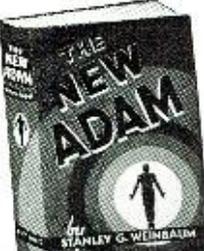


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we want to take this opportunity to say that they are playing cricket in every respect. . . . In other words the price list was not the most modern, in fact can be said to be of ancient vintage. . . . So you men in Canada, everything is okay and "Is everybody happy?"

Now, for those men in the States who might feel that we published an old price list for what advantages it might make available to back up our argument, we want to say that the present price lists of the R.T.A. are higher than those which we discussed. So there!

Is This Utopia?
WE'VE been yelling for cooperation among servicemen in the United States. Some of our men believe that they have accomplished the ultimate when they subscribe to a cooperative ad; you know, the kind wherein the names of all of the local service shops who are members of a guild, local chapter or what have you—are included. . . . After that is done, it seems as if the idea is—every man for himself.

Well, once again from Canada, we receive information which shows cooperation at its best. . . . In fact, to substantiate what we say, so as to convince the non-believers we are reproducing both sides of a card. This card is very illuminating. Examine it thoroughly—very thoroughly. . . . Something of this kind in the United States would do very much toward bettering the conditions of the radio industry at large and would raise the R.S.A. to where it belongs. . . .

Here are a group of men representative of the R.T.A. membership in seven towns. The card as you see is distributed by one of these members. . . . The man desires the maximum amount of business—that is natural, yet he lists all of the other service stations who are members of the R.T.A. . . . That, gentlemen, is cooperative spirit! Machin Bros. do not fear that Grinnel Bros. located in the same town of Windsor will cut their throat in trying to get business. . . . They are friends and have confidence in each other—in each other's pledge of honesty. . . .

Read the card and you will see that the group operate as one—all complaints are to be sent to the Secretary of the Association. . . . Whether or not the association guarantees the work of the members we do not know, but we think that they do, otherwise the suggestion to send complaints concerning members to the destination stated, would not be made.

Such cooperative spirit—friendly relations are sorely needed in the United States. The various chapters of the R.S.A. comprise the nucleus for such groups. . . . Cooperative newspaper advertising is not enough—it should be carried further. . . . Once more we say that it can be done—for here it is! . . . It is being done! —30—



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RADIO PHYSICS COURSE

by Alfred A. Ghirardi

(Continued from September issue)

How the energy is received: The purpose of this chapter is not to present a complete description of modern sensitive receiving sets, but simply to set before the student an elementary conception of how the radio energy is received at the receiving station and what must be done to it to convert it most efficiently into a form that we are able to hear. While it is true that receivers with crystal detectors are used very little at the present time, the author has found that the student can gain a great deal of fundamental theory concerning radio receivers by studying a simple crystal receiver at first. By doing this, most of the theory of tuning and detector action may be developed simply, without the necessity for introducing any of the complications brought in by vacuum tubes. After these receiver fundamentals are firmly grasped, the study of vacuum tube receivers can be pursued with ease.

It should be remembered that these fields go through every nonmetallic body which may be in their path. If now, a conductor of any kind is erected in their path, as for example the aerial wire, a voltage will be induced in it by the rapidly passing fields. In the case of the reception of very high-frequency fields (short wave work), the antenna may consist merely of a wire, but with the receiving apparatus at the center instead of the generator. This is called a "doublet" antenna. In order to be efficient for broadcast band reception, the length of such a doublet would have to be too long to be practical.

The antenna usually employed consists of a flat-top aerial portion which is connected to the radio receiver by the lead-in wire. The other side of the receiver circuit is connected to the ground either by connecting it to a metal plate buried in the ground, or connecting it to a water pipe which serves the same purpose, since the pipe runs through the ground for a considerable distance and therefore makes electrical contact with it. It is evident that the combined aerial and the lead-in wires form one plate of a condenser and the earth and ground wire form the other. The distributed capacity action thus set up is illustrated by the small condensers shown distributed at intervals between the ground and these parts in this illustration. The capacitance of a simple receiving antenna of the type shown and used for radio broadcasting reception, may be as much as 150 to 300 micro-microfarads (200 mmfd. being a good average). The inductance of the wire may be as much as 50 to 100 microhenries and the total resistance may be anywhere from 25 to 100 ohms, depending on the length of the wires, resistance of the ground contact, etc.

Note: The arbitrarily selected standard receiving antenna which is used, will be explained next month. -50-

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WOODSTOCK TYPEWRITERS

(Earshot from page 61)

there a saturation point in original ideas. We see the same old rigs with possibly a different tube here and there. But we can all design such a transmitter by looking at a tube table and by finding a suitable substitute. The RADIO NEWS 1940 All Purpose, and the "Dialomatic" were born of the desire to get away from the conventional and do the iconoclastic. What we have done, can be done by many an amateur who has a bit of foresight and the ability to put two and two together.

WE have been making the rounds. Servicemen everywhere report an increase in business. We hope that they will realize that this is the result of a local condition and not over extend themselves. They should remember all the lean years that have gone before, and use that information for the making up of a "bad-times fund." If they utilize this minor boom advantageously, they will find themselves in a condition to continue nicely with little fear as to what the future may bring.

WHEN a serviceman recently told us that he had been approached by a manufacturer's representative with the statement that "the new frequency modulation of Major Armstrong will outmode every radio receiver on the market," we could hardly believe our ears. Not only is this patently false, but it is a type of salesmanship that can only result in the demoralization of the trade. The sale of receivers on the basis of fear has no place in our radio profession; and the only recourse that the serviceman should have to that type of pressure is to politely, but definitely, throw the offending gentleman out of his shop by the seat of his pants, and the scruff of his neck. A report to the manufacturer should also be made. If then you get no satisfaction, let us know, and we'll do something about it. At the very least we will give it plenty publicity. The present receiver market is much too firmly entrenched to be outmoded by any new type of transmission. The only thing that can cut our receiver market off is government action, which is highly unlikely. So don't take on a line of new receivers merely because the salesman tells you that the present type of transmissions will be supplanted with another, newer kind. Demand to know where and when these new type transmissions will take place. It's a 100 to 1 that the salesman cannot give you any information on that point. KAK.

Hammhatter

(Continued from page 35)

have "that touch." Nice gain, feller. Keep it up! Ed.]

THE Canadian air is completely silent of amateur transmissions by Canadian amateur operators.

The Dominion Government has sent out instructions to all amateurs ordering them to dismantle their transmitters completely, to take down all directive beam aeriars, or other aeriars, except those required for radio reception.

The reason for the ban is obvious. While even the most powerful stations cannot be sure

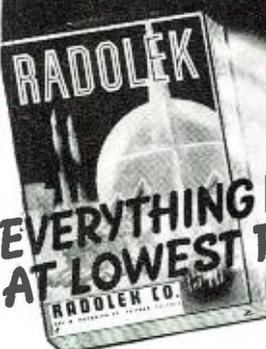
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of 24-hour communication with Germany, even the smallest transmitters can reach Germany, Africa, Italy, or any other part of the world. And a transmitter of any size, might be used to send out to Germany information that would damage the Ally's cause.

The only exceptions to be made in the ban are in cases where commercial transmitters are the only means of communication—such as Northern Ontario mine camps and remote Arctic posts. These, by special arrangement, will be permitted to operate under police supervision. Their remoteness ensures that no information of contraband nature would reach them for re-transmission to Germany. Government and airways transmitters will be permitted to operate.

The "complete dismantling" of transmitters that has been ordered by the Canadian Government, means that every single unit of the transmitter must be disconnected from each other unit, and the parts stored.

The government radio inspector maintains "monitor" service on the Canadian air—a patrol that listens to all bands of Canadian radio to detect illegal broadcasts.

Such monitors could detect and trace any station attempting to evade the general ban. It is likely that the ban will apply for the duration of the war.

Should any event occur that would lead authorities to suspect there was forbidden information leaking out of Canada by radio, all amateur sets, even when taken down, are liable to confiscation or to be ordered sealed.

FROM W2GFV we hear:

W2KXD, after a brief sojourn to 20 in search of DX, has returned to 10-meter fone again. Dick's quality has improved considerably since he reduced the bias on his class-B tens in the modulator. They seemed to have been running class-C. Audio?

W2LAU, the little amateur unit of Milburn, N. J., is showing signs of increased interest in ham radio, but not for long. He starts college this fall.

W2JNS has a new Hammarlund "HQ-120" receiver. He says it works fb, but the boys are kidding Walt about the reports he gives. It seems the HQ-120 has a "Scotch R meter" and you have to have a whale of a sig to wheedle an R4.

W2LPE expects to have a 300-watt rig on the air shortly. The outfit has a pair of RCA 808's in the final, and is quite a jump from the ill 6L6 rig Frank is working out with now on 40.

A check-up on W2BCC's log shows that 24 states have been contacted from his car, while in motion. Bob has one of the best portable-mobile rigs around town, and with 30 watts input has also contacted Europe several times while driving around.

W2MCF also starts college this fall, and probably his call will be heard much less on 80-meter CW. George has been toting a small rig with him all summer and has been working out fb from both the country and seashore.

Another college freshman is W2JON. Al went to see about registering for the coming semester, and had a two-hour QSO with one of the office girls, without once mentioning school! He also got a service job from the Dean on the way out.

Two portable-marine stations that put swell sigs into W2 are W5HQB aboard the S.S. *Marymar*, and W6NTM aboard a commercial tuna-fishing boat. They can nearly always be heard on ten-meters, while down around Central America or off the coast of Mexico.

W2KBX, formerly of 160-meter fone, can now be found on ten after a layoff of about two years. Bill is an aviator with *THE 1*, and one of his more important acquisitions during this period is a charming airline hostess as a wife. [ALL airline hostesses is charming! Ed.]

W3HOH has recently moved to a new and better location. After reconstructing his 3-element beam, Ken finds working the VK's and ZS's a cinch on 10 meter fone.

W2IEF, having procured a Class-A ticket recently, is now giving 20-meter fone a try. The start of the DX season will see Russ down on ten again though, as he works out very well.

W2CRW, although having a 150-watt rig on 20-meters, frequently gets on ten-meter fone with a small 15-watt rig to talk to some of the local boys.

Both W2GWJ and W2HHY say you should fire the office-boy in charge of sending out limelight cards as they did not receive any!!! [We did! Ed.]

FROM Ed. Lewis:

How many hams recognize Victor Beverly Pitts as someone they know? Why, "America's orneriest ham" (W5AOH) of Raton, N. Mex. Vic is probably the best known ham in the country, if not the world.

This reporter spent his vacation down in the beautiful country which AOH brags about so much, and is now prepared to give you the low-down on this widely known Op. Vic has been working with radio since 1915. Says he grew up with it. Was first licensed as an associate in old W5CO and has operated with the present QRA for the past 10 years. Was an E.E. in the world war with a commission of 1st looney.

The orneriest ham's shack, located adjacent to his home, also houses his radio repair shop and a very modern machine shop. We learned that Vic is an accomplished engineer and that he designed, cast and assembled much of his shop equipment on which he turns out precision machine tool work and models, for inventors as well as parts for his own experiments. This versatile ham also operates a completely equipped sound truck from which he conducts a man-on-the-street program and other street advertising. He claims it's the best street program in the country because he gives away more merchandise.

Take it from me, he's the same glib-tongued wise cracker in the S.I. as on the air.

The self-styled "New Mexican Kilowatt" XMTR is of modern commercial appearance, equipped for operation on all bands, with rapid break-in. Apparently Pitts prefers 20 M., not having changed the tuning or made a replacement for a year and a half. Doesn't believe in fiddling with the XMTR as long as it's puttin' out efficiently. Vic formerly used a rotary beam but says he was too tired to turn it so pulled it down. A two section 8JK is now in use. Those who have contacted 5AOH on 10 may recall hearing him mention his coal burning, off center fed vertical Herz. The shack stove and pipe is half way cut ES "smoke comes out the top and R.F. all over." However, the shack will be heated with gas this winter. Hope Vic doesn't try to get smoke ES R.F. out of bottled gas.

America's orneriest ham was always identified by a cowbell until McNinch and associates said no. A typical serious-minded business man off the air, he can't explain his tendency to clown while transmitting. Besides referring to himself as "America's orneriest ham—perhaps the world's," he is also known as "Raton's one man Chamber of Commerce." "The New Mexican Matador," "throw the bull by day and shoot it at night," "The handle is V-I-C-K as in salve" and "The New Mexican Kilowatt."

Now to straighten everyone out on that famous QSL card—it is a heavy cardboard, beautifully hand painted and costs far more than the jit he demands of SWL's. All hams requesting a QSL receive it promptly but Vic says he can't take care of the SWL's, too. During the winter months 5AOH has received as high as 15 SWL letters a day for a 30 day period. One month's correspondence on file in the shack fills a large shoe box. The Logs show over 15,000 QSO's and in excess of 7,000 QSL's. Only the more unusual cards grace the wall of the shack, including the highly prized QSL of the Archduke of Austria. 200 to 250 ham and SWL visitors are received every summer. Practically every state and province in the U. S. and Canada and many furrin countries are represented, including England, Australia, South America and Egypt.

Vic likes to chew the fat with all the hams but his favorite contacts are 2FRD, the F.B.I. fingerprint expert down in Va., 2JEB, 2KAX, Peckskill, N. Y., 3GKM and 9WZV, Muncie, Ind.

Our schedule with the home town boys was delayed two hrs. when a tourist drove up with one of those emergency repair jobs. Business before pleasure so we missed our contact but we did have a nice QSO with 9WZV. Oh well, it was a brother Hoosier, anyway.

Pitts' hero is Steinmetz, whose picture occupies a prominent place on the shack wall.

Now that we've unmasked the Matador why doncha give him a call or better still, drop in an' see him sometime. You'll find out he isn't shootin' the bull about that New Mexico scenery. "The hospitality is somethin', too. Yeah man!"

Raton's only other ham is Frank Foxall, 5ETZ. Frank is a dyed-in-the-wool C.W. D.X. hound. WAC in one hr. ES won't work W's except scheds. off the air at present but will be on 10 m. phone this winter. It's that awful 5AOH influence that's makin' him forsake the key.

W6AM writes:
The combined Pacific-Southwest Division Convention, commonly known as the *Treasure Island* Convention, turned out just fine. Seven hundred registered at the Whitcomb Hotel. The Radio Show in conjunction with it was well attended, so undoubtedly outlying amateurs were able to see all the latest merchandise as conveniently as possible.

Both Directors J. L. McCargar, W6EY, and Director Charles E. Blalock, W6GG, were present, conducting their respective meetings.

The meeting voted to have next year's convention in Long Beach, California, and to resume normal operations as to the division conventions namely, the Southwestern Division would have their own convention, and the Pacific Division theirs. Instrumental in the decision to have the next convention in Long Beach was the personally forwarded invitation by the Mayor of Long Beach, in which he offered the use of Long Beach's 53,000,000 Auditorium, offered to send out a mailing, furnish convention badges, print the program, and give the convention attendance a free boat trip throughout the harbor, and battle fleet.

W6QD held his usual excellent DX roundup. Technical talks were presented by Harry Engwicht, W6HC, James Sharpe, W. A. Waegner, Clayton F. Bane, W6WB, Frank Jones, W6AJF, Ed. Hayes, W6SA, Prof. F. E. Terman, Jack McCullough, W6CHE.

One of the trips included a visit at the RCA Bolinas station, with its 32 beam antennas.

Flores Hoover won the code contest, with her beautiful handwriting, at 43 words per minute.

Fisherman W6FEX Wally, is trimming windows at *Radio Supply Company*.

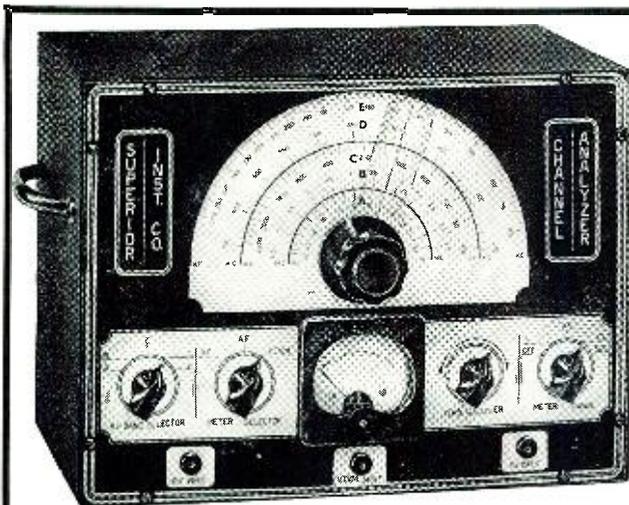
Captain Dick Loynes, of the Yacht *Contender*, is studying to be an amateur, so that he can use that beautiful *Temco* Transmitter and all those *Biiley* Crystals he bought for the Honolulu Yacht Race.

Director Mike Gibbons surprised the Southwestern Division *Treasure Island* A.R.R.L. Convention by dropping in out of the skies, and attending the banquet.

The Oregon Amateur Radio Association announces their annual convention will be held in Eugene, Oregon, during April, 1940.

Ed Stevens has a name plate on the front of his car—K7BC. On the back of his car it says W7BB. How come?

[And I guess that's that for this month.—Ed.]



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Fundamentally, what the Superior Channel-Analyzer does is to permit the serviceman to follow the **SIGNAL** from antenna to speaker through each and every stage of any set ever made, and inferentially, of any set that ever will be made, using the **SIGNAL** as the basis of measurements. Thus if there is trouble in one particular channel or stage of a receiver, the serviceman can isolate the faulty stage and then proceed to ascertain the very part or component that causes the trouble.

Many of the troubles in modern receivers are due to the Automatic-Volume-Control and Automatic-Frequency-Control circuits and ordinary instruments do not permit measurements directly upon these circuits, so the Superior Channel-Analyzer includes a direct-current Vacuum-Tube Voltmeter that **DOES** make these measurements directly and with a negligible loading of the measured circuits.

Other problems cease to be problems too, when the quick-solution method of the Channel-Analyzer is applied. For instance, suppose a local oscillator in a superheterodyne drifts. The Channel-Analyzer has a switch operated, tuned input circuit with amplifier, whereby not only the presence of drift may be discovered, but also the amount and direction of drift.

Distortion is another difficulty that often nettles a serviceman. The Channel-Analyzer has a jack for the insertion of earphones so that you can listen to the signal directly from any stage and, therefore, discover the stage in which the distortion takes place. Next, the VTVM is used to discover the very component in that circuit that is causing the trouble. How often have you cherished the hope that someday you would own an instrument that enables you to measure the actual signal voltage across the load of any stage in the set, and thus by comparison determine the gain per stage. The Channel-Analyzer enables those dynamic voltage measurements and does a whole assortment of other work besides, yet

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

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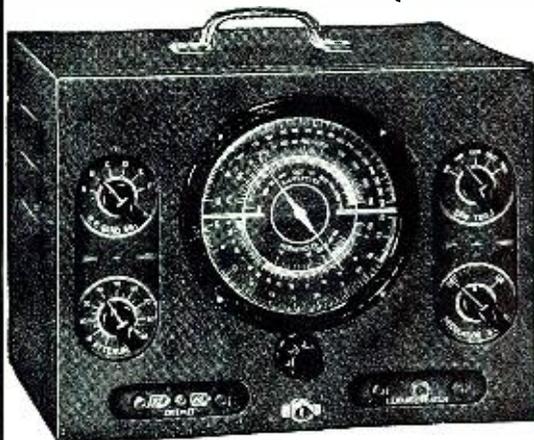
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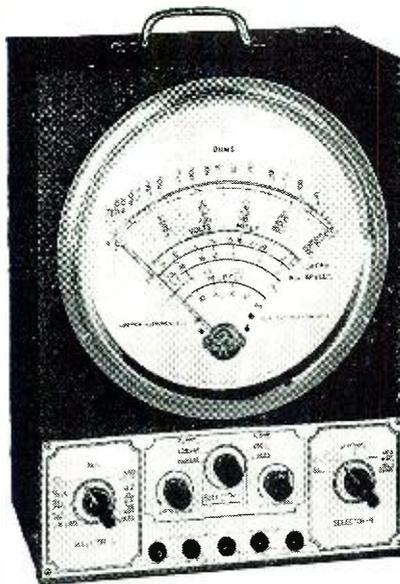


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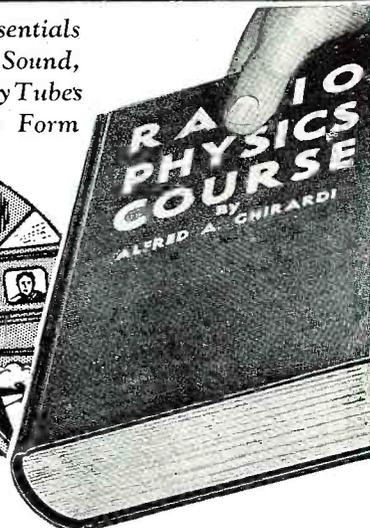
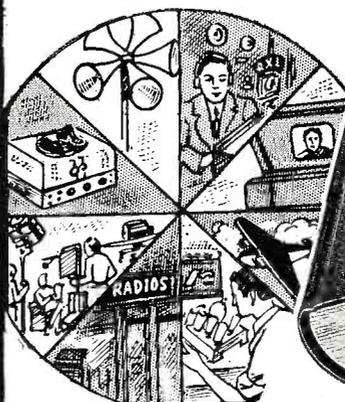
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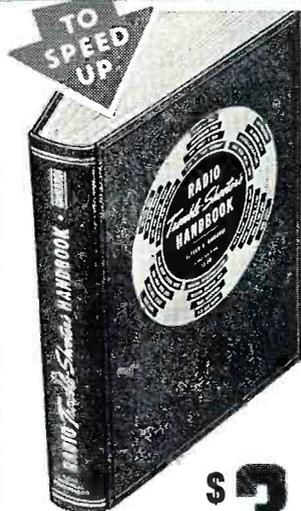
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