

WORLD'S LEADING RADIO MAGAZINE

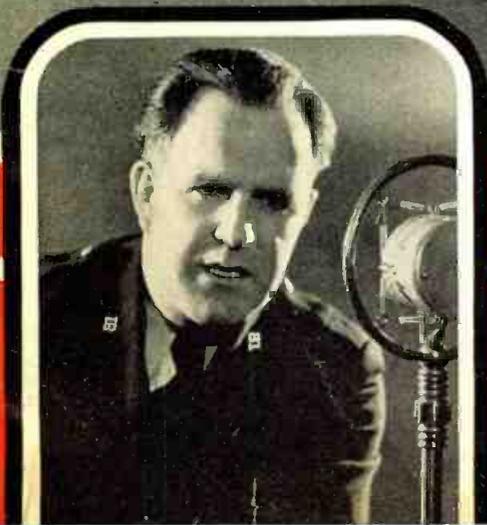
RADIO NEWS AND SHORT WAVE RADIO

DECEMBER

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FIGHTING CRIME with RADIO



5 NEW SETS TO BUILD

A Publication Devoted to Progress in Radio

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Amateur Activity

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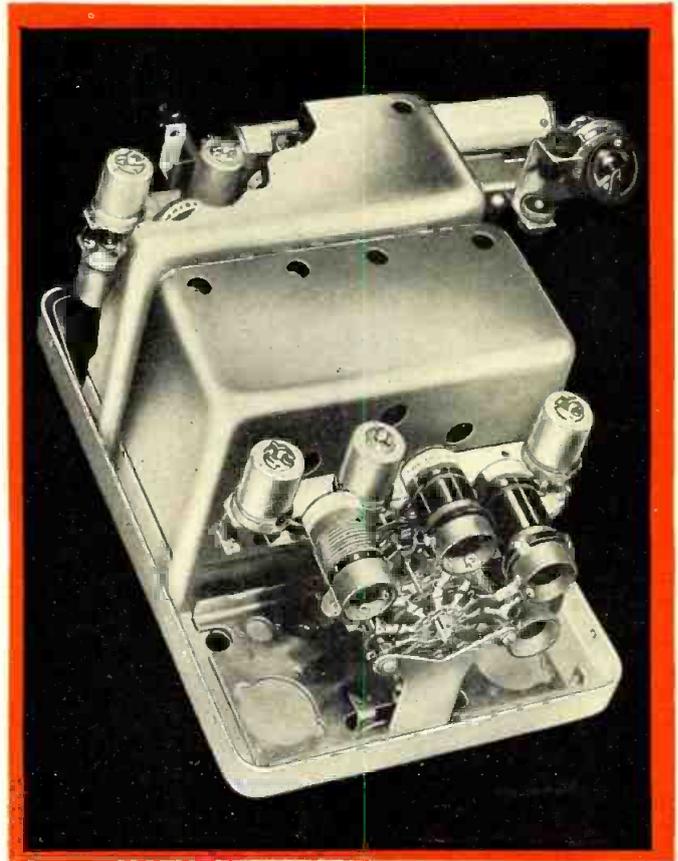
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HE SENTRY BOX unit includes the tuning condenser and dial mechanism as well as the coils and switch compartments. Separate coils are used for each circuit and no tapped coils are used. A unique type of construction permits shortest possible leads — coils are mounted directly on their respective band change switches. Separate shielded compartments house the R.F., detector and oscillator circuits. The result is efficiency and stability in performance heretofore impossible of attainment.

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Radio

How a "Tip" got Tom a Good Job

Panel 1: GEE, THERE'S DJC IN BERLIN. THAT'S THE TENTH FOREIGN STATION TONIGHT. RADIO IS SURELY FUN.

Panel 2: HELLO, TOM, HOW'S EVERYTHING? OH, NOT SO. GOOD BILL, BUT I'M STILL HAVING FUN PLAYING WITH RADIO. HADD J.C. LAST NIGHT ON A LITTLE SET I BUILT. IS RADIO STILL YOUR HOBBY TOO?

Panel 3: NO, TOM, I'VE BEEN TOO BUSY MAKING GOOD MONEY OUT OF RADIO TO SPEND TIME "PLAYING" WITH IT. GOSH, BILL, YOU'RE SURE LUCKY. I NOTICED YOUR SWELL CLOTHES AND SNAPPY CAR. I THOUGHT YOU HAD INHERITED A MILLION. TELL ME ABOUT IT.

Panel 4: I AM LUCKY, TOM, BUT YOU HAD THE SAME CHANCE. REMEMBER ABOUT A YEAR AGO I SHOWED YOU A BOOK FROM NATIONAL RADIO INSTITUTE THAT TOLD ABOUT THE OPPORTUNITIES AND BIG FUTURE IN RADIO, AND HOW OTHERS HAD SUCCEEDED THROUGH THEIR HOME TRAINING? REMEMBER, I TRIED TO GET YOU TO ENROLL FOR THEIR COURSE WHEN I DID.

Panel 5: WELL, IT WAS THE SMARTEST MOVE I EVER MADE. I'M DOING SWELL, MARY AND I ARE TO BE MARRIED NEXT MONTH. TOM, WHY DON'T YOU SNAP OUT OF IT? DON'T STAY IN THAT DREARY LOW PAY JOB ALL YOUR LIFE. RADIO IS MORE THAN A PLAYTHING. IT'S A BIG BUSINESS. IT'S YOUR OPPORTUNITY. TAKE MY TIP. IT ISN'T TOO LATE. RADIO IS STILL YOUNG AND GROWING.

Panel 6: IF BILL SUCCEEDED, I CAN TOO! THEN I CAN MAKE REAL MONEY SERVICING RADIO SETS OR GET A JOB IN A BROADCASTING STATION OR INSTALL AND SERVICE LOUD SPEAKER SYSTEMS OR MAKE GOOD MONEY IN ANY ONE OF THE MANY OTHER NEW AND GROWING BRANCHES OF RADIO. THERE'S NO END OF GOOD JOBS FOR A TRAINED RADIO MAN! YES, SIR, I'M GOING TO SEND FOR THAT FREE BOOK AND GET THE DOPE RIGHT NOW!

Panel 7: YOU CERTAINLY KNOW RADIO. MINE NEVER SOUNDED BETTER. THANKS! N. R. I. TRAINING CERTAINLY PAYS. I JUST STARTED A FEW MONTHS AGO AND I'M MAKING GOOD MONEY ALREADY. THIS SPARE TIME WORK IS SWELL FUN, AND SOON I'LL BE ALL SET FOR A GOOD FULL TIME JOB.

OH, TOM IT'S WONDERFUL—TO THINK HOW FAST YOU'VE GONE AHEAD SINCE YOU WENT INTO RADIO. WE NEVER COULD HAVE GOTTEN MARRIED ON WHAT YOU WERE GETTING BEFORE.

OUR WORRIES ARE OVER. I'M MAKING GOOD MONEY NOW, AND THERE'S A BIG FUTURE AHEAD FOR US IN THIS LIVE WIRE RADIO FIELD.

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Vol. XVII December, 1935

No. 6

Reading Guide to this Issue—

As a matter of convenience for those having specialized interests in the radio field, the following lists the articles and features in this issue, classified under 14 heads. The numbers correspond with the article numbers in the Table of Contents on this page:

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Coming—

The January issue will introduce a constructional article on a "Ham" receiver, par excellence! The receiver to be described was especially designed and custom built for Henry B. Lockwood, owner of amateur station W2HFS, Mt. Vernon, N. Y., to meet his extremely rigid requirements of sensitivity, selectivity, stability, dependability—and above all—high signal-to-noise ratio. It is an 8-tube superhet which leaves nothing to be desired by the discerning "ham" who can afford to spend a medium price and has the technical ability to build his own receiver.

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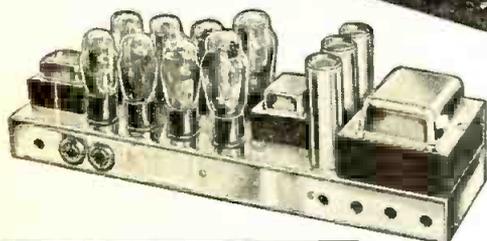
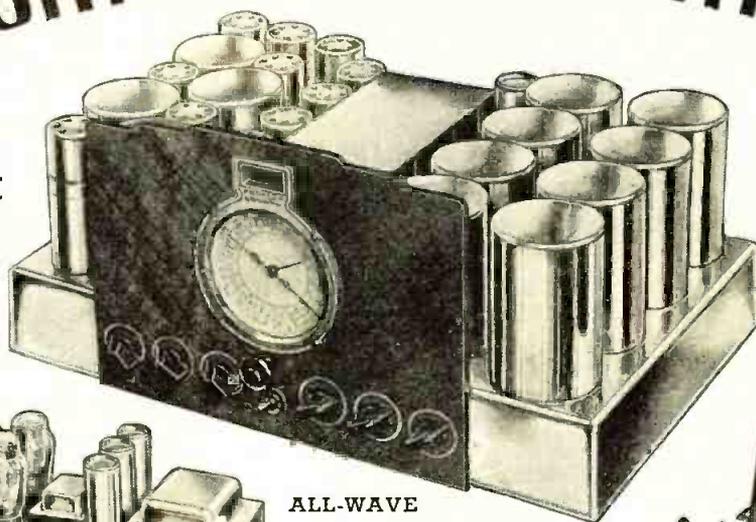
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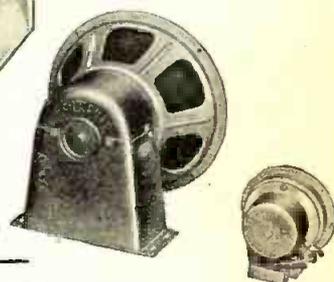
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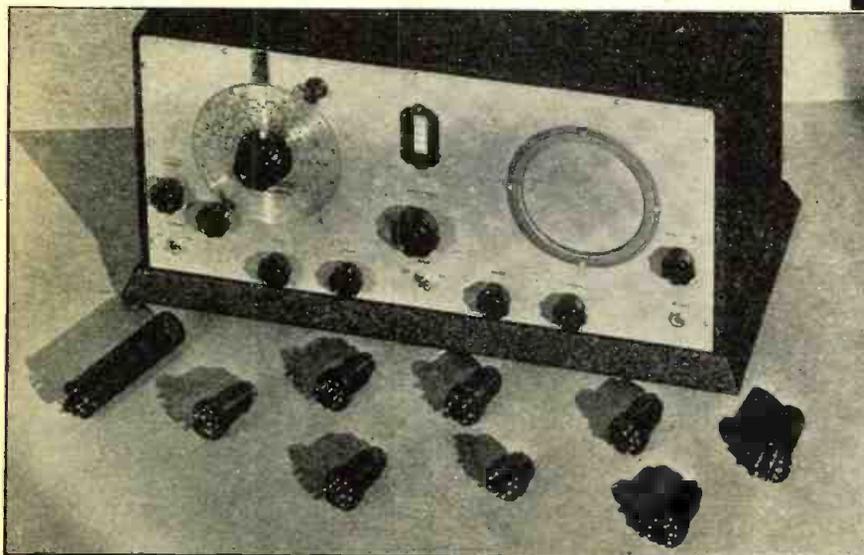
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SAY RADIO NEWS EXPERTS After Exhaustive Tests



IRON CORE I. F.

Much of the high degree of sensitivity found in the Super Sky Rider is due to its Iron Core I.F. system, of which Mr. Cockaday says, "The high degree of sensitivity in this receiver was, of course, obtained through the use of iron core, intermediate frequency transformers used with high gain metal tubes. I predict that the next general improvement in receiver design will be the incorporation of iron core I. F. transformers. This receiver therefore is the forerunner among American Receivers of the coming type of receiver in this class."

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Pages From A Serviceman's DIARY

WEDNESDAY — Arrived early. Off to calls.

Number One—Stromberg 635, magnetic speaker. Complaint: won't work. Turned on set. Tubes light. Removed 45 tube. No sound in speaker. Removed speaker cord tips from set and connected same across pilot-light socket terminals. No sound. Removed unit and found armature broken. Brought to shop to replace armature.

Number Two—Philco 11-tube all-wave. Complaint: can't get Europe! Loaded up with noise-reducing aerial material and started off. Found set in very noisy location. Usual broadcast type antenna and installation. Installed 20-foot doublet with twisted-pair lead-in. Connected lead-in to coupler and attached set. Still noisy. Removed coupler and connected transmission line direct to antenna and ground posts on set. Tuned to London and it came pounding in with little background noise. to the astonishment and delight of all concerned (including me). Tuned to local broadcast. Weak and noisy! Connected both sides of transmission line to antenna post. Locals O.K. Installed single-pole, double-throw switch so the customer could connect transmission line either way.

Number Three—Stromberg 12. Complaint: howls when first turned on. Expected sour 45-tube and was not disappointed. Cleaned condenser rotor contacts, replaced worn lead-in strip and tightened ground clamp. Off to next patient.

Number Four—Stromberg 642. Complaint: fades at times. Listened patiently (if wearily) to the stock phrase, "When the doctor arrives, the pain disappears." Set operating O.K., of course. Antenna and ground, O.K. Tapped tubes; O.K. for noise. Pounded chassis. Nothing happened. Checked volume-control operation carefully. Slightly noisy in one spot. Connected up oscillator, using an unmodulated carrier, rechecked volume control. Rough action now very apparent. Found bad spot coincided with normal room volume position when receiving stations which caused most trouble. Got customer's O.K. for volume-control replacement and shop overhaul. Pulled chassis and returned to shop.

THURSDAY—Arrived early at yacht harbor with complete equipment to service a yacht job reported last week. Philco Transitone. Owner wanted hook-up changed so his batteries would be under equal load. Saved me one trip by explaining that he had a 32-volt Delco system with the radio hooked across one battery only. Took along the fat resistor I had ordered and went aboard. Installed resistor in series with 32-volt line. Set noisy! Rechecked with

THESE records from an anonymous serviceman's diary should be of decided interest to veteran servicemen, as well as to those whose experience in the service field is more limited. Written by a man who "knows his stuff," and shot with an occasional outcropping of humor, these items provide many hints not found in text books. More of these pages will appear from time to time.

6-volt battery. Still noisy. Turned down volume control. Still noisy! Removed chassis and replaced usual cause of trouble, the first a.f. transformer, and re-installed. O.K.!

Stopped off on my way back to shop to look over an A. K. 627. Complaint: distorts. Checked set. Volume control slightly noisy. 47's weak. Replaced 47's. Still distorts slightly. Removed to shop and checked thoroughly. Everything O.K., except volume control. Replaced volume control. Distortion cured.

FRIDAY—Ho, hum! Another day. Got to get going!

Number One—Stromberg 29. Complaint: weak reception. Found normal deflection of tuning meter when tuning to resonance with local broadcast signals. Turned chassis upside down and gave it the once-over visual inspection which often saves so much time. Found 10,000-ohm resistor, connecting to speaker plug receptacle, badly overheated, the lacquer coding having flaked off in spots. Traced lead from resistor to .3 condenser in by-pass condenser block, removed lead from condenser terminal and checked condenser with ohmmeter. Showed reading of 1500 ohms—a high-resistance short-circuit, of course! Replaced this condenser with a good 400-volt type by-pass, and on second thought replaced the .3 by-pass in the tuning meter circuit also, although it tested O.K.

Next—An A. K. 37. Complaint: fades, noisy. Found filament voltages low on the 26's. Tightened terminal nuts, bringing voltage up to normal. Volume control noisy. Found winding O.K., so removed moving arm, cleaned all arm contact surfaces with garnet paper, increased tension and polished flat phosphor-bronze strip connecting to middle terminal of volume control and re-assembled. O.K.

Next—Victor 9-54 combination. Complaint: radio squeals, phonograph N.G. Found set unstable but operating fairly well below 1000 kc. Slight i.f. and considerable r.f. oscillation at high-frequency end of scale. Readjusted r.f. feed-back condenser. No effect! Checked voltages. First detector plate. 160 volts—too high! Removed S.P.U. Found open 1000-ohm section in voltage divider. Removed gang condenser, aligned and neutralized i.f. amplifier. Reassembled complete. Radio now O.K. Tried "phono" section. Pushed record-changer starting switch. No results. Pushed turntable tentatively and mechanism operated O.K.



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Radio News

December, 1935

Fighting Crime with

TWO-WAY RADIO

No longer has the professional criminal all of the advantages of modern science aiding him in his illicit pursuits. Radio is a weapon that the modern police officer relies on more and more each year. And now 2-way police radio steps in to give the forces of law and order the upper hand, so that the criminal, even with his high-powered automobile and machine guns, has nowhere to turn without the eyes, ears, and strong arms of the law ready to reach out and pull him down

CAR Three calling headquarters . . . Car Three calling headquarters . . . Kay."
"O. K., Car Three . . . Go ahead . . . Kay."
"Reporting man discovered stabbed . . . May be dead . . . Front Street near Main . . . Need ambulance . . . Will report for identification after further examination . . . Kay."

It is two A. M. Most of the city's 100,000 are asleep. But not all! Lights still burn in the Daily Gazette office. Out on Route 14 the Pine Tree Inn orchestra plays its closing number. In the swanky Rosedale section the last bridge parties are breaking up. And quietly nosing around town are the cars of the police motor patrol.

In Car Five, Patrolmen McFee and Elton idling along State Street have just passed an open car heading leisurely out of the business section. They eyed the two men on the front seat, automatically noted the car was tan-colored and continued on. At headquarters, Sergeant Dobson was sitting at the microphone about to send out the two o'clock time signal when his receiver spoke up and Car Three made its startling report. Now Dobson leans forward and addresses his microphone and the night

By Victor Hall

patrol, listening intently, hears:

"Attention all cars . . . Attention all cars . . . Man discovered stabbed . . .

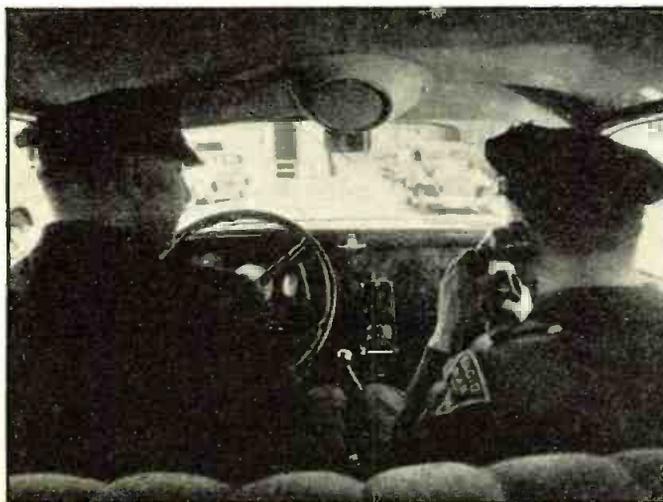
Front Street near Main . . . City Hospital ambulance being called . . . Keep lookout for suspicious persons . . . Halt suspected cars . . . (The telephone at Dobson's elbow rings; its bell sounds faintly in every car) . . . Stand by a moment . . . (Dobson turns away to his phone; in the cars, his voice fades, remote and muffled; then at the first words he hears, Dobson shoves the telephone close up to the microphone and what he says suddenly

becomes clearly audible again in the police cars) . . . You're calling from Lacy's drug store, eh? . . . Saw three men fighting . . . You say two of them jumped in a car on Main Street . . . Didn't get the license number . . . An open car, eh? . . . tan colored? . . . They drove off West! . . ."

Out on State Street McFee and Elton stiffen up. Two men—open car—tan colored. McFee is spinning his wheel, shifting gears, backing, turning, and as Dobson finishes his message . . . keep lookout . . . these men may be armed . . . Time two-four . . . Dobson . . . Kay," Elton grabs the telephone off the dashboard.

"Car Five calling . . .

THEY SAW, THEY HEARD, AND NOW THEY SPEAK!
The new 2-way police radio installations being rushed into the police cars of leading cities of the United States are enabling law officers to keep in touch with other police cars and with headquarters so that reinforcements can be called upon and the criminals headed off during the actual chase. Getaways seldom exist nowadays.





Car Five Calling. . . . Open tan car with two men in front seat just passed us going out on State Street. . . . Have turned around and are following. . . . Kay."

Dobson replies: "O. K., Five. . . . Cars One, Two, Six and Seven, get on main crossings. . . ."

An instant later Elton's voice comes back: "Car Five calling. . . . Five calling. . . . Open car turned off on Park Avenue. . . . Is heading through Rosedale, probably for Route 14. . . . We're turning into Park now. . . . They've seen us. . . . They must be the ones. . . . They're hitting it up. . . . Going 65, 70!"

At Headquarters

Sergeant Dobson at headquarters suddenly becomes a commander-in-chief directing the movement of units capable of obeying at 80 miles per hour, capable also of telling him where they are, what they see.

He barks a few words into the microphone, repeats them, repeats them again. His hands move swiftly over the table before him. A number of shining little

DISPATCHER ON DUTY

Here is the dispatcher taking down an actual report from a speeding police car running down the criminals. The row of lights in the upper right-hand corner tells him where every car is stationed and just which one can best aid in the capture.

brass discs shift quickly over the map of the city. Where Five last reported the speeding car, he places a sombre-looking black disc. Out on the highways, the patrol cars move in synchronism with the discs, matching the pattern formed by what an observer might take to be an odd game of checkers played single-handedly by the sergeant.

INSTALLATION DETAILS

The two illustrations at the left show the compactness of the transmitter, with views outside and inside. Below: How the various other units of the 2-way system are placed at strategic points in the car's anatomy.

That pattern is such that five of the discs now lie athwart five roads leading from Rosedale.

The black one—where will it turn next? That question the Sergeant and the men listening in the patrol cars blocking Rosedale ask themselves. They have but a few instants to wait and then comes:

"Five calling. . . . Elton in Five calling. . . . Runaway car fired at us. . . . McFee hit. . . . Ought to have attention quick. . . . Can't follow. . . . Tan car turned right into Hillside Street. . . . Trying to make Route 14 that way. . . ."

The Sergeant snaps to the microphone, gives more orders. He returns to his map, moves the black disc sharply right and forward and then clusters four of the shining brass ones close around it. Only an inch of map space shows around the black disc now.

Gang Car Ditched

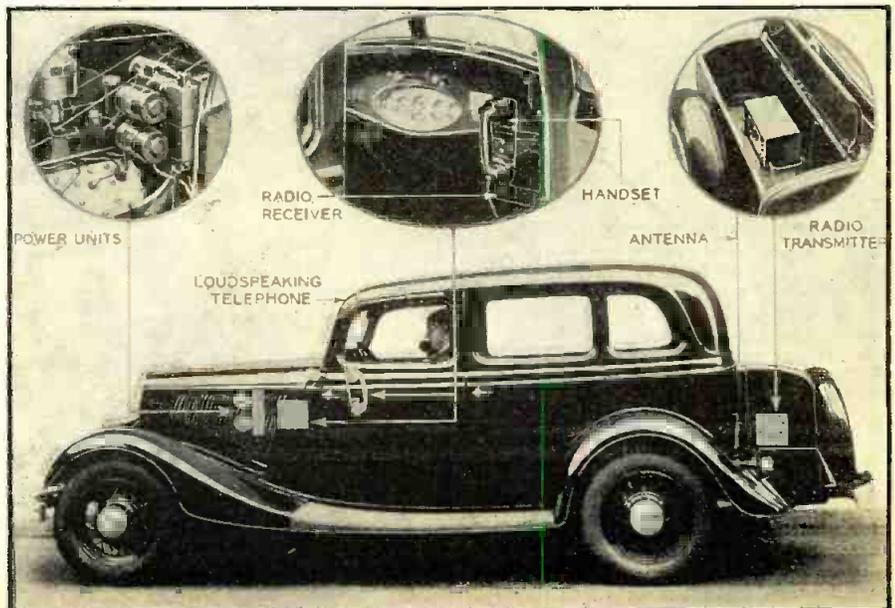
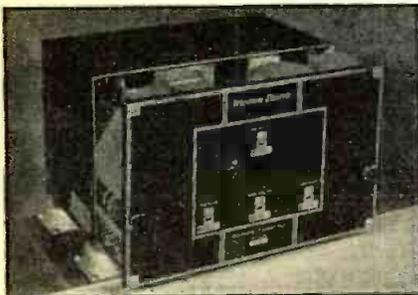
"Car Six calling. . . . Six calling. . . . Chasing car on Hillside. . . . Chasing car on Hillside. . . ." And a minute and a half later, "Car Two calling. . . . Two calling. . . . Ditched tan car at entrance to Route 14. . . . Both men knocked out but not killed. . . . Shall we bring them in?"

Sergeant Dobson barks more orders into the microphone and restores all but three of the brass discs to their normal positions. He picks up the black disc, drops it with a faint plunk into a little box and then relaxes with a sigh.

Frightened calls from Rosedale are swamping the police switchboard in the hall: "Say, Officer, I heard some shots."

"Officer, there's been a shooting up here somewhere." . . . "Get a man up here quick, I think I heard some . . ." And the telephone man, glancing at a message in the sergeant's hand, is replying, "Yes, sir, yes, ma'm, a couple of hold-up men; we got 'em near the Pine Tree Inn. . . ." Thus 2-way police radio, latest weapon in the hands of the police for fighting crime.

One-way police radio—namely, equipment for transmitting from headquarters to patrol (Turn to page 378)



WHAT'S NEW in RADIO

Yes, there is something new in radio! On this and the following pages you will find important inside information in our descriptions of and tests on the metal tube sets, parts and accessories

By William C. Dorf

A New Mike for Police Cars

A hand type microphone has just been announced by the Universal Microphone Co. for police cars equipped for two-way radio communication. The microphone is fitted with a rubber mouthpiece. It weighs less than two pounds and comes in single and double button models.

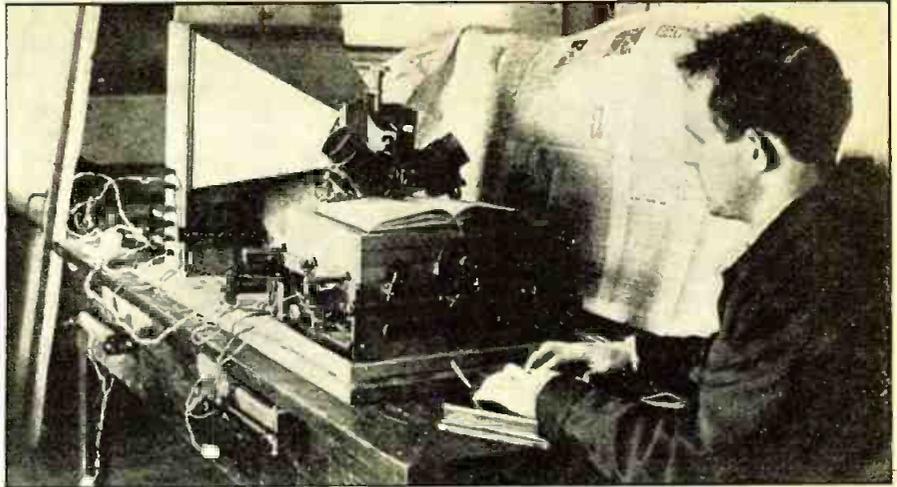
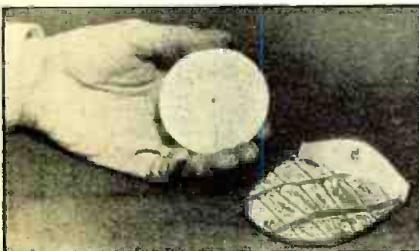
Dealers See New Receiver Line

The new line of Stewart-Warner "Ferrodyn" receivers equipped with the new metal tubes, were recently introduced to the public at a national convention of the company's dealers and distributors at the Drake Hotel in Chicago.

Circular Slide Rule

The Tavella "Mascot" vest-pocket slide rule shown, offers the dual advantages of far greater compactness and greater scale length (and therefore accuracy) than slide rules of the ordinary type. Also its cost, complete with leather case, is only a fraction of the cost of straight rules. It is unbreakable and the sharp black graduations on white celluloid make it easy to read.

On the front are a "D" scale, a "C" scale, a "CI" scale and an "L" scale. It is therefore suitable for the multiplication of three factors with one setting. Conversions to d.b. can easily be made. Scales on the back include trigonometric scales with scales for obtaining squares and square roots.



RADIO DEVICE ENABLES BLIND PERSON TO READ

There has recently been developed the device pictured above, which converts printed letters in a book to electronic impulses on a special framework upon which the blind person places his hands. He soon learns to read these impulses as he would the raised letter of the Braille system. The device uses photo-electric cells and other radio parts and was invented in the Physics Department of a Soviet university.

A New Item for Auto Radio Enthusiasts

A new type spark plug with built-in resistor for eliminating ignition noise in auto radios has been recently developed by engineers of the AC Spark Plug Co. The resistor unit can be removed and replaced should it become ineffective, without replacing the entire spark plug.

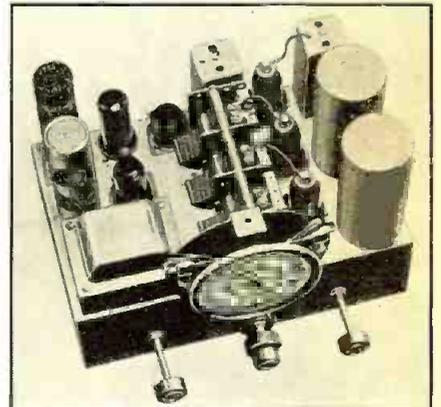
lower operating temperatures. The new tube will also replace type 5Y3, the glass rectifier tube incorporating the octal type base.

An Attractive Metal Tube Set

This three-band 7-tube set made by the International Radio Corporation, employs the new metal tubes throughout and it (Turn to page 374)

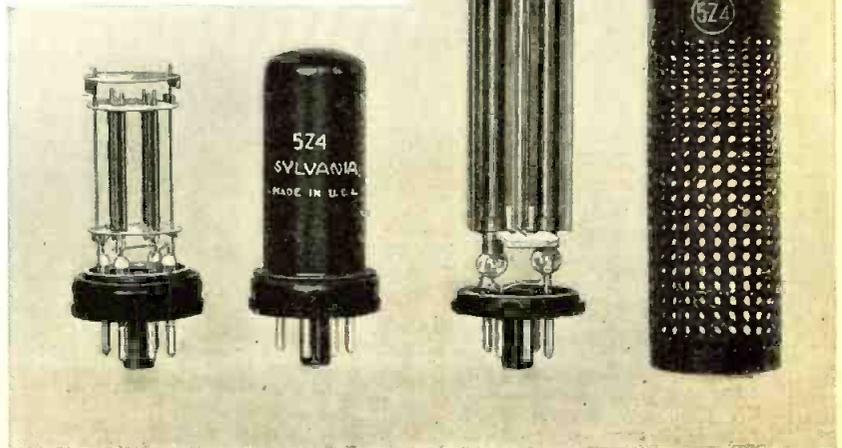
The Latest in Cathode-Ray Equipment

The Clough-Brengle Model CRA cathode-ray oscillograph incorporates a built-in linear sweep circuit, input amplifiers and a power supply for operating the 3-inch cathode-ray tube. This instrument used in combination with their model OM signal generator provides a modern method for servicing radio sets.



New Small-Size Metal Tube Rectifier

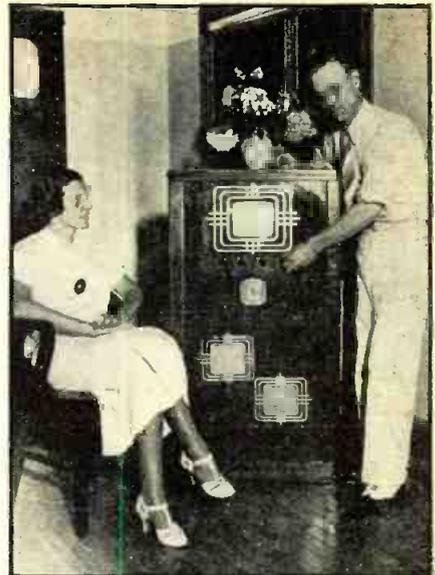
A new type 5Z4 metal tube, interchangeable with the original cage type 5Z4 metal rectifier was recently introduced by Hygrade Sylvania Company. The outstanding feature of the new tube is its reduced size, which the manufacturer points out was accomplished without loss of any of the electrical characteristics. The height of the tube is 3 3/4 inches and the diameter 1 5/16 inches. The filament current drain is 1.5 amperes as compared to the 2.0 amperes drain of the original 5Z4. The decreased filament wattage results in





WHAT YOU CAN SEE

Figure 1: The illustration, above, is a reproduction of a photograph made of a received image on the oscillograph tube, which is the heart of the Farnsworth Television system. Figure 5: The middle picture shows an operator adjusting the Farnsworth commercial rack-mounting television equipment. Figure 3: At right of page is Mr. Farnsworth demonstrating his standard home-type receiver for television and sound reception.



How Cathode Rays are used in Both FARNSWORTH

Many experimenters would like to know how the for picking up the picture as well as for recreating of the Farnsworth system employing a

By Samuel

LAST month, RADIO NEWS described the special demonstration given for members of its editorial staff at the Philadelphia laboratories of Farnsworth Television, Inc. We reported on the fidelity and clearness of Philo T. Farnsworth's system and the fact that 10 by 12 inch and 6 by 7 inch images had been successfully achieved by the young inventor. Now, in this second article, we will set forth the methods as well as the results of the young inventor's high-definition television tests.

360-400 Lines

The previous article contained some skeleton details of this highly advanced system of image transmission. And we are now elaborating on the earlier facts to give a precise picture of the Farnsworth system—one of the most advanced in the world. We might repeat these few facts before proceeding into our technical description of the apparatus and methods: The RADIO NEWS demonstration was conducted on 240 lines. But the inventor intends to increase his system to 360 lines and, and

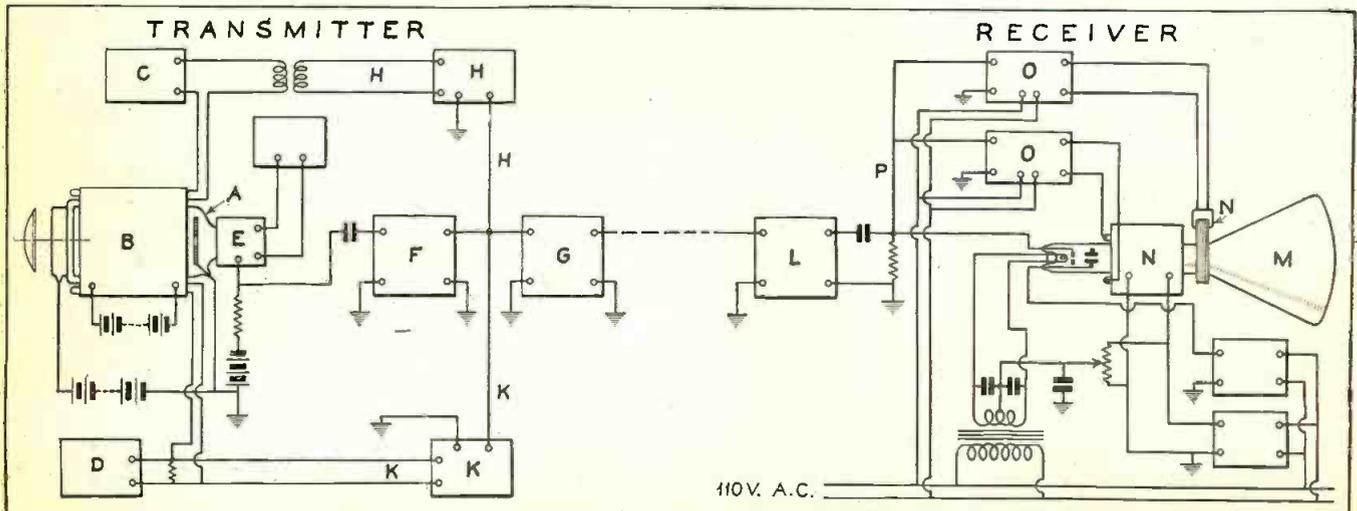
still later, to "something in the order of 400 lines."

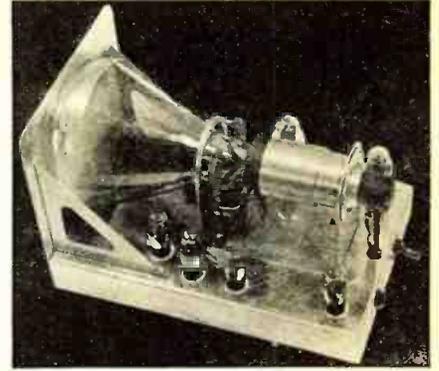
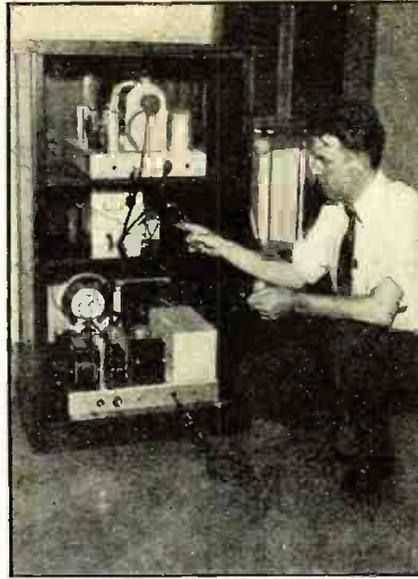
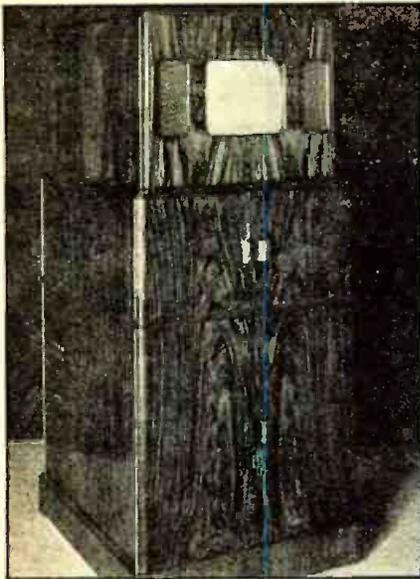
An idea of the type of image seen at our special demonstration is conveyed by Figure 1. But, you must keep in mind the fact that photographs are

DISSECTOR AND RECREATOR

Figure 2: Diagram, below, shows schematically how the cathode-ray principle is used in the transmitter and in the receiver. The dotted line indicates a wire connection, although these impulses are sent easily by radio. The text explains the various functions of the circuit.

very difficult to take of the moving images at the end of a cathode-ray tube and that the same image directly conveyed to the eye registers as being clearer than the average photograph of the image. Also, it is apparent that the eye and brain of the viewer of a television program automatically make allowances for minor imperfections of the moving image. But the same viewer is bound to be more critical when gazing at a still picture of the same image. Actually, however, a television program consists of a rapid succession of minute





THE TELEVISION RECEIVER

Figure 7: The view above, of the television reception unit comprises the cathode-ray tube and associated radio tubes mounted on metal chassis. Figure 4: Center illustration shows a view (from the back) disclosing the television receiver, at the top; the power supply, bottom; while the operator points at the short-wave unit. Figure 6: At the top left of the page is the Fernseh model using the same principles and manufactured for the German market.

Transmission and Reception by TELEVISION

cathode-ray type of tube can be used in television it. This article explains the mode of operation number of important and novel features

Kaufman

parts of pictures and it is the efficient reconstruction of the entire series that registers itself on the viewer's mind in determining the merits of the transmissions.

The RADIO NEWS group was impressed with the Farnsworth demonstration. And the daily press, too, accorded favorable comment to demonstrations at the Philadelphia laboratory. Figure 2 gives the basic schematic outline of the Farnsworth television transmitter and receiver circuits, virtually identical

to the apparatus employed at the Philadelphia press demonstrations. Mr. A. H. Brolly, chief engineer of Farnsworth Television Laboratories, Inc., who jointly with Mr. Farnsworth explained the system to this magazine's staff, prepared the diagram. The pick-up of the transmitter, designated on the diagram as A has been dubbed the "image dissector." The light intensities of an image focused upon its photosensitive surface is converted by the dissector into fluctuations of an electric current. The scanning system also embraces its enveloping coil assembly (B) and the scanning oscillators (C) and (D). Mr. Brolly pointed out that their joint duty is to analyze the area of an image into (Turn to page 375)

Cathode Ray

MAGIC "EYE"

By Merle Cummings

A NOVEL application of a cathode-ray tube has been made in the "Magic Eye" feature of the new season's RCA-Victor line. The "eye" consists of a special type tube installed horizontally in the radio receiver so that only the dome, with a fluorescent surface resembling the human eye, is visible through a panel opening. When the set is functioning, the "eye" blinks forth with a green light broken only by a tiny fan of shadow. The spread and contraction of the shadow fan denotes just how accurately the set is tuned.



THE NEW TUBE AND HOW IT SHOWS TUNING

At the center is shown the new 6E5 tube, with the cathode-ray "eye" at the top of the bulb. The two outside views show the end of the tube and the indications of out-of-tune and in-tune positions of the tuning dial.

When the shadow is narrowed to a thin line, the listener knows definitely that his set is tuned to the most reso-

nant point. This feature greatly enhances "silent tuning" inasmuch as the (Turn to page 381)



A WESTERN DX'ER

This is the amateur station WTEOR owned and operated by Rex Womach of Everett, Washington.

THE amateurs' value to the nation in times of disasters which cut off normal communication to whole sections of the country with one sweep, leaving a trail of havoc and the burden of summoning help on his shoulders, have been recorded in news columns and radio magazines from time to time. Frequently, however, their deeds of heroism go unnoticed. It happens that about once or twice a year an "act of God" hits some section of the United States and, with all of the suffering which ensues and the need for calling help, leaves a devastated area without its normal means of wire communication with the "outside" world.

MOST recent of these terrible disasters was the Florida hurricane last September which left a trail of death and destruction from the southern tip of the state, the Keys, sweeping northward along the west coast then turning inland at Cedar Key just south of Tallahassee. Here again the amateur demonstrated his ability to rally to an emergency and come through with a communication job that, alone, brought news of the suffering in the stricken zone and summoned the necessary help that undoubtedly alleviated much of the suffering.

Credit for the success of the emergency communication goes largely to the 75 meter 'phone men who cleared the entire band and received it exclusively for the handling of the emergency traffic. But, to one "ham" goes a large share of the credit for his excellent resourcefulness. He is Fred G. Bassett, Jr., owner of station W4AKI. With the news of hurricane sweeping up from the Gulf of Mexico with the Florida Keys directly in its path, Bassett left his home at Eustis, Fla., on Sunday, September 1, for Matecombe and Tavernier keys which suffered most severely from the storm. He took with him a portable transmitter and receiver which run on battery power. Then from early the following Monday morning until Wednesday he stuck by his post and broadcast to the anxious outside world the dramatic story of the disaster; summoned aid and directed the manner of its arrival and kept all Florida informed of the progress of the hurricane. His messages ran: "Seventy-five dead, forty-seven injured, four doctors killed; no medical aid, no food or water, no medical supplies, no clothing." Thus, was unfolded the story of the Florida hurricane.

Bassett, of course, was not alone in accomplishing the feat that will make amateur history. He was one—one of the principal

ones—of a number of Florida stations that formed an emergency Florida network which was helped in its work by the co-operation of the entire 75 meter 'phone band which with the help of policing by amateurs in other districts, was kept entirely clear of stations excepting only those handling the emergency traffic.

Activity of the Florida network began with the first gust of wind that hit the keys and continued until normal means of communication was restored. They dispatched news of barometric readings, wind speeds and relief preparations. As the hurricane gained in force, Bassett found himself the only means of contact with the stricken zone. Alonzo O. Bliss, W4COT, working with W4AKI established contact with state authorities and the Red Cross and maintained direct contact with the operator on Matecombe. Bliss handled the bulk of traffic from and to the Keys and did an excellent job of it.

Then followed the dramatic story of the disaster. Amateurs and short-wave listeners all over the country followed it in detail, many being able to pick up W4AKI direct. Your Editor, operating his station at the time, picked up a QST message from W4BYV in which it was said the stations in Florida handling the emergency traffic were receiving severe interference from stations outside the district, particularly those in the first and second districts. We, along with a number of other stations, immediately repeated the broadcast. The alarm spread like wildfire. Everyone, of course, was eager to co-operate. The policing was carried on by W2KR, W2BO, W3DQ and countless others. Every time a station opened with a CQ or a call and apparently unaware of the situation, the self-designated "police" stations jumped upon him. They all closed down and listened.

A Dramatic Story

The story unfolded was truly dramatic. Reports of the storm's effect filtered through—a story from a man whose house had been flattened by the wind with one blow; the list of dead and injured with the description of necessary supplies. . . . the story of the derailed train. . . . "Tell Colonel MacNamara no shelter, no cover for the injured; situation very bad" . . . "Boat with 200 cots, 400 blankets, 40 tents and complete medical supplies has left by inland waterways. Should be there in few hours" . . . more weather reports . . . an amateur in Tama is told storm will reach his city within hour, he replies his family is being taken care of but he is going to standby until the wind takes his antenna down . . . a message from the Miami Red Cross: "Several truck loads of food and medical supplies are leaving Miami for the keys" . . . and so on until the Florida stations faded out as the dawn arrived over

The "HAM" Shack

¶ A Department
for the amateur
operator to help him
keep up-to-date

Conducted by
Everett M. Walker

Editor for Amateur Activities

New Jersey—1,500 miles from the scene of tragedy, destruction, death and need.

An actual account of the Florida amateurs' part in handling the emergency traffic was prepared by George F. Kendrick, W4COS, of St. Augustine, Fla. This account, containing more than 1,600 words, was forwarded by amateur radio by W4COS to W4CVQ, W. H. Jacobs, of Fort Bragg, N. C., who himself took part in the emergency work, and then forwarded to the writer. W4COS's account follows:

"When the weather bureau advisory was broadcast at 10 a.m. on Labor Day, September 4, little did any of the amateur radio 'gang' in Florida realize the momentous hours to follow. What happened in the Florida keys that night and the following several days is now history.

"Monday night found the Florida storm network on the job. The Army Amateur 'phone net of Florida was called by W4WS, M. L. Patterson, the net control station, who requested W4GO, A. H. Davis, at Clewiston, to take over the net control station as he was nearest to the storm area, and centrally located. He did, and continued to do so for nearly sixty hours of continuous operation.

"After finding out just who was on the air he turned the job of clearing the 75 meter 'phone band over to W4DU, at Jacksonville and W4BYV, at Fargo, Ga. At this point W4BYV called QST and asked that all stations within the frequencies of 3900 and 3920 kilocycles QRT or QSV stop transmitting or change frequency, for that was the area in which the Florida network was working."

"At this point W4CVQ at Fort Bragg, N. C., hearing this QST offered his services to contact northern stations and ask their aid in clearing the channels for the emergency traffic. This offer was immediately accepted, and a QST (general call to all stations) was broadcast. The channels first requested were 3900 to 3825 kilocycles and 3940 to 3960 kilocycles. This cleared the channel for W4AKI who was operating on 3945 kilocycles.

"The balance of the 3940 to 3960 channel was used for clearing traffic north," says W4CVQ, "and how traffic could be handled on this clear channel can best be described by the following illustration: A message was started in Maine regarding the removing of passengers from the liner Dixie; this message was handled over the cleared channel and was delivered to the proper person in Florida and an answer was back to the sender in twenty-three minutes. The following stations operated in the cleared channel: W3LA, W3AJM, W8AVS, W5DAN, W2FJC, W1ADM, W1GND, W9MM, W8BWH, W4MJ, W3MK, CO8YB, W4COD, W8INP and W4ANU.

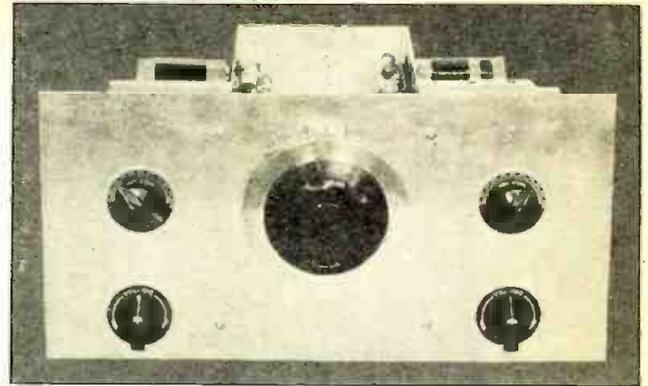
"Time and again one could hear a station in the cleared area and one of the high powered (watch-dogs as W4BYV called them) stations

(Turn to page 376)

LOW-COST "HAM" SET EMPLOYS "DUAL" REGENERATION

(Jones-Silver "Super-Gainer")

By McMurdo Silver



THE FRONT VIEW

An excellent degree of band spread is provided. Rough tuning is accomplished by the two controls above and ganged band spread by means of the large central dial.

REGENERATION is the oldest known method of getting something for, relatively, nothing. Regeneration applied to a single tube will yield sensitivity limited only by its degree and stability, which is simply another way of saying that in the matter of sensitivity alone, a regenerative detector will give just about all that can be had from multi-tube "repeater" amplifiers.

The price paid is the criticalness of regeneration control, this being one of the reasons for its abandonment in favor of complicated multi-stage but non-critical receivers in the broadcast field. The second reason is selectivity. On weak signals the selectivity of a critically regenerative detector is quite good, but not with strong interfering signals. However, if selectivity, or the major portion thereof, can be had through the use of several good tuned circuits, then regeneration will simply and economically contribute additional selectivity and gain.

A 3-Tube Superhet

Going from the general to the specific, the "Super-Gainer" described herewith, using only three tubes (plus a rectifier), provides a high order of sensitivity and image selectivity and through non-critical i.f. regeneration, practically "single-signal" selectivity on c.w. reception.

Conceived by Frank Jones, the "Super-Gainer," for no more than the cost of a "three-tube, one r.f., regenerative detector and one a.f. amplifier," can be quickly and easily built to give

practically the full selectivity and all the gain of much more expensive superhets. As such, it is the answer to the prayer for a fine receiver by thousands of financially embarrassed c.w. amateurs.

How all this is accomplished is best explained by the circuit herewith.

R.F. and I.F. Regeneration

Signals are fed from an antenna through the usual low (twisted hook-up wire) capacity to the tuned grid circuit of the 6C6 first detector. This 6C6 is hooked up as the conventional "electron-coupled" regenerative detector, regeneration being controlled by the screen-grid voltage potentiometer, R1. Quite obviously this circuit so far is a one-tube regenerative receiver, capable of all of the weak-signal sensitivity of such circuits. But for selectivity, this circuit is called upon only to discriminate between a desired signal and its "image" 900 to 1000 kc. away. This it can easily do by virtue of a good high-Q circuit, plus regeneration.

To the suppressor grid of this 6C6 first detector is connected the 76 oscillator plate (or grid, preferably). This is pure electron coupling of a stable, harmonic-free type but without prolific harmonic generation.

Because the oscillator and the regen-

A UNIQUE LAYOUT

The designers have adapted an unusual assembly plan which results in short leads and high efficiency. The circuit is shown to the right.

erative detector both tune quite sharp, relatively, no attempt is made to gang the two circuits except over the narrow amateur and s.w. broadcast frequency bands. This can be done quite nicely for any actually used frequency bands by simply first tuning or setting the separate first detector and oscillator tank tuning condensers controlled by the upper left and right knobs.

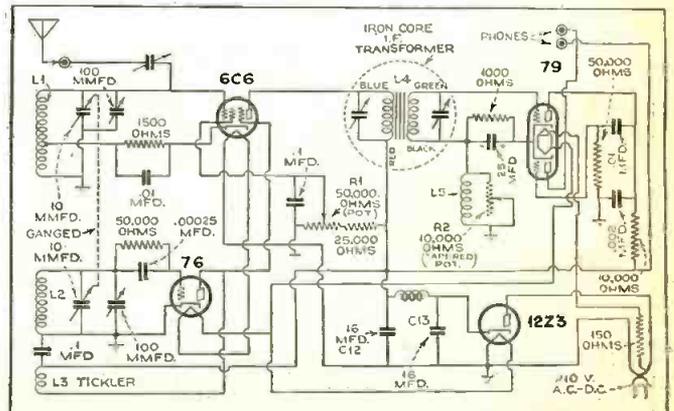
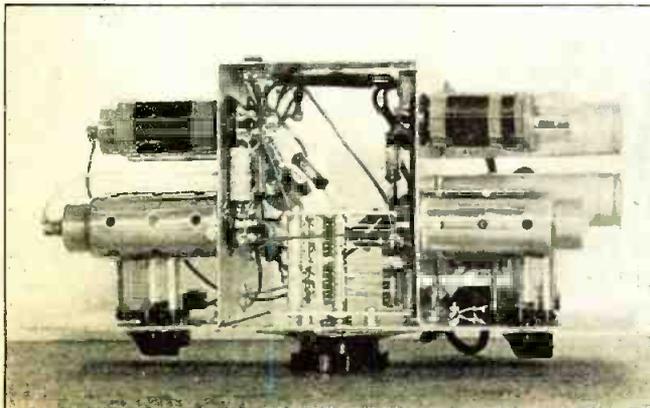
The 6C6 first detector feeds a dual tuned Aladdin "Polyiron" iron-cored i.f. transformer tuned to anywhere between 450 and 500 kc. The two high-Q circuits of this i.f. transformer contribute about as much selectivity and almost as much gain as would two ordinary air-core i.f. transformers. But here again regeneration is used to further increase gain and selectivity up to practical single-signal proportions.

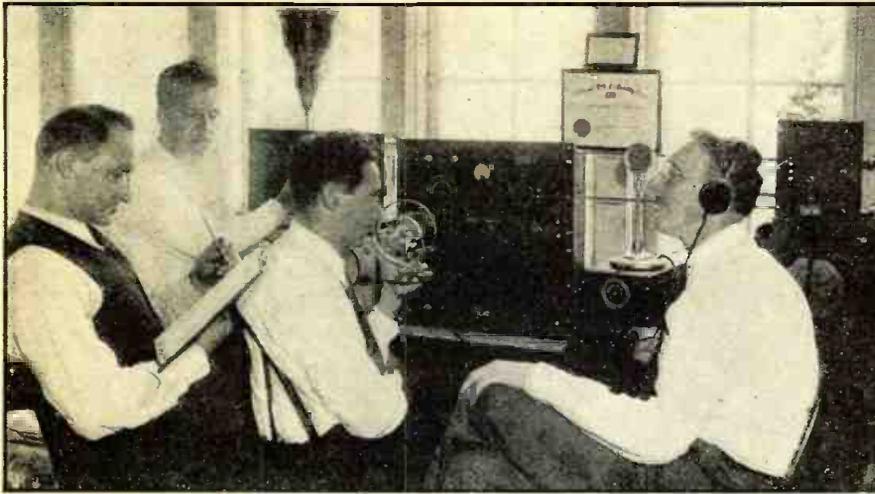
Providing Regeneration

The first section of a 79 dual triode is used as the regenerative second detector. Regeneration is provided by connecting the r.f. choke, L5, between cathode and B-, or its plate return. This makes a conventional oscillator circuit, oscillation and regeneration being controlled by rheostat R2 shunting L5.

The second triode section of the 79 tube is the audio amplifier, resistance coupled to the first 79 triode section (second detector), and terminates in the tip jacks for headphones. A magnetic loudspeaker may be used satisfactorily on fairly strong signals.

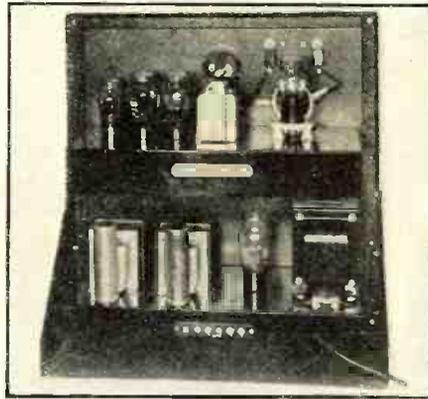
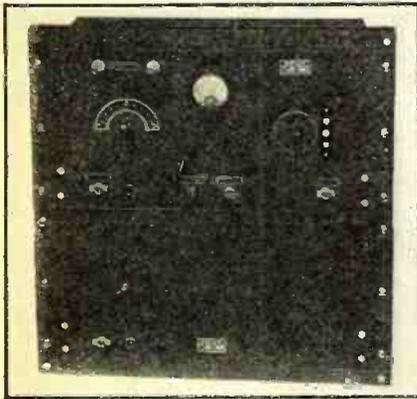
A 12Z3 rectifier (Turn to page 371)





CONDUCTING 5-METER DX TESTS AT PELHAM

Here is the 5-meter experimental transmitting and receiving station set up at the Westchester Listening Post to investigate possibilities of 5-meter DX. This post is located on the top of a high hill and is considered to be a very favorable location. Participating in the tests, left to right are Ed. Berliant W211HE, your Editor, Ben Russ W2QZ, and Nat Bernstein W2GKB.

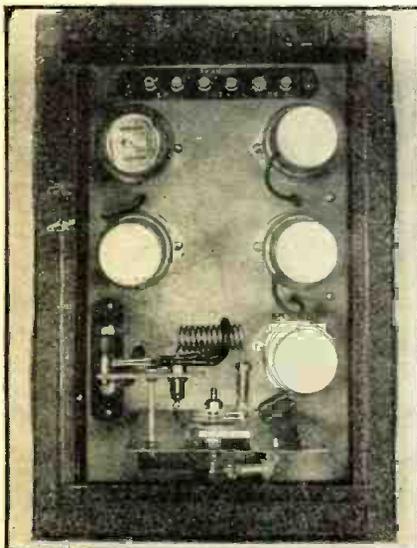


THE TRANSMITTER, FRONT AND REAR VIEWS

The illustrations, above, show the front and rear views of the 5-meter transmitter used in the tests. The job is completely a.c. operated and all control is accomplished from the front of the panel. The unit is completely encased in the rear as well as top, bottom and front. The shielding cases have been removed to show the layout.

WHAT THE RECEIVER LOOKS LIKE

The two lower illustrations show the inside and front views of the superheterodyne receiver employed in this series of tests. The receiver is completely single-control and fully shielded as indicated below. Notice the novel method of coupling the coils to the antenna circuit.



Checking-Up

5

A review of some of the results obtained when RADIO NEWS enlisted the aid of a number of local 5-meter amateurs last summer to test the distance covering ability of 5-meter communications

By L. M. Cockaday

DURING the last six months we have heard of many DX records being broken in the United States and in England for distance transmissions on 5-meter wavelengths. First it was 30 to 40 miles. Then distances from 100 to 150 miles were mentioned and later distances as great as 500 to 700 miles were rumored as the maximum figures for reception of these tiny wavelength signals. In order to check up on these rumors, our staff outlined a series of experimental transmissions and made arrangements to have them listened for by 5-meter observers at distant points. The results may be summarized as follows: Distances up to 25 to 35 and often 50 miles may be easily covered with a suitable antenna placed at the best available heights above ground at the various locations. Distances well over 100 miles can be covered fairly regularly from the tops of high buildings, hills, etc.; and once in a while a distance of 300 to 500 miles is covered and reported by listeners.

Proved Reliability

At any rate, RADIO NEWS is convinced that ultra-high frequencies have emerged from the preliminary laboratory stages to a point where, with the suitable apparatus now obtainable, reliable voice transmission can be obtained and with very low powers (of the order of 10 watts output) the various distances mentioned above can be covered fairly regularly, depending upon the location.

The importance of 5-meter communication is also further demonstrated in localities where heavy static is prevalent. Here the amateur phone wavelengths above 75 meters are severely interfered with, whereas the 5-meter wavelengths cover the local area, up to

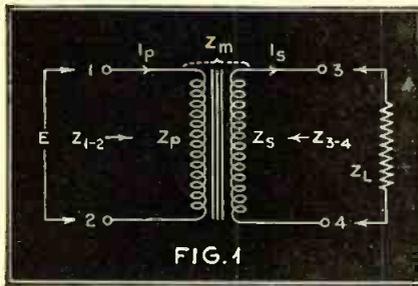


FIG. 1

IN Part III we learned what happens when impedances are mismatched in an audio frequency transmission line. Distortion is introduced by reflection losses and reflection phase shifts, both of which usually vary with frequency.

SINCE the component units of an audio-frequency system seldom have the same terminal impedance, we must have available a suitable means of matching different impedances. Transformers are frequently employed for this purpose. We all know that a properly designed impedance-matching transformer performs this duty satisfactorily. Insufficient knowledge as to just how and why a transformer functions sometimes prevents us from making the most of their possibilities. In this installment, therefore, we shall attempt to explain the elementary theory of a transformer as an impedance-adjusting device. The theory is not difficult, but it is very important to memorize it to an extent where you can use the information without referring to a textbook.

An Exact Definition

When you are called upon to define a transformer, you usually visualize a device having two separate windings on a common core. Then you proceed to explain that energy is transferred from one winding to the other by the magnetic flux that flows through the core, and is therefore common to both coils. Such a description of a transformer is satisfactory for qualitative purposes. For analytical work, we need a more exact definition.

We may define a transformer as any network with two or more windings between which there exists a "mutual impedance." This means that the circuits associated with each winding will influence each other. These effects are measurable, of course, and can therefore be evaluated quantitatively. The mutual impedance between a winding A and a winding B is defined as the vector ratio between the open-circuit voltage on A, and the current flowing in B. Since the impedance is "mutual," it works both ways. That is, it may also be defined as the vector ratio of the open-circuit voltage on B and to the current flowing in A. These definitions probably sound very simple and trite, but they give the first and most important clue to the action of a transformer as an impedance-matching device; namely, *what happens in one winding determines the characteristics of the other.*

Theory and Practice for Correct IMPEDANCE MATCH

By C. A. Johnson

Part Four

For sake of simplicity, we will first analyze the action of an ideal transformer. By this we mean a transformer consisting of two purely inductive windings, and having no magnetic losses. Later we will show to what extent this ideal is approached in practice. Figure 1 is a diagram illustrating a simple transformer. We will define the symbols used as follows:

Symbols Used

Terminals 1 & 2—Terminals of primary.

Terminals 3 & 4—Terminals of secondary.

E—Voltage applied to primary.

I_p —Current flowing in primary.

I_s —Current flowing in secondary.

Z_p —Inherent impedance of primary due to its inductive reactance.

Z_s —Inherent impedance of secondary winding due to its inductive reactance.

Z_m —The mutual impedance existing between the two windings.

Z_{1-2} —Impedance looking into the primary. Note that this is not the same as Z_p !

Z_{3-4} —Impedance looking into the secondary. Note that this is not the same as Z_s !

Z_L —Impedance of load that may be attached to the secondary.

All of the above values of Z are usually complex quantities in practice (see Part II), but in this analysis we do not have to separate them into real and imaginary parts.

An Ideal Transformer

Now it can be shown that in the case of an ideal transformer both Z_p and Z_s are infinitely large pure inductances. Furthermore, in the ideal case, we always have the following relation between Z_p , Z_s and Z_m

$$Z_m = \sqrt{Z_p Z_s} \quad (1)$$

It appears, therefore, that Z_{1-2} is determined by a combination of the effects of Z_p and Z_m . Similarly, Z_{3-4} is a function of both Z_s and Z_m . This fact

helps to clarify the action of Z_m . In the light of this information, we may write the following equations for Figure 1.

By Kirchoff's First Law and our definition of Z_m ,

$$E = I_p Z_p + I_s Z_m \quad (2)$$

and

$$I_s Z_s + I_s Z_p + I_p Z_m = 0 \quad (3)$$

Now from these equations we see that Z_m is the *connecting link* between the *current* in the *primary* and the *voltage* in the *secondary*, or vice versa. You must always remember that a transformer, as such, always works the same way in either direction. The terms "primary" and "secondary" are merely a convenient way of designating the source and load in a system.

From equations (2) and (3) it may also be shown that

$$Z_{1-2} = \frac{Z_p}{Z_s} Z_L \quad (4)$$

The detailed calculations involve differential calculus and are not of extreme importance here. The important thing to notice is very simple and should never be forgotten. Look at equation (4) once more. Note that the value of Z_{1-2} is entirely dependent upon Z_L ! The values of Z_p and Z_s merely determine the ratio of the transformer. This is strictly true, of course, only in the case of the ideal transformer. However, it is true within limits for any practical case.

Impedance Ratio

Hence, we may conclude that it is never correct to assume that the "ohms primary" and "ohms secondary" of a given transformer are fixed constants like the resistance of a piece of wire. The impedance ratings on transformer windings are always interdependent. A transformer designed to match a 200-ohm line to a 500-ohm line is designed

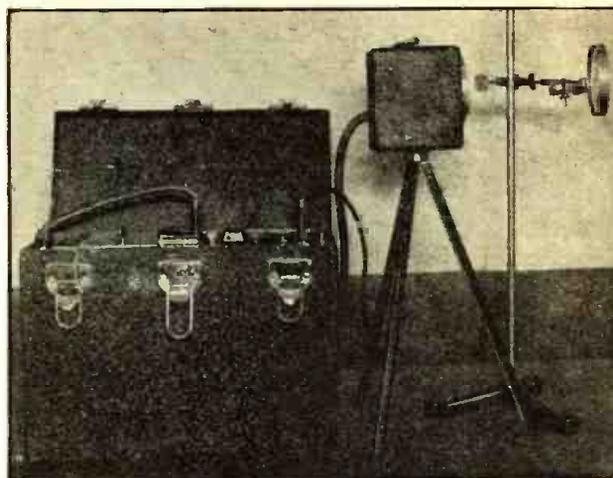
to have a $\frac{Z_p}{Z_s}$ ratio of .4. It usually

will work equally well for matching a 250-ohm line to a 625-ohm line, and often for still higher or lower values, provided the ratio is the same.

In our next installment, we will discuss the factors that determine the impedance range over which ordinary transformers may be used. This depends upon the width of the frequency band to be transmitted, and on the allowable distortion.

A Receiver for the TALKING LIGHT-BEAM TELEPHONE

By C. A. Johnson and V. Sharp



THE RECEIVING UNIT
READY FOR ACTION

At the left is the pre-amplifier in its carrying case. At the right is the photo-cell on its tripod and the condensing lens.

IN this article is described the receiving circuit used with our light-beam transmitter at New York University. Many other types of circuits may be used, but we offer this working design as a starting point for our experimenters.

The essential units of a successful apparatus are:

1. Some type of light-sensitive device (such as a photo-cell) having a uniform frequency response over the audio range.

2. A low noise-level pre-amplifier having enough gain to bring the photo-cell output up to about -50 decibels for the average signal level.

3. A power amplifier having a gain of about 80 decibels, and sufficient power output for the loudspeaker system required.

We have tried all available types of light-sensitive devices. Some types appear to have an advantage from the standpoint of output level, but this is usually offset by non-uniform frequency response, and difficulty of coupling to the pre-amplifier.

The photo cell we are using at present is a Cetron type CE-2, which was designed for talking motion-picture work. Any similar type, such as the G.E. PJ23, will work equally well. The standard type of photo-cell coupling-circuit is used as shown in Figure 1.

The values of resistor and coupling condenser shown were found to give the best combination of gain and frequency response in our system. We also found that by adding the by-pass condenser, C-2, and the resistor, R-6, the circuit was more stable at high gain.

The Pre-amplifier

The circuit of the pre-amplifier is also shown in Figure 1. It is similar in design to that in any sound-head amplifier. Since the power consumption is low, we designed it to operate with batteries so as to simplify our problem of hum elimination. This also enabled us to use the 864 type of tube, which gave us the least trouble with microphonics. This circuit will prove to be very satisfactory for experimental work, because it is flexible, inexpensive; and can be built so that it is completely free from extraneous noises.

We have tried two different methods of arranging this equipment on a chassis. Each has some advantages, depending

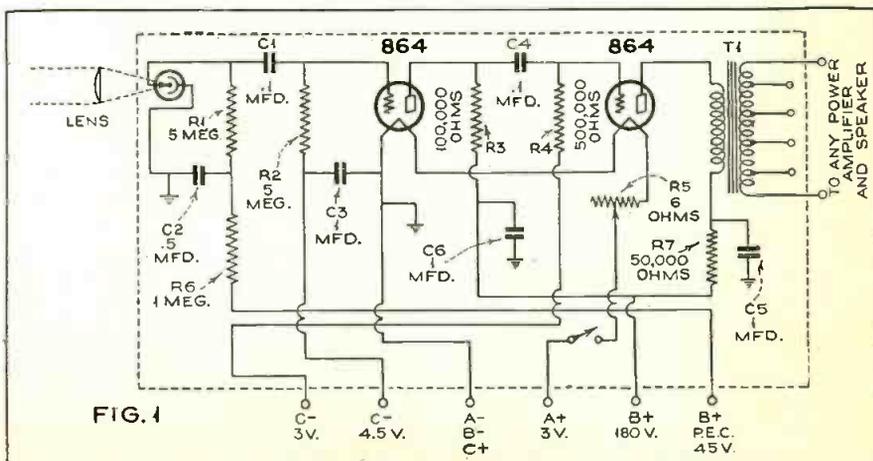
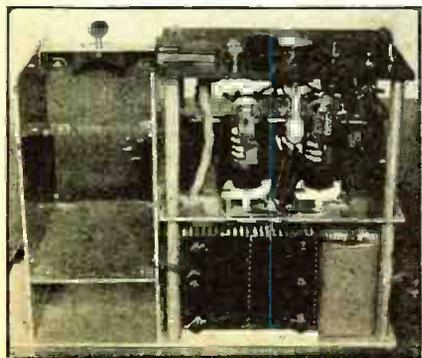
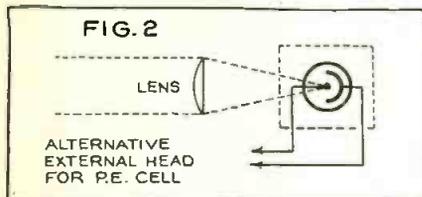
upon the requirements of the problem, and upon the parts that you have available. The first method is to mount the photo-cell in a housing that is separate from the pre-amplifier. Connection is then made by means of a well-shielded and insulated photo-cell cable. The second method is to build the photo-cell and two amplifier stages into one common housing. This eliminates the problem of a photo-cell cable, but introduces the problem of an isolated battery supply; unless the entire outfit is to be cumbersome. We have obtained better results with the second method, but will describe, briefly, the mechanical details of each.

Construction

If the photo-cell is to be in a separate unit, the first problem is to build the housing. For this purpose, we built a 16-gauge sheet-iron box, 3 1/2" square and 5" high. The top was fitted with a removable cover, held in place with Parker-Kalon screws. A one-inch round hole was cut in the back side of the box (about 2 inches above the bottom), for the photo-cell cable. A 1/2-inch round hole was cut on the front side of the box for the photo-cell window. The height of this hole (Turn to page 381)

CONSTRUCTION DETAILS

Figure 1 gives the circuit for the complete pre-amplifier. Figure 2 shows the circuit for an external photo-electric pick-up for use if it is desired, to move it a distance away from the pre-amplifier. The photograph shows an internal view of the pre-amplifier with a compartment for batteries and another compartment for the photo-cell housing to fit into.





DOOR-TO-DOOR

AN important sales method often featured. Our readers are invited to guess what is wrong with this picture; then read the article and find out if you are correct.

YOU may be the best radio serviceman in town, but if you cannot sell your services to the members of your community, all your technical training, equipment and experience are of little value to you. And if you are a beginner in service work you *must* learn the business side of the profession *plus* the technical side!

It is a well known fact that among many independent servicemen there exists, far too often, a certain lack of showmanship and business ability which seems to be associated naturally with the technical mind. Invariably, it acts as a distinct barrier to the building up of a flourishing and successful business, and the sooner you realize it the better off you are going to be!

Building Your Business

There is really no excuse for this state of affairs. It is likely that most servicemen are so engrossed with the ever-increasing technical complexities of their work that they just don't think of an advertising and promotion side to their business and so have never set out to find out anything about it. Many of them think that it costs so much money to advertise that only large organizations can afford it. They do not realize that there are numerous excellent business-building methods open to even the smallest shop. If you are a serviceman you can easily be a good business man and a good salesman if only you will learn the fundamentals of business promotion and apply yourself to its problems with the same degree of enthusiasm and seriousness that you show in the technical phases of your work. It is the purpose of this series of articles

"SELLING



The Opening Gun in the Battle for Better Servicing



PLANNING THIS IMPORTANT SERVICE SERIES

AT this conference in the RADIO NEWS Editorial sanctum plans were made to incorporate in this series all of the information necessary to help servicemen, beginners and old timers, too, for that matter, in understanding the purely business aspects of servicing. Left to right: Mr. John H. Potts, Associate Technical Editor; Mr. Alfred A. Ghirardi, well-known service expert; Mr. T. S. Ruggles, specialist in business building; and your Managing Editor, Mr. S. Gordon Taylor.

to tell you how to go about it. You yourself will have to decide how big a "splash" you can make then carry out your own program. It is our aim to show you exactly how to "make sales of your service" in ways that will promote customer good-will and make many new friends; how to "promote" your business (no matter how small) through the many channels open to you by tested and proved methods; how to

make "extra" profits; how to put "good business methods" to use; how to keep "service and sales records" so that the maximum amount of important and useful information is made available at a moment's notice, etc. When these fundamentals are fully understood, your own common sense and ingenuity *should* carry you on toward a fuller measure of success than you have heretofore enjoyed!

OVER-THE-COUNTER SALES PROFITABLE

THE well-stocked sales counter of a successful and reliable service organization in Pelham, N. Y. Notice the side-lines carried. Mr. Walter R. Kolb, co-partner in the business, says, "This is one of the most profitable adjuncts to our business." He is shown serving a customer.



SERVICE"

Most of the larger service and sales organizations are fully aware of the great value of business methods, advertising and promotion. But some servicemen, working alone, forget these aids, which mean all the difference between making a "fair profit" and "just a bare living"

By A. A. Ghirardi
and T. S. Ruggles



SELLING OVER THE TELEPHONE

DON'T forget that many profitable sales of radio service, as well as sales of electrical repairs and wholesale appliances, can be made over the telephone. That is one of the main efforts of Mr. Jerry Liucci, of the service firm of Kolb & Crawford, in Pelham, New York.

First of all, it must be understood that there is a definite technique involved in getting new business and holding your present business against competition, just as there must be a definite technique in servicing radio equipment or doing almost any other worthwhile thing. Also, that there are many different methods to be employed in getting new business—some are open to all, others work well in some types of communities and not in others, still others are effective only at certain times of the year and others require such a large outlay of money that only large organizations are prepared to finance them.

Keeping At It

The next important point is that no matter what methods you employ, they must be plugged *systematically* and *doggedly!* This is one of the most important "secrets" of the entire story—if you are not prepared to carry out any business promotion plan persistently and systematically, you'd better not start it at all—you'll *lose* less money by not starting. Your business may absorb *your* thought 24 hours a day, but remember that it is not sufficient to tell a man about your services only once in order to sell him. His life is full of other interests which occupy his attention in rapid succession, and he will soon forget about you—unless you hammer away at him at sufficiently frequent intervals (with your message) until he automatically thinks of your shop when any question about his radio comes up. Then, and not until then, have you really "sold" your service to him.

Selecting Your Methods

There are many different methods which are available to you for getting business. For example there is "personal" selling (and that includes both *counter* selling and *door-to-door* selling or "canvassing"), *telephone* selling, *direct mail* advertising (postcards, blotters, log books, sales letters, etc.),

newspaper advertising, *radio* advertising and *displays*. These and other types of selling will be described at appropriate places in this series. Best results are usually obtained when the serviceman uses a combination of these sales methods such that *one* follows up the efforts of the *other*—for example, direct mail, followed by telephone or personal selling, etc.

You must understand thoroughly that *personal salesmanship is basic in a successful servicing business!* Your business is a "personal-service" business. Your customers are not buying merchandise so much as they are buying *your own* personal services. The thing

you've really got to sell is—yourself—as well as your shop. Therefore, isn't it obvious that the most logical way to sell yourself is through *personal contact* if the set-up of your business and community makes this practical?

Every time a prospect (or a regular customer) comes into your shop, you should be two men in one—an expert technician and an expert salesman. One without the other is a *serious handicap* in these days of exceedingly keen competition. But selling at the counter is really the easiest of all kinds of selling. The customer was already sufficiently interested in what you have to offer to take the time to (*Turn to page 383*)

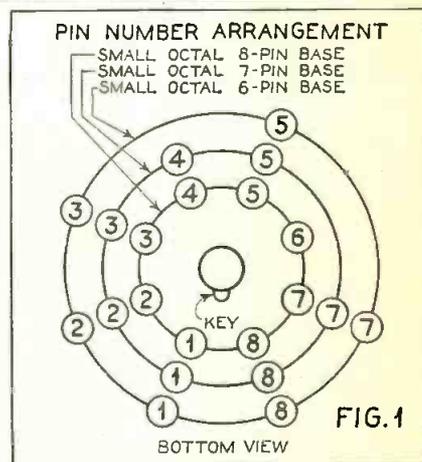
More Information on

METAL TUBES

John M. Borst

SUPPLEMENTING the information given in the June issue, below are given the characteristics of four additional metal tubes released by R.C.A. These are the 5Z4, a full-wave rectifier, the 6F5, a high-mu triode, the 6F6, a power pentode, and the 6L7, a pentagrid mixer tube of a new design.

All these tubes, regardless of the number of prongs, will fit the same eight-contact socket. An illustration of the bottom view of the base is shown in Figure 1. The concentric circles of pins show which pins are omitted in the 7-, and 6-prong tubes, and the two different 5-prong arrangements. The key of the central pin points to the space between pins number 1 and number 8. The diameter of the pin-circle is .687 inch; the length of the pins is .375 inch and the length of the central pin is .56 inch. The maximum diameter of the base, which is also the maximum diameter of the tube, is 1 1/8 inch. A bot-



tom view of type 6A8 is shown in Figure 2.

Here is a brief review of the previously described metal tubes, giving their purpose, the glass equivalents, and the prong connections.

With very few exceptions, pin number 1 is connected to the shell, pins number 2 and 7 are the heaters, pin number 8 is always a cathode and pin number 3 is the plate. Unless otherwise indicated, this is true of the following tubes.

6A8—A pentagrid converter, equivalent to the 6A7. In addition to the above regular pin connections, pin number 4 connects to the screen, number 5 to the os- (*Turn to page 341*)

Call	Location	kc.	kw.
SC1	Kalmar	1438	0.2
SCA	Boras	1447	0.2
SCD	Gavle	1483	0.2
SCT	Uppsala	1492	0.2
SCM	Kristineham	1500	0.2
SCII	Jonkoping	1515	0.2
SCJ	Karlskrona	1530	0.2

SWITZERLAND

Geneva	401	1.3
Beromunster	556	100.0
Sottens	677	100.0
Monte Ceneri	1167	15.0
Basle	1375	0.5
Berne	1375	0.5

TURKEY

Istanbul	188	5.0
Ankara	231	7.0

UNITED KINGDOM

Droitwich (Midland National)	200	150.0
Moorside Edge (North Regional)	668	50.0
Westerglen (Scottish Regional)	767	50.0
Washford Cross (West Regional)	804	50.0
London Regional	877	50.0
Belfast	977	1.0
Droitwich (Midland Regional)	1013	50.0
Westerglen (Scottish National)	1050	50.0
Newcastle	1122	1.0
London National	1149	20.0
Moorside Edge (North National)	1149	20.0
Washford Cross (West National)	1149	20.0
Aberdeen	1285	1.0

U. S. S. R.

RV1	Moscow	174	500.0
RV14	Irkutsk	187.5	20.0
RV10	Minsk-Kolodisheli	208	35.0
RV76	Novosibirsk	217.5	100.0
RV4	Klarkov	232	10.0
RV8	Baku	238	10.0
RV53	Leningrad	245	100.0
RV11	Tashkent	256.4	25.0
RCZ	Moscow	271	100.0
RV7	Tiflis	283	35.0
RV60	Alma-Ata	310	10.0
RV19	Ashkhabad	333.3	10.0
RV66	Krasnoyarsk	333.3	1.0
RV3	Saratov	340	20.0
RV63	Verkhneudinsk	350	10.0
RV12	Rostov	355	20.0
RV24	Smolensk	364	2.0
RV5	Sverdlovsk	375	40.0
RV21	Erivan	380	10.0
RV27	Makhuch-Kala	390	3.0
RV49	Moscow	401	100.0
RV25	Voronezh	413.5	10.0
RV47	Stalinabad	421.3	2.0
RV37	Ufa	436	10.0
RV83	Oirat-Tura	450	1.0
RV45	Orenburg	461.5	1.0
RV14	Omsk	472	1.0
RV41	Syktvykar	472	1.0
RV74	Chelboksary	472	1.0
RV34	Stalingrad	522	10.0
RV52	Chita	556	20.0
RV42	Gorki	565	10.0
RV36	Arkhangel'sk	586	10.0
RV35	Astrakhan	598	10.0
RV18	Pyatigorsk	610	1.0
RV31	Ivanovo	625	10.0
RV56	Vladivostok	635	0.3
RV29	Penza	640	1.0
RV23	Petrozavod'sk	648	10.0
RV17	Grozny	676	1.0
RV46	Kazan	686	10.0
RV16	Karigauda	686	1.0
RV9	Samara	713	10.0
RV65	Kiev	722	35.0
RV64	Saratov	734	1.0
RV78	Ordzhonikidze	749	10.0
RV26	Izhevsk	767	3.0
RV51	Stalino	776	10.0
RV39	Nalchik	794	1.0
RV73	Moscow	832	100.0
RV61	Simferopol	859	10.0
RV30	Ioshkar-Ola	888	1.0
RV55	Dnepropetrovsk	913	10.0
RV13	Engelsk	937	1.0
RV67	Gomel	959	1.0
RV86	Odessa	968	10.0
RV70	Ukhta	968	2.0
RV33	Cherugov	1013	5.0
RV57	Leningrad	1040	10.0
RV75	Krasnodar	1050	1.0
RV20	Tiraspol	1068	4.0
RV15	Vinnitsa	1095	10.0
RV12	Kharkov	1185	10.0

YUGOSLAVIA

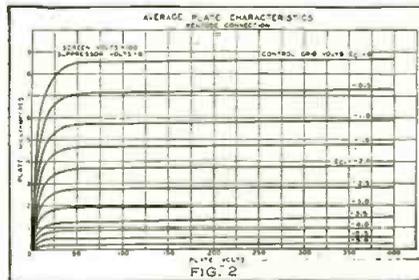
Ljubiana	527	5.0
Belgrade	686	2.5
Zagreb	1086	0.7

New ACORN Pentode

(Continued from page 335)

entirely different. In order to shield stages from each other, the tube can be mounted as shown in Figure 1, thus separating the plate and the grid by the shield. Ordinary by-passing is not satisfactory at these ultra-short waves. It is recommended to employ a flat ribbon as a lead to the tube terminal and to insulate this from the grounded shield by a strip of mica. This then functions as the by-pass condenser right at the tube terminals. When the tube is used as an a.f. amplifier, the recommended voltages are: plate supply, 250 volts; screen potential, 50 volts; control-grid bias, 2.1 volts; suppressor connected to cathode at socket; plate load, 1/4 megohm. The plate current is then .5 ma.; the grid leak can be as high as 1 megohm. The voltage amplification is approximately 100 and an undistorted voltage output of 40-50 volts rms can be obtained.

The 954 offers several unusual opportunities around the laboratory. For in-



stance, connected as a triode, it can be used as a vacuum-tube voltmeter. We can then do away with the lead to the source of voltage to be measured, by building the

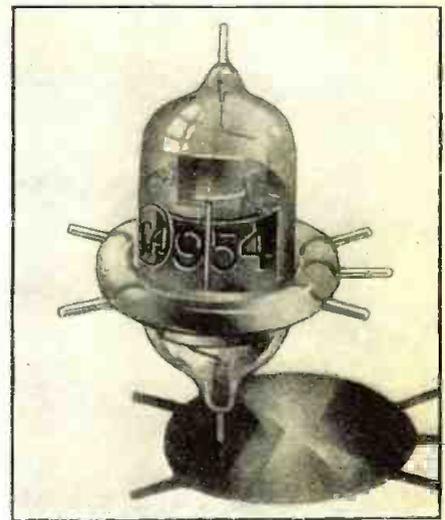


TABLE I
954

EF (a.c. OR d.c.)	6.3 VOLTS
If	0.15 AMP.
CAPACITY G-P. (WITH SHIELD-BAFFLE)	0.007 MAX. MMFD.
INPUT	3 MMFD.
OUTPUT	3 MMFD.
OVERALL LENGTH	1 1/16 ± 3/16
OVERALL DIAMETER	1 1/32 ± 1/16

MAXIMUM RATINGS

Ep (d.c.)	250 V. MAX
Eg3 SUPPRESSOR (d.c.)	100 V. MAX
Eg2 SCREEN (d.c.)	100 V. MAX.

TYPICAL OPERATION AND CHARACTERISTICS

	CLASS A AMPLIFIER			BIASED DET.
	90	250	250 (THROUGH PLATE LOAD)	
Ep	90	250	250	VOLTS
Eg2	90	100	100	VOLTS
Eg1 (C.G.)	-3	-3	-6	VOLTS
SUPPRESSOR (G3) CONNECTED TO CATHODE AT SOCKET				
μ	1400	OVER 2000	—	—
Rp	1	OVER 1.5	—	MEG
Gm	1100	1400	—	μMHOS
Ip	1.2	2.0	0.1 MA (WITH 250V. SUPPLY)	MA.
Ig2	.5	.7	—	MA.
PLATE LOAD	—	—	250,000	OHMS

tube itself inside an oversize test prod. The grid terminal should stick out and this would make it possible to apply the unknown voltage directly to the tube.

More Information on METAL TUBES

(Continued from page 339)

cillator grid, number 6 to the oscillator anode-grid. G4 is connected to the top cap.

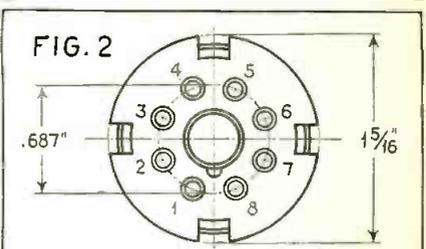
6C5—A triode somewhat like the 76 but with a higher mu. The grid connects to pin 5.

6D5—A triode approximately like the 45, but indirectly heated and using a 6.3 volt filament supply. Pin arrangement is the same as that of the 6C5.

6H6—A twin diode, which has no glass equivalent. It contains two diodes with independent cathodes. Pin number three connects to P2, number 4 to K2. Pin number 5 connects to P1 and number 8 to K1.

6J7—A pentode amplifier with high amplification factor similar to type 77. The screen connects to pin 4, suppressor to pin 5, control grid to top cap.

6K7—A pentode with variable-mu char-



BOTTOM VIEW OF BASE OF TYPE 6A8

PIN NO. 1 - SHELL	PIN NO. 6 - NO. 2 GRID
PIN NO. 2 - HEATER	PIN NO. 7 - HEATER
PIN NO. 3 - PLATE	PIN NO. 8 - CATHODE
PIN NO. 4 - NO. 3 & 5 GRIDS	TOP CAP - NO. 4 GRID
PIN NO. 5 - NO. 1 GRID	

acteristics, similar to type 78. Pin connections are the same as for the 6J7.

The following are the four additional types:

5Z4—A full-wave high-vacuum rectifier, similar to type 80. Pin connections: 1—shell, 2—heater, 4—plate number 2, 6—plate number 1, 8—heater and cathode. Heater voltage 5.0 volts
Heater current 2.0 amperes
A.C. plate voltage per plate (r.m.s.) 400 max. volts
Peak inverse voltage 1100 max. volts
Output current (d.c.) 125 max. m.a.
Max. overall length 5 1/2 inch
Max. diameter 1 5/16 inch
Base small octal 5-pin

6F5—A high mu triode, similar to the

(Turn to page 380)



PUERTO RICAN WNEL, 1290 KC., 5 KW.
At the left is a "shot" of San Juan, Puerto Rico, with WNEL's mast towering above its surroundings. Photo submitted through courtesy of Observer Johnson, of Chisholm, Minnesota.

THE DX CORNER

S. GORDON TAYLOR
(For Broadcast Waves)

THE 1935-36 broadcast band DX season is now well under way and applications are invited from those who desire appointments as Official Listening Post Observers for 1936. If you are now an Observer and wish to renew your appointment please drop a line to the editor of this department to that effect. If you are not now an Observer but wish to serve in this capacity during 1936, include a brief summary of your DX accomplishments and the equipment you use. Appointments for 1936 will shortly be made and 1936 official certificates issued before the first of the year. There are no fees or charges of any kind and the only requirement is that observers submit monthly reports of distant stations heard.

IT is the purpose of the DX Corner to provide information which will be of real help to DX readers. In order to accomplish this it would be extremely helpful if readers would write in stating just which of its features are best liked. To cooperate towards this end, please drop a line to the editor, listing the five features which have been of most interest and help to you during this or past months. For your convenience the various features which have been appearing are listed as follows:

- Foreign "Best Bets" List
 - DX Calendar
 - U. S. Station Changes
 - F.C.C. Monitor Schedules
 - List of Official RADIO NEWS L.P.O.'s.
 - DX Club Register
 - Photos of Stations
 - Photos of Official Observers
 - Our Readers Report—
 - Foreign Station Addresses
 - Equipment for the DX'er
- Just list the five which you like best, placing these five in the order of their importance to you.

THERE are a number of terms now being commonly used in DX circles which the editors believe were originated by RADIO NEWS. Among these terms are "listening post" as applied to radio reception, "listening post observer," "official listening post," "official listening post observer," etc. These terms are copyrighted by RADIO NEWS and have been in use in this publication regularly since 1932. During the past year or more some of these have been quite commonly adopted by the various DX clubs. More recently, however, newspapers and other magazines have been following the lead and are also making free use of these terms. RADIO NEWS has no objection to their use by DX or short-wave clubs and hereby extends permission to any and all clubs to use them freely. However, it is suggested that commercial publications desiring to make use of these terms make written application to the editors of RADIO NEWS for permission.

Attention—Urgent!

Following are DX programs to be dedicated to RADIO NEWS during the month of November. More complete details on these stations will be found in the "DX Calendar" elsewhere on these pages:

- Nov. 7, KCMC, 5-5:30 a.m. (Halsey)
 - 13, WHEF, 1-2 a.m. (Wood)
 - 13, WPEN-WRAX, 4-4:30 a.m. (Cleaver)
 - 17, CMBX, 2-4 a.m.
 - 20, KGEZ, 5-5:30 a.m.
 - Dec. 4, WDAS, 3-3:20 a.m. (Cleaver)
- It is respectfully and urgently suggested that every Radio News reader who tunes in these programs drop a line to the stations reporting on the reception. Obviously stations receiving a large number of reports are more favorably inclined towards dedicating future broadcasts to Radio News and it is therefore hoped that each one of the stations listed above will be snowed in with reports from readers of this department—and, of course, from Official Listening Posts.

DX CALENDAR

Below are given lists of special and periodic DX broadcasts arranged in the order of dates and hours for the convenience of DX'ers. These special DX broadcasts constitute a happy hunting ground for the DX listener and most of them are put on the air at considerable expense to the station owners. Their only compensation comes in the form of reports from listeners and it is therefore hoped that RADIO NEWS readers will do their share by reporting every station tuned in. Practically all of these stations will verify reception upon request but in fairness it is suggested, where verifications are requested, that return postage be enclosed with reports. All hours shown are a.m. unless otherwise indicated. All time is Eastern Standard. The initials at the end of an item are those of the club to which the individual broadcast is dedicated.

SPECIALS

November

2	Beg. 2	1260 kc., KVOA, Tucson, Ariz., .5 kw.
3	1-1:15	890 kc., WILL, Urbana, Ill., .25 kw. CDNR
	1-2	1310 kc., CJLS, Yarmouth, N. S., .1 kw.
	7:30-8:30	950 kc., KMBC, Kansas City, Mo., .1 kw. CDNR
4	3-3:30	1113 kc., FECAMP, Fecamp, France, 10 kw. IDA
6	3-5:10	1400 kc., WIRE, Indianapolis, Ind., .5 kw. CDNR
7	5:10-5:30	1420 kc., KCMC, Texarkana, Ark., .1 kw. RADIO NEWS
10	2-3	1270 kc., CMKC, Santiago, Cuba, .15 kw. NRC
	2:30-4:30	1320 kc., KID, Idaho Fall, Idaho, .25 kw. NNRC
	3-4	1370 kc., KFRO, Longview, Texas, .1 kw. NNRC
	4:30-5:30	1200 kc., CKNX, Wingham, Ontario, .05 kw. CDNR-NRC
11	1-2	1360 kc., WGES, Chicago, Ill., .5 kw. NNRC
13	1-2	1500 kc., WHEF, Koscisko, Miss., .1 kw. RADIO NEWS
	Beg. 2:01	1210 kc., KIUL, Garden City, Kansas, .1 kw.
	2-5	1320 kc., CMON, Havana, Cuba, .25 kw.
	4-4:30	920 kc., WPEN-WRAX, Philadelphia, Pa., .25 kw. RADIO NEWS
16	4-5	1010 kc., CHML, Hamilton, Ontario, .05 kw. CDNR
17	1-2	920 kc., KVOA, Denver, Colo., .5 kw. CDNR
	1-2	583 kc., Riga, 15 kw., 1105 kc., CDNR

Official RADIO NEWS Broadcast Band Listening Post Observers

United States

- Alabama: Ray Wood
- Arkansas: James F. Halsey
- California: Frank D. Andrews, Roy Covert, Bill Ellis, Randolph Hunt, Walter B. McMenemy, Radio Fellowship, George C. Sholin, Warren E. Winkley
- Connecticut: Fred Burligh, James A. Dunigan, Stanley Grabowski, Philip R. Nichols, R. L. Pelkey
- Georgia: W. T. Roberts
- Illinois: Herbert H. Diedrich, Ray E. Everly, H. E. Rebensdorf, D. Floyd Smith
- Indiana: E. R. Roberts
- Iowa: Lee F. Blodgett, Ernest Byers
- Kansas: Vernon Rimer
- Maine: Danford Adams, Steadman O. Fountain, Floyd L. Hammond, Roger Williams
- Maryland: William L. Bauer, Louis J. McVey, William Rank, Henry Wilkinson, Jr., Frank Zelinka
- Massachusetts: William W. Beal, Jr., Walter C. Birch, Russell Foss, Simon Geller, Robert A. Hallett, Warren C. Reichardt, Evan B. Roberts
- Michigan: John DeMyer, Howard W. Eck
- Minnesota: F. L. Biss, Walter F. Johnson
- Mississippi: Mrs. L. R. Ledbetter
- Missouri: Dudley Atkins, III.; C. H. Long, M. F. Meade
- Montana: R. W. Schofield
- New Jersey: Henry A. Dare, Jack B. Schneider, Alan B. Walker
- New York: Jacob Altner, Murray Buitekant, Stephen Flynn, Ray Geller, Edward F. Gess, Robert Hough, Robert Humphrey, John C. Kalmbach, Jr., Harry E. Kentzel, Maynard J. Louis, Harold Mendler, Robert C. Schmarler, R. H. Tomlinson, William Wheatley
- North Carolina: Marvin D. Dixon
- North Dakota: O. Ingmar Oleson
- Ohio: Irwin Beitman, Stan Elcheshen, Donald W. Shields, Richard J. Southward
- Oregon: David Hunter, Walter Weher
- Pennsylvania: Robert W. Botzum, Robert Hoffman Cleaver, Edward Kocsan, J. Warren Rutzahn, Francis Schmidt, Joseph Stokes
- Rhode Island: Spencer E. Lawton
- South Dakota: Mrs. A. C. Johnson
- Tennessee: W. S. Jackson
- Texas: E. L. Kimmons
- Vermont: Harry T. Tyndall
- Virginia: A. J. Parfitt, C. C. Wilson
- Washington: John Marshall Junior High School Radio Club
- West Virginia: Clifford Drain
- Wyoming: J. H. Woodhead

Foreign

- Alaska: S. A. Tucker
- Australia: Albert E. Faull, Victoria; George F. Ingle, New South Wales; Aubrey R. Jurd, Queensland
- Canada: William H. Ansell, Saskatchewan; C. R. Caraven, British Columbia; Claude A. Dulmage, Manitoba; C. Holmes, British Columbia; Philip H. Robinson, Nova Scotia; Art Ling, Ontario; John W. Ker, British Columbia
- Cuba: Rafael Valdes Jimenez, Camaguey
- England: R. T. Coales, Hants; F. R. Crowder, Yorkshire; George Ellis, North Stockport; Charles E. Pellatt, London
- Irish Free State: Ron. C. Bradley
- Newfoundland: A. L. Hynes, Clarenville
- New Zealand: P. T. Kite, Auckland; L. W. Mathie, Hawke's Bay; R. H. Shepherd, Christchurch; Eric W. Watson, Christchurch
- Philippine Islands: George Illenberger
- Puerto Rico: Ralph Justo Prats, Santurce
- South Africa: A. C. Lyell, Johannesburg
- Sweden: John S. Bohm, Malung
- Switzerland: Dr. Max Hausdorff, Viganella

		Madonna, 50 kw.; 1258 kc., Kuldiga, 10 kw. IDA
2-4	?	1380 kc., CMBX, Havana, Cuba, .15 kw. RADIO NEWS
3-5		1300 kc., WHAZ, Troy, N. Y., .5 kw., 4-5 for UDNC
4:30-5		630 kc., WGBF, Evansville, Ind., .5 kw. NRC-CDNR
5-7		1310 kc., WTRC, Elkhart, Ind., .05 kw. NZDNA
19	1-4	940 kc., WDAY, Fargo, N. D., 1 kw. IDA
	1:30-2:30	749 kc., RADIO MARSEILLE, Marseille, Fr., 100 kw. IDA
	3-4	1230 kc., CPX, La Paz, Bolivia, 10 kw. IDA
20	Reg. 2:01	1210 kc., KIUL, Garden City, Kansas, .1 kw. CDNR
	3-6	1500 kc., WOPI, Bristol, Tenn., .1 kw. CDNR
	5-5:30	1310 kc., KGEZ, Kalispell, Montana, .1 kw. RADIO NEWS
24	3-4	1270 kc., CMKC, Santiago, Cuba, .15 kw. NRC
26	1-3	922 kc., OKB, Brno, Czechoslovakia, 32 kw. IDA
27	Reg. 2:01	1210 kc., KIUL, Garden City, Kansas, .1 kw. IDA
28	11-6	900 kc., WJAX, Jacksonville, Fla., 1 kw. CDNR
29	1:15-1:45	986 kc., HGE, Genoa, Italy, 10 kw. IDA



LISTEN FOR THIS STATION NOVEMBER 20

KGEZ, Kalispell, Montana, 1310 kc., 100 watts, will broadcast a special DX program for RADIO NEWS listeners on the above date at 5-5:30 a.m., E.S.T. Their transmitter, shown above, was designed by Donald Gorman, KGEZ's chief engineer.

December		
1	1-2	1310 kc., CJL, Yarmouth, N. S., .1 kw.
	2-3	1040 kc., CP4, La Paz, Bolivia, 10 kw.; 2-2:15 IDA; 2:45-3 NNR
	2-4	890 kc., WAMN, Fairmont, W. Va., .5 kw. CDNR
2	1-2	832 kc., RW39, Moscow, U. S. S. R., 100 kw. IDA
4	3-5:10	1400 kc., WIRE, Indianapolis, Ind., .5 kw. NNR
	3-3:20	1370 kc., WDAS, Philadelphia, Pa., .1 kw. RADIO NEWS
8	2-3	1250 kc., CMKC, Santiago, Cuba, .15 kw. IDA
	2:30-4:30	1320 kc., KID, Idaho Fall, Idaho, .25 kw. NNR
	3-4	1370 kc., KPRO, Longview, Texas, .1 kw. NNR
10	4:30-5:30	1200 kc., CKNX, Wingham, Ontario, .05 kw. CDNR
11	Reg. 2:01	1210 kc., KIUL, Garden City, Kansas, .1 kw. CDNR
13	2-5	1320 kc., CMON, Havana, Cuba, .25 kw. NRC
14	4-5	630 kc., WHJB, Greensburg, Pa., .25 kw. CDNR
15	1-1:30	600 kc., WICC, Bridgeport, Conn., .5 kw. CDNR
	1-3:30	590 kc., WOW, Omaha, Neb., 1 kw. CDNR
	1-2	920 kc., KVOD, Denver, Colo., .5 kw. CDNR
	3-4	1500 kc., KDB, Santa Barbara, Calif., .1 kw. CDNR
	3-5	830 kc., WEEU, Reading, Pa., 1 kw. NRC
	4-5	630 kc., WGBF, Evansville, Ind., .5 kw. CDNR
	4-5	1310 kc., KVOI, Lafayette, La., .1 kw. CDNR
	5-6	1010 kc., CHML, Hamilton, Ontario, .05 kw. CDNR
	5-7	1310 kc., WTRC, Elkhart, Ind., .05 kw. CHRISTMAS PARTY

PERIODIC

Daily— 7:30 a.m. 1050 kc., KPBI, Abilene, Kansas.

L.P.O. BUIEKANT, NEW YORK
An active DX'er, Mr. Buiékant, in addition to being a RADIO NEWS Observer, is also first Vice-President of the Globe Circlers' DX Club. The receiver is a Majestic 10-tube super.



		5 kw. (tips)								
Tuesdays—	2:30-3 a.m.	900 kc., KSEI, Pocatello, Idaho, .25 kw.	Kc.	Call	1	2	3	4	5	6
Thursdays—	8 p.m.	1320 kc., WOKR, York, Pa., 1 kw. (NRC)	832	RW39		6				
	11-11:15 p.m.	1010 kc., CKCK, Regina, Sask., .5 kw. (tips)	840	CMQ						
Fridays—	8:45-9 p.m.	1530 kc., W9XBY, Kansas City, Mo., 1 kw. (tips)	850	JOFK						
	11-11:30 p.m.	980 kc., KDKA, Pittsburgh, Pa., 50 kw. (DX tips)	850	TIEP						
Saturdays—	3 p.m.	1360 kc., WQBC, Vicksburg, Miss., 1 kw. (tips)	870	JOAK-1						5
	3:30-3:45 p.m.	830 kc., WEEU, Reading, Pa., 1 kw. (tips)	870	LR6		*				
Sundays—	12:45-1 a.m.	1250 kc., WTCN, Minneapolis, Minn., 1 kw. (DX tips)	870	2GB	5					
	1 a.m.	640 kc., KFI, Los Angeles, Calif., 50 kw. (DX tips)	910	XENT		*	*	*		
	2 a.m.	730 kc., CICA, Edmonton, Alberta, 1 kw.	910	LR2		*				
	2-5 a.m.	1380 kc., CMBX, Havana, Cuba, .25 kw.	910	4RK	5					
			920	HHK		*	*	*		*
			932	PRF4		*	*	*		*
			940	CMBX		*	*	*		*
			950	LR3		*	*	*		*
			950	2UE	5					
			959	Poste Parisien	7					
			960	NIAW		*	*	*		4
			960	CMCD		*	*	*		*
			960	VHRC		*	*	*		*
			990	LR4		*	*	*		*
			990	XEK		*	*	*		*
			1010	3HA	5					
			1013	Midland Reg.	7					
			1020	2KV	7					
			1022	EAJ-15	7					
			1031	CTIGL	7					
			1050	CX26		*	*	*		*
			1050	2CA	5					
			1095	EAJ7	7	*				
			1110	2UW	5					
			1113	Radio-Normandie	7	*				
			1120	4BC	5					
			1140	11TO	7	*				
			1150	LR8		11				
			1175	JOCK-2						5
			1180	2CH	5					
			1180	3KZ	5					
			1190	LS2	*	*	*			
			1170	4TO	5					
			1195	Frankfurt	7	*				
			1200	VV3RC		*				
			1220	4AK	5					
			1230	LS8		*				
			1230	2NC	5					
			1240	WKAQ		*				
			1270	2SM	5					
			1270	LS9		*				
			1290	4BK	5					
			1380	4BH	5					
			1380	CMBX		*				
			1410	2KO	5					
			1460	7UV	5					

Consolidated Foreign "Best Bets"

Following is a list of the foreign stations being heard by Official Observers in different sections of the U. S. and Canada. Wherever either an asterisk (*) or a number appears in a column it indicates that the station has been heard in the section represented by that column. Where a number appears it represents the approximate local time when the station is heard. Heavy numbers represent p.m. and light numbers a.m. This list is made up from observers' reports as follows: Column 1 (New England)—Observers Hammond and Reichardt; Column 2 (New York, Ontario)—Observers Kentzel, Ling, Louis, and Tomlinson; Column 3 (Pennsylvania, Virginia)—Observers Rontzahn and Wilson; Column 4 (Mississippi)—Observer (Mrs.) Ledbetter; Column 5 (Minnesota)—Observer Johnson; Column 6 (West Coast)—Observers, Hunt, Hunter and Sholin.

The location and power of the European stations listed will be found in the European Call List elsewhere in this issue; of the TP's, in the Asiatic Call List published last month.

(Note: Official Observers and other readers are invited to send in a listing of foreign stations heard each month. In doing so it will facilitate matters if stations reported are made up in the form of a list giving the frequency, call, location and hour (your own local time) when best heard.)

Kc.	Call	1	2	3	4	5	6
574	Stuttgart	7					
590	NEPN		*				
630	3AR		*				
640	5CN	5	5				
650	1YA	5	*			6	5
670	2CO	5	5				
681	HJN		*				
720	3YA	5	*		*	6	5
730	SCL	5	*				
740	2BL	5	5				
750	KGU					*	
750	JOBK-1						5
750	7NT	5	5				
770	3LO	5	5				
770	JOHK					5	4
780	CKSO					*	
800	4QG	5	5			5	
830	LR5		*				
830	JOIK				*		4

F.C.C. Monitor Schedules

The complete schedule of monitor transmissions during the first week of each month was given in this department last month. Since that time government reports indicate only two changes, in the form of additions to the list, as follows:

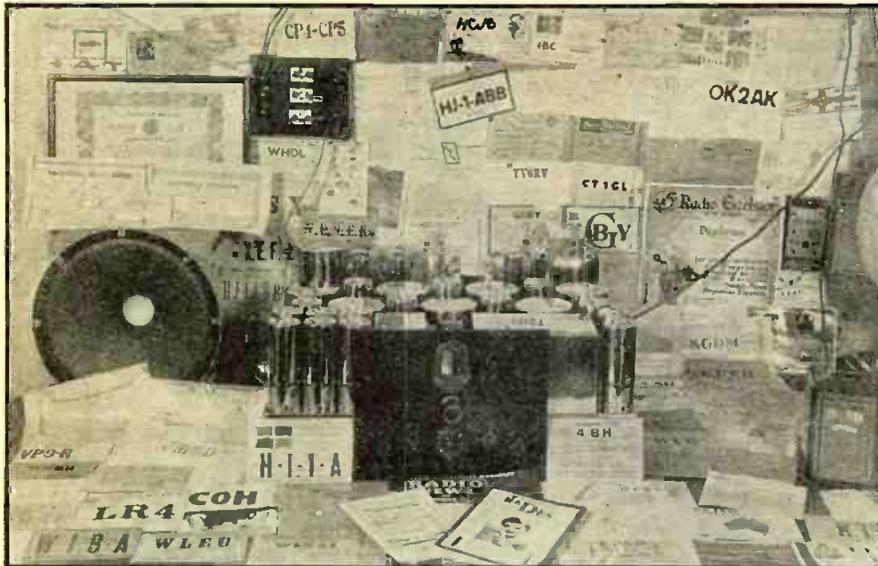
Monday, 5:10 5:30 a.m., WCAC, Storrs, Conn., 600 kc.
Wednesday, 5:50-6:10 a.m., KVOS, Ardmore, Oklahoma, 1210 kc.

DX Club Register

Space does not permit listing of all clubs but additional information has been received from two of them and is given herewith. Information on other leading DX clubs was given in the DX Corner of the October issue.

The Universal Radio DX Club, 2018 Green Street, San Francisco, California; Charles C. Norton, President. World-wide membership. Membership fee and dues \$1.00 for one year, including weekly bulletin.

The Plainfield DX Club, 431 Watching Avenue, Plainfield, New Jersey; Harold J. Clark, Secretary. Nation-wide membership but residents of any of the Plainfields of the United States particularly welcome. Initiation fee and



LISTENING POST OF ROBERT BASE, BALTIMORE

His 23-tube Scott All-Wave Imperial is shown, surrounded by a mass of verifications from stations heard by Mr. Base.

membership card 25c, annual dues 50c. Members receive DX tips bulletin, called the "Red Nite Owl." Official verification card forms on sale to members.
Additional information on either of these clubs may be obtained by addressing an inquiry to the editor of this department.

Correspondents Wanted

The following DX'ers would like to correspond with fellow DX'ers in the U. S. and Canada: Norman Keys, 2 Jean St., McKinnon S. E. 14, Victoria, Australia.
Charles E. Pellatt, 5 Brackley St., Golden Lane, London E. C. 1, England.

Interclub Cooperative "Plan"

For several years there has been a movement on foot to correlate the activities of the various DX clubs in arranging special DX broadcasts to avoid interference resulting when two independently arranged specials took place on the same frequency at the same time. Unfortunately these efforts were handicapped in previous years by the inability of the clubs to get together on a basis of mutual agreement and cooperation. This year, however, a plan has finally been worked out on which all of the important clubs could agree. As a result the Interclub Cooperative "Plan" is now in operation.

The following list of rules explain the activity quite thoroughly:

1. "The CPC Chairman of each club will send a weekly report to the "Clearing House" listing all DX'es definitely arranged, the notification to show call letters, frequency, location, date and Eastern Standard Time (frequency check dedications excepted)."
2. "The CPC Chairman of each club will receive a weekly report from the Clearing House, listing all DX programs and the club which arranged the program. It will be the duty of each CPC Chairman to advise his committee members not to arrange any DX'es that will clash with those already arranged."
3. "Each club agrees that under no circumstances will they make unfair use of the information supplied them by the Clearing House reports. This includes the agreement that no club will write to a station scheduled for a DX program for another club and ask to have a portion of that DX program dedicated to their club."
4. "Each club agrees that for all foreign DX'es they will do their utmost to give the foreign DX broadcast a clear frequency for the period of the DX, and if possible to also keep the adjacent frequencies clear. Cuban and Mexican programs will not be considered foreign."
5. "Each club agrees that it will not publish anything in its publication that will in any way be offensive to another club in the plan."
6. "Each club agrees that it will not use the publications of any other DX Club in the plan, to secure the names and addresses of members of other DX clubs and then write to them soliciting their membership."
7. "If the clearing house shall receive notice of two programs on the same frequency for the same period, the notice which shall have the earlier post mark shall receive priority—except foreign programs, which will be given priority in all cases. The clearing house shall immediately notify the sender of the conflicting program of the necessity of cancelling the conflicting broadcast."
8. "Each club agrees that it will not publish or publicize the DX programs arranged by another club without the permission or request of the president of that club. When permission is granted, clubs listing DX programs arranged by another club will give credit to the club that arranged for the DX. If any program is to be shared with another club, it shall be so listed and credited."

other club without the permission or request of the president of that club. When permission is granted, clubs listing DX programs arranged by another club will give credit to the club that arranged for the DX. If any program is to be shared with another club, it shall be so listed and credited."

The "Clearing House" referred to is operated by Miss Emily Griswold who, for the betterment of DX'ing, has volunteered for this service without compensation.
To date the organizations participating in the "plan" are: The Canadian DX Relay, Goderich, Ont.; Newark News Radio Club, Newark, N. J.; International DXers Alliance, Bloomington, Ill.; National Radio Club, York, Pa.; Globe Circles DX Club, Brooklyn, N. Y.; Universal Radio DX Club San Francisco, Calif.; Mid-Co DX Exchange, Wichita, Kansas. The Radio News Broadcast Band DX Corner has recently been added to this list and it is lending its wholehearted support to the "plan."

The "plan" has been functioning in full stride since early in September and to all appearances is meeting expectations in every respect. Thus the ideal for which many DX club executives have been striving for years has apparently been attained. Elwin H. Bullard, Chairman of the Courtesy Program Committee of the Canadian DX Relay, deserves unlimited credit for his untiring efforts towards the inception and organization of this activity. He has worked tirelessly towards this end and deserves a vote of thanks which is hereby heartily extended to him on behalf of all of the Radio News Official Listening Post Observers.

Should there be any other DX clubs who wish to become active participants in the "plan" it is suggested that they communicate with Mr. Bullard whose address is P. O. Box 170, Drummondville, Quebec. Mr. Bullard writes that all clubs not now in the "plan" but who are willing to subscribe to the 8 rules given above are cordially invited to apply for membership.

Our Readers Report—

Observer Hammond (Maine): "Not much luck with the TP's to date as static is still bad. 1YA heard but very weak. My log stands at 712 with 281 verified including several TP's, European and South American."

Observer Reichardt (Massachusetts): "On Sept. 11 I had PRF-4, on 923 kc. very good. Heard also YVIRC, LR-6, and LS-2. On Sept. 9th I tuned in 25 TP's (G-Good, F-Fair, and P-Poor) 5CK-G, 7NT-G, 2BL-G, 2GB-G, 3YA-P, 5CL-F, 3LO-F, 4QG-G, 4RK-G, 3HA-G, 2KV-F, 2CA-F, 4BC-G, 4TO-G, 2CH-G, 3KZ-F, 2UE-P, 2CO-P, 2UW-P, 2SM-F, 4BK-F, 4BH-G, and 2KO-G. 7UV also coming in. These are best 4:30 to 5:30 EST. Early in the evenings I have heard Fecamp, Frankfurt (on until 8 p.m. EST) also Stuttgart. EAJ-7, CT1GL, EAJ-15, PP, MR, and Turin. The best time is 6:15 to 7 p.m. EST on Saturday nights."

Observer Ling (Ontario): "1YA is the only TP coming through although several carriers have been heard."

Observer Lonis (New York) reports that the DX season opened up early in his location and that he has heard: 5CK, Sept. 8, 9, 10, 13; 1YA, Sept. 7, 9, 11, 12, 13, 14, 17; 2CO, Sept. 6, 7, 8, 9, 11, 12; 2BL, Sept. 7, 8, 9, 11; 7NT, Sept. 6, 8, 9, 17; 3LO, Sept. 6, 7, 8, 12, 13, 17; 4QG, Sept. 8, 9.

Observer Tomlinson (New York) reports 1YA, 5CL, 3YA, 3AR, and 7NT heard well enough for verification purposes, with 7NT coming in best of all. HHK, 921 kc., heard on Fri-

days. WKAQ, good volume, bad interference. Finds TA's coming through best from 6 to 7 p.m. EST and offers the following notes: Fecamp, 1113 kc., heard most every night, about R3. Bad QRM. Seems to run the IBC program each evening now. Frankfurt, 1195 kc. same. Between 6 and 7:30 p.m. announces in several different languages; German, English, and others can't make out yet. Best signal R4, Turin, 1140 kc. bad QRM but heard two evenings right after 6 p.m., with singing. Signal reaches RW at times, drowning out all others on 1140. RW39, 832 kc., quite sure this was the Russian. Logged enough for a verification 5 to 5:16 p.m. Time checks with his schedule. Signed off with lady doing announcing and the International by large orchestra, or recording. Also lists 14 South Americans which he receives best between 7:30 and 8:30, with LR3 good all evening. Observer Tomlinson inquires as to what Spanish speaking station on about 1095 kc. leaves the air at 7 p.m. He believes it to be EAJ7 but has not completely identified it. Can anyone help him on this?

Observer Routzahn (Pennsylvania): "Have just completed my version of the Radio News Tenatuner and believe me I was greatly surprised at the results I obtained on it. Stations which have been very weak, come in nearly like locals. I heard a few ball games with it that I would not have heard otherwise and I hope it does the same thing in bringing in DX stations later in the season."

Observer Wilson (Virginia) has been hearing a station in the background of WBT on 1080 kc. They seem to go off the air at 7 p.m. and speak a foreign language which is not Spanish. Thinks it may be Bordeaux and asks for dope from other listeners.

Observer (Mrs.) Ledbetter (Mississippi): Although September static ran high reports 1YA nearly every morning she tried for it. 4QG heard September 8th at 5:29 a.m. Is also hearing 3YA and heard 2BL (on its old frequency, prior to Sept. 1st). Japs heard are JOHK (5:07 a.m.), JOIK, JOFK and JOAK-1. She says further: "Reception here is not usually good before October 1st. August reception of the TP's was a surprise to me."

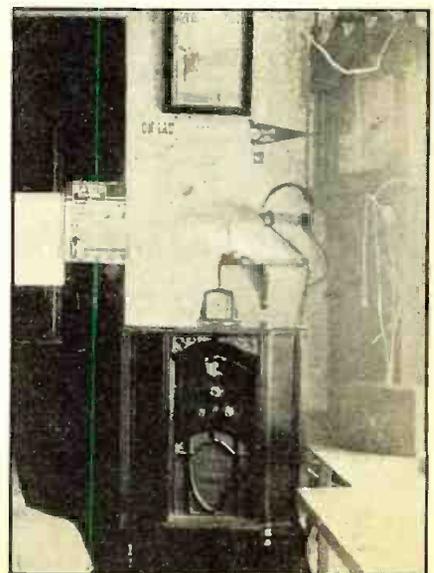
Observer Johnson (Minnesota): "I have just erected a new cage antenna 48' in length, 4 wires (enamed) of 7 strands each, 35' high. The improvement in signal strength is very welcome, and with the Tenatuner just made, I hope to get some very good DX this year. 3YA puts in a signal almost equal to 1YA in strength. I heard 1YA sign off one morning at 6:30 a.m. EST, and 3YA 8 minutes later (Sept. 13)."

Observer Sholin (California): "The weather at present (September) is still quite warm. JOHK, 770 kc. is the best Jap at present, being R6 at 4 a.m. PST. JOIK, 830 kc. is R5 at 4 a.m. PST. All other 10 kw. Japs are heard but with poor volume. They are best heard as they sign off between 4:30 and 5 a.m. PST. The NZ and Australian stations are weak but are heard best at 2-3 a.m. PST."

Observer Hunter (Oregon): "The TP's are coming in best at about 5 a.m. EST, the best ones being 1YA, 3YA, JOAK-1, JOBK-1, JOCK-2, JOHK and JOIK. Heard the WIRE broadcast for Radio News Sept. 4th and sent them a report. Have now logged 464 stations, (Turn to page 365)

OBSERVER LONIS' LISTENING POST

With his 7-tube Philco L.P.O. Lonis, Hannibal, N. Y., has chalked up numerous foreign catches including South American, European, Hawaiian, Australia and New Zealand stations.



Testing the Taylor-Cockaday "Ocean Hopper"

By John H. Potts

Part Two

IN presenting the description of the "Ocean Hopper" receiver last month the statement was made Japanese and Australian stations were successfully tuned in during the very brief preliminary tests of the completed receiver. Since that time additional tests have been conducted at the Fairfield and Westchester Listening Posts, resulting in an enviable log presented here. It may be well to point out that these tests were made mostly in the daytime and that every station listed was positively identified. Because of the tests being largely limited to daylight the best results were, of course, shown on the higher frequencies. However, enough 49 meter stations were tuned in during brief evening operation to show conclusively that the effectiveness of the receiver extends throughout its entire range. The stations logged are listed at the end of this article.

Also a Good Ham Set

Just to show that the utility of the "Ocean Hopper" is not limited to short-wave broadcast reception a little time was spent tuning in 20 meter amateur phone stations, among which were the following west-coast and foreign stations, TI2AV, HP1A, TI3AV, W6BUT Portable, HP1XE, TI2RC, W6CQG, W6CAM, W6CEP, XIG, XIQ, X1HH, HC1FG, VP5PZ, VE4CW, VE3GS, VO1I, G6XR, LU6AP, G6GO, F8DR, VE4HD, VE5EH, W6LGD, PY1CK, G5ML, HH5PA, VP9R, VE2BA, VE3GS and W7CGR.

In the article last month it was stated that the designers of this receiver had as their primary object the development of a receiver which would insure loud-speaker reception from all parts of the world. The following lists leave little doubt concerning attainment of this desire because all reception during the

testing of this receiver was on the loudspeaker.

The receiver as it stands provides an excellent signal-to-noise ratio. In noisy locations, however, it is sometimes necessary to do everything possible to reduce noise to a minimum and for that reason it was decided to add a simple tone control. The method for connecting this into the circuit is indicated in Figure 1. It consists of an Electrad, Type 997 variable resistance of 40,000 ohms and a .02 mfd. condenser which replaces condenser C8 of the original



"ON THE AIR" TESTS

William C. Dorf at the controls in the Westchester Listening Post. The receiver lived up to its name magnificently, spanning oceans in all directions.

BLUEPRINTS

RADIO NEWS "Ocean Hopper" blueprints are available for 50 cents per set and include full-size chassis layout drawings, full-size picture wiring diagram, etc. Order direct from: RADIO NEWS, Blueprint Dept., 461 Eighth Avenue, New York City.

circuit. The variable resistor may be mounted in the unused hole provided on the front of the original chassis. If the constructor's location is a reasonably quiet one the tone control will not be needed but where the receiver is to be operated under conditions of high local noise this addition will be advantageous.

Any type of antenna may be used effectively. The antenna coil primary is isolated from the chassis. If an L type antenna is used, the method of hooking up is shown in figure 2 (a). The middle antenna post is joined to the ground post and to the ground connection. A doublet antenna is connected as shown

in figure 2(b). The manufacturer's recommendations should be carefully followed in all doublet installations, particularly as to the grounding of the electrostatic shield which is used in many types of doublet transformers.

During the coming month steps will be taken to provide headphone connections and perhaps other refinements. This work should be completed in time to permit publication of the dope in the next issue of RADIO NEWS.

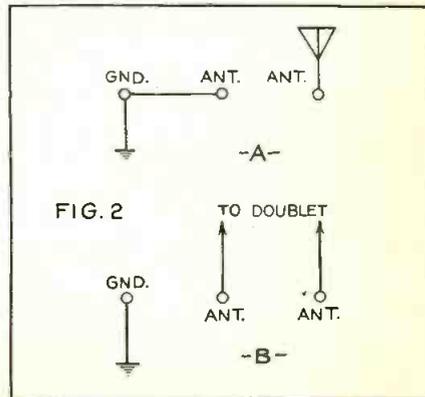
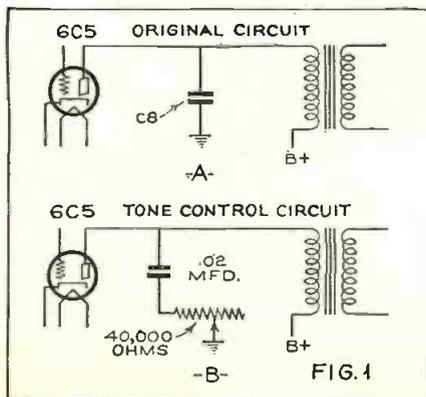
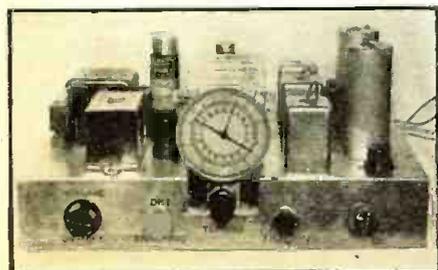
Log of the Ocean Hopper

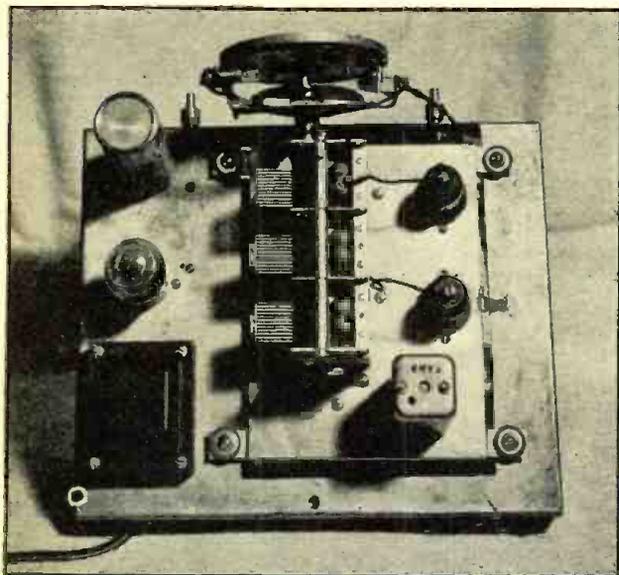
Wave-length Meters	Call Letters	Frequency Kc.	City Country
19.5	W2XAD	15330	Schenectady, N. Y.
19.6+	DJQ	15280	Zeesen, Germany
19.6+	GSI	15260	Daventry, England
19.6+	FYA	15245	Pontoise, France
19.7	PCJ	15220	Huizen, Holland
19.7	W8XK	15210	Pittsburgh, Pa.
19.7	DJB	15200	Zeesen, Germany
19.8	GSF	15140	Daventry, England
19.8	HVJ	15123	Vatican City
19.9+	RKI	15040	Moscow, U.S.S.R.
21.2+	HJ5ABE	14110	Cali, Colombia
22.7+	ORP	13200	Ruyselede, Belg.
24.9+	RV59	12000	Moscow, U.S.S.R.
25.2	FYA	11890	Pontoise, France
25.2+	W8XK	11870	Pittsburgh, Pa.
25.3+	W2XE	11830	New York, N. Y.
25.3+	I2RO	11810	Rome, Italy
25.4+	DJD	11770	Zeesen, Germany
25.5+	GSD	11750	Daventry, England
25.5+	CJRX	11720	Winnipeg, Canada
25.6+	HJ4ABA	11710	Medellin, Col.
27.2+	PLP	11000	Bandoeng, Java
27.9+	JVM	10740	Nazaki, Japan
28.1+	JVN	10660	Nazaki, Japan
29.0+	ORK	10330	Ruyselede, Belgium
30.4+	EAQ	9860	Madrid, Spain
31.2+	CT1AA	9600	Lisbon, Portugal
31.2	HBL	9595	Geneva, Switzerland
31.2+	HP5J	9590	Panama City, Pana.

(Turn to page 365)

ADDING A TONE CONTROL

At the right end of the front chassis wall is the tone control, mounted in a hole which was unused in the original receiver.





DEDICATED TO R. N. OFFICIAL

The P.C.A.

(Preselector-Converter)

It is seldom that short-wave and broadcast reliable unit that will bring them the band reception including more than selectivity. This unit is, therefore, not only that insures good distance reception when

EASY TO CONSTRUCT

Notice the simple layout, which consists mostly of the P.C.A. unit that may be obtained all wired-up. About the only wiring the constructor has to do is for the three components for the power supply, at the left.

By

L. M. Cockaday

H. J. Benner

Glenn H. Browning

EARLY in 1935 the writers were discussing converters and the observation was made that a converter could be designed which, when connected to a broadcast receiver, might cover broadcast as well as the short-wave bands, but at first the feasibility of such a design did not look very promising. However, experimental facts bore out the contention that this type of device was entirely possible and final checks showed the idea was a "natural."

IN the design of this preselector-converter-amplifier, the shortcomings of the ordinary converter of a year or so ago were clearly kept in mind. Consequently, the design to be described consists of a sharply-tuned antenna circuit and one stage of radio-frequency amplification before the converter tube. Thus, inherently amplification as well as selectivity and image

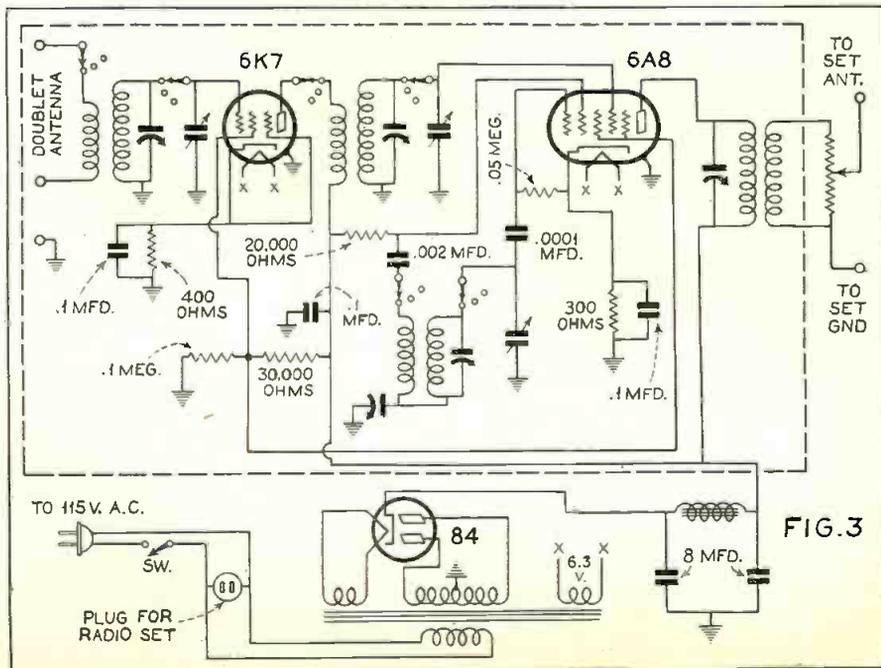
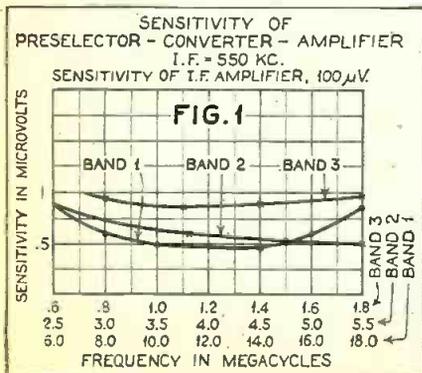
suppression is obtained in this apparatus itself.

The P.C.A. "Observer" (preselector-converter-amplifier) is a complete unit in itself and is designed primarily to be placed some distance from the radio receiver to which it is connected, although of course this is not essential. In fact, the writers had in mind that it would be convenient to have a tuning device located by one's easy chair which would have complete control of the DX radio programs being received, that is, the operator may tune in distant stations on either broadcast or short-wave bands and have at his control the intensity of the output signal as well as the "on-and-off" switch. Here's DXing with Comfort!

1 Microvolt Sensitivity

The broadcast receiver to which the Observer is attached acts really as an i.f. amplifier, second detector, and audio amplifier. A specially-designed transformer connects the output of the Ob-

server directly to the antenna-ground system of the broadcast receiver. Practically all receivers will tune to a frequency of 550 kilocycles. Consequently, this was chosen as the intermediate frequency that would be most suitable, for it was found under those conditions that the Observer would tune throughout the broadcast band up to about 560 kilocycles or within about 10 kilocycles of the intermediate frequency. The Observer operates satisfactorily with any radio receiver whether it be a t.r.f. set or a superheterodyne. In fact, the writers have used it successfully with one of the pocket-type International receivers whose sensitivity is several hundred microvolts and obtained very excellent foreign reception. When the Observer is used with a broadcast receiver the sensitivity of which is adjusted to about 800 microvolts, the overall sensitivity provided is 5 microvolts (or better) all over the tuning range of the Observer, while if the sensitivity of the radio receiver is adjusted



S. W. AND B. B. L. P. OBSERVERS

“Observer”

and Amplifier)

band listeners can buy an efficient and “utmost” on both shortwave and broadcast sufficient sensitivity and over-abundant the first all-wave unit of its type but one used with even mediocre receiving sets.



LISTENING FOR WAR NEWS

Glenn Browning, at left, and your editor using the Observer for checking up war news transmissions from Libya, Eritrea, and Ethiopia.

to 100 microvolts the Observer provides an overall sensitivity, for the bands covered, of about 1 microvolt. This latter sensitivity is usually greater than can be used except under favorable atmospheric conditions.

Only One of Its Kind

As indicated before, the P. C. A. Observer may be located some distance away from the broadcast receiver. A socket connection for plugging in the broadcast receiver is provided in the rear of the chassis so that the “off-and-on” switch will control both units. The only other connection between the two units is a lead which carries the intermediate-frequency currents from the transformer output to the antenna post of the broadcast receiver. This does not have to be shielded except in the case where a local station has a broadcast frequency near 550 kilocycles. In such a case shielding is necessary so that broadcast stations will not be picked up on the lead between the re-

ceiver and the Observer. Generally it is not necessary to ground the two units together, as the lighting circuit performs this operation satisfactorily. In all cases, however, it is advisable to determine whether or not a direct ground connection between the two is necessary. If there is any hum in reception, reversing the A. C. plug will remedy it.

The Observer covers a frequency range from .56 to 18 megacycles in three bands. Band No. 1 has a range from 5.6 to 18 mc.; band 2 from 1.7 to 5.7 mc.; and band 3 from .56 to 1.84 mc. The three sets of three coils each

are placed in a tuning catacomb with shields separating the antenna, r.f., and oscillator coils. Coil-switching is employed and the switch blades are mounted in the same catacomb as the coils. The switching is so arranged that all coils in the tuning catacomb, not being employed in the circuit, are automatically short- (Turn to page 380)

New

ALL-WAVE TUNER

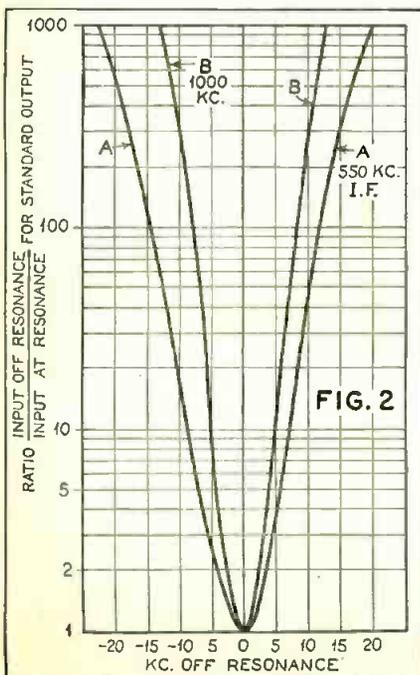
(Wilco Model 600)

By Richard Feeney



LOGGING S.W. STATIONS

An official Observer at the Westchester Listening Post tries out the new unit for DX short-wave reception.



IN this new all-wave 6-tube super-heterodyne tuner there is an excellent opportunity for servicemen and radio dealers to multiply their profits in modernizing obsolete radio sets or by adapting it as a complete up-to-date tuning unit for all manner of public-address systems.

There are thousands upon thousands of old sets whose owners hold on to them for one or more reasons, perhaps chiefly because the cabinet is made from beautifully finished woods and its period design was selected to harmonize with their particular decorative scheme. Also, owners of 6- or 7-year-old sets contend with poor selectivity and sensitivity and other drawbacks of the tuning circuit, because their audio amplifier system, using such power tubes as the 45 and 50 types is capable of providing enjoyable quality of reproduc-

tion. It would appear certain that such owners would be glad to know that they can still retain their cabinets and present audio amplifiers and by the addition of this new tuner be able to bring their receiving equipment up-to-date with short-wave tuning ranges to receive foreign reception. There are any number of sound reproducing systems employing antiquated r.f. tuners and many that are without any tuner at all, both of which should provide fertile fields for this new compact easy-to-install tuning unit. (Turn to page 369)

EVERYTHING IN RADIO

1936

• RADIO'S LEADING SUPPLY GUIDE •

Radio

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WORLD-WIDE SETS

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TESTING EQUIPMENT

LABORATORY EQUIPMENT

AMATEUR EQUIPMENT

EXPERIMENTERS' PARTS

S. W. APPARATUS

SET-BUILDERS' KITS

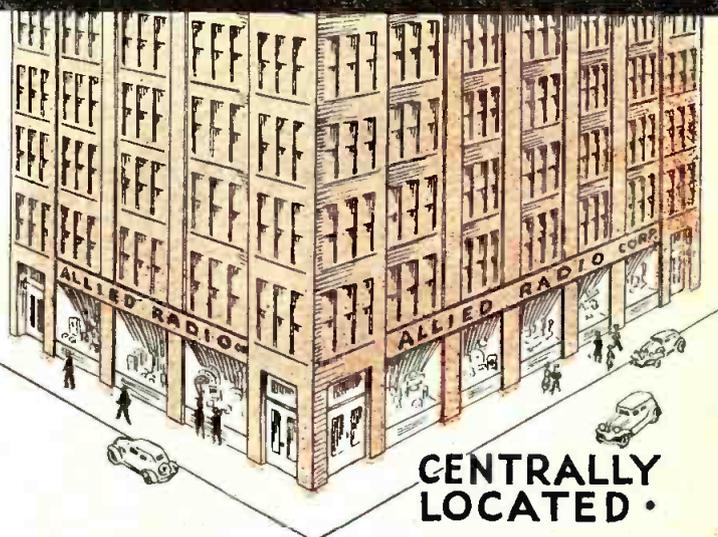
PUBLIC ADDRESS

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HP5B PANAMA CITY, CANAL ZONE

Here is a reproduction of a photograph of station HP5B, the Club Miramar, taken by O.L.P. Foshay, on his recent South American trip.

THE thirty-third installment of the DX Corner for Short Waves contains the World Short-Wave Time-Table for 24-hour use all over the world.

Affiliated DX Clubs

We are hereby placing a standing invitation to reliable DX Clubs to become affiliated with the DX Corner as

Associate Members, acting as advisers on short-wave activities, in promoting short-wave popularity and reception efficiency. A list of associate organizations follows: International DX'ers Alliance, President, Charles A. Morrison; Newark News Radio Club, A. W. Oppel, Executive Secretary; Society of Wireless Pioneers, M.

The DX

for the

Conducted by

Laurence

Mickelson, Vice-President; U. S. Radio DX Club, Geo. E. Deering, Jr., President; the Radio Club Venezolano, Venezuela, President, R. V. Ortega; The World-wide Dial Club, President, Howard A. Olson; International 6000-to 12,500-Mile Short-Wave Club, Oliver Amlic, President, Joseph H. Miller, Vice-President; Globe Circlers DX Club, W. H. Wheatley, President; Radio Fellowship, M. H. Ryder, Chairman; Short Wave Club of New York, H. C. Lange, President.

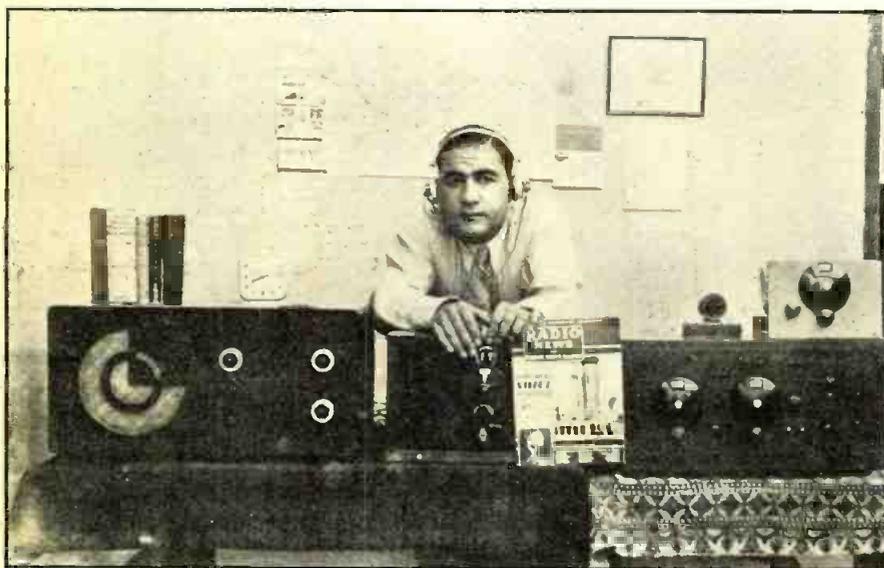
Any DX fan wishing to join any one of these Clubs or Associations may write for information to the Short-Wave DX Editor, and his letter will be sent to the organization in question. Other Clubs who wish to become affiliated should make their application to the Short-Wave DX Editor. Clubs associated with the DX Corner have the privilege of sending in Club Notes for publication in RADIO NEWS.

Your DX Logs Welcome

Please keep on sending in your information on any S.W. stations that you hear during the coming month, getting them in to the short-wave DX Editor by the 20th of the month. In this way you share your

AN OBSERVER IN BAGDAD

Official Radio News Short-Wave Listening Post Observer Hagop Kouyoumdjian of Bagdad, Iraq, a faithful reporter.



THE WORLD'S ORIGINAL ORGANIZATION OF

S.W. PIONEERS

Official RADIO NEWS Listening Post Observers

LISTED below by states are the Official Radio News Short-Wave Listening Post Observers who are serving conscientiously in logging stations for the DX Corner.

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Alabama, J. E. Brooks, L. T. Lee, Jr., William D. Owens; Alaska, Thomas A. Pugh; Arizona, Geo. Pasquale; Arkansas, James G. Moore, Don Pryor; Calif. A. Wilkinson; California, Eugene S. Allen, A. E. Berger, C. H. Canning, Earl G. DeHaven, G. C. Gallagher, Werner Howard, Wesley W. Loudon, Robert J. McMahon, Oriente I. Noda, Jr., Geo. C. Sholin, James E. Moore, Jr., Phil E. Lockwood, Hank G. Wedel, H. H. Parker, Fred A. Pilgrim, Douglas S. Catchum, Frank C. Andrews, Fred M. Craft, Radio Fellowship; Colorado, Wm. J. Vette; Connecticut, H. Kemp, Geo. A. Smith, Philip Swanson, J. Herbert Hyde; District of Columbia, Phillip R. Belt; Florida, James F. Dechart, George H. Fletcher, E. M. Law; Georgia, C. H. Armstrong, Guy R. Bigbee, James L. Davis, John McCarley, R. W. Wintree; Idaho, Bernard Starr, Lawrence Swenson; Illinois, E. Bergeman, Larry Eisler, Robert Irving, Charles A. Morrison, Phillip Simmons, Samuel Tolpin, Ray A.

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Wm. C. Dorf, Capt. Horace L. Hall, Robert F. Kaiser, John C. Kalmbach, Jr., J. H. Kattel, W. B. Kinzel, Wm. Koehnlein, T. J. Knapp, A. J. Leonhardt, Joseph M. Malast, S. Gordon Taylor, Edmore McLanson, Joseph H. Miller, R. Wright, Harry E. Kentzel, Howard T. Neupert, A. C. Doty, Jr., Thaddeus Graber, Ken L. Sargent, Robert J. Flynn; North Carolina, W. C. Couch, E. Payson Mallard, H. O. Murdoch, Jr.; North Dakota, Bill Bundlie; Ohio, Paul Burns, Charles Dooley, Stan Elcheshen, Albert E. Emerson, Samuel J. Emerson, R. W. Evans, Clarence D. Hall, William Oker, Donald W. Shields, C. H. Skatzes, Carl P. Peters, Orval Dickes, Edw. DeLaet, M. L. Gavin, Charles W. Krier; Oklahoma, H. L. Pribble, Robert Woods, W. H. Boatman; Oregon, Harold H. Flick, Geo. R. Johnson, James Haley, Ernest R. Remstert, Ned Smith, Virgil C. Tramp; Pennsylvania, Oliver Amlic, Harold W. Bower, Roy L. Christoph, R. O. Lamb, John Leiminger, Geo. Lilley, Edward C. Lips, Chas. Nick, Hen. F. Polm, C. T. Sheaks, K. A. Staats, F. L. Stutzinger, Walter W. Winand, J. B. Canfield, Charles B. Marshall, Jr., S. G. De Marco; Puerto Rico, Manuel F. Betances, A. N. Lightbourn; Rhode Island, Carl Schradieck, Joseph V. Trzuskowski; South Carolina, Edward Bahan, Ben F. Goodlett; South Dakota, Paul J. Mraz; Tennessee, Chas. D. Moss, Eugene T. Musser, Darrell Barnes; Territory of Hawaii, O. F. Sterneman, A.

Corner SHORT WAVES

M. Cockaday

"Best Catches" with other readers and they, in turn, share with you, making for improved knowledge on short-wave reception. Also send in any corrections or additions that you can make to the short-wave identification charts, including station addresses, station slogans, station announcements, and any identifying signals the stations may have.

To save a lot of wasted effort for our editors it would be best if our Observers use a standard form for their reports of new stations or station changes. We have found a system of paragraphs, in exactly the following procedure, most convenient:

"JVH, Nazaki, Japan, 20.5 meters, 14,600 kc., daily 12 m. to 1 a.m., EST, irregularly testing 3 p.m. EST."

In other words, use one paragraph to an item and also indicate whether data was from a veri, an announcement or other source.

HAS HEARD ALL CONTINENTS

Imagine yourself dropping-in to visit Pierre A. Portmann, soon to be appointed an Official Short-Wave Observer for RADIO NEWS. You would see a raft of verification cards, from 44 countries, grouped around a business-like DX Corner. The receiver at the left is a National a.c., SW3 and the other is a 3-tube set he built himself. At the lower right is a power unit for supplying both receivers.

Let Our Organization Members Vote on the Following!

When the DX Corner for Short Waves first started it was the idea to try to have our figures of wavelength and frequency as accurate as possible. The conversion figures for these two important identifications depend upon the speed or the velocity of light. We, therefore, decided to use the latest and most accurately determined velocity and we obtained these figures from

the Bureau of Standards, at Washington, and converted all figures to wavelength, using them. It is unfortunate, however, that station "frequencies" are allocated and the "legal" speed used in these allocations is still 300,000,000 meters per second, rather than the more accurate figure. This has given our time-table a slightly lower wavelength for all stations than those specified in the government lists. Your editor actually believes (for the sake
(Turn to page 354)



"LA VOZ DE LOS LABORATORIOS"

Morgan Foshay, left, visits HJLABE. Next to him, left to right, are: R. Troncoso (Spanish announcer), A. Feuntes, A. Basmagi, R. Feuntes and F. C. Longano.



SHORT-WAVE LISTENING POST OBSERVERS

Fabius; Texas. James Brown, Heinie Johnson, Carl Scherz, Bryan Scott, James W. Sheppard, John Steward, Overton Wilson; Utah. Earl Larson, Harold D. Nordeen, A. D. Ross; Vermont. Eddie H. Davenport, Jos. M. Kelley, Dr. Alan E. Smith, John Eagan; Virginia. G. Hampton Allison, L. P. Morgan, D. W. Parsons, Gordon L. Rich, Gaines Hughes, Jr., E. L. Myers; Washington. Glenn E. Dulbe, A. D. Golden, Charles G. Payne, J. W. Partner; West Virginia. Kenneth R. Boord, R. E. Sumner, Fred C. Lowe, Jr.; Wisconsin. Willard Hardell, Walter A. Jasiorowski; Wyoming. L. M. Jensen, Dr. F. C. Naegeli, Eric Butcher

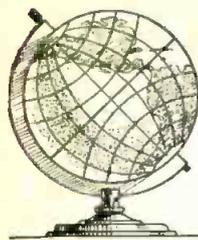
S.W. PIONEERS

Official RADIO NEWS Listening Post Observers

LISTED below by countries are the Official RADIO NEWS Short-Wave Listening Post Observers who are serving conscientiously in logging stations for the DX Corner.
Argentina. J. F. Edbrooke, Santiago E. Roulier.
Australia. Albert E. Faull, A. H. Garth, H. Arthur Matthews, C. N. H. Richardson, R. H. Tucker, Harold E. Lower.
Belgium. Rene Aricks.
Bermuda. Thursten Clarke.
Brazil. W. W. Enete, Louis Rogers Gray.

British Guiana. E. S. Christiani, Jr.
British West Indies. E. G. Derrick, Edela Rosa, N. Hood-Daniel, Aubrey H. Forbes.
Canada. I. T. Atkinson, A. B. Baadsgaard, Jack Bews, Robert Edkins, W. H. Fraser, Fred C. Hickson, C. Holmes, John E. Moore, Charles E. Roy, Douglas Wood, Claude A. Dulmage, A. Belanger, Robert B. Hammersley.
Canal Zone. Bertram Baker.
Canary Islands. Manuel Davin.
Central America. R. Wilder Tatum.
Chile. Jorge Izquierdo.
China. Baron Von Huene.
Colombia. J. D. Love, Italo Amore.
Cuba. Frank H. Kydd, Dr. Evelio Villar.
Czechoslovakia. Ferry Friedl.
Denmark. Hans W. Priwin, Hilbert Jensen.
Dominican Republic. Jose Perez.
Dutch East Indies. E. M. O. Godee, A. den Breems, J. H. A. Hardeman.
Dutch West Indies. R. J. van Ommeren.
England. N. C. Smith, H. O. Graham, Alan Barber, Donald Burns, Leslie H. Colburn, Frederick W. Cable, C. L. Davies, Frederick W. Gunn, R. S. Houghton, W. P. Kempster, R. Lawton, John J. Maling, Norman Nattall, L. H. Plunkett-Checkemian, Harold J. Seli, R. Stevens, L. C. Styles, C. L. Wright, John Gordon Hampshire, J. Douglas Buckley, C. K. McConnon, Douglas Thwaites, J. Rowson, A. J. Webb.
France. J. C. Meillon, Jr., Alfred Quagliano.
Germany. Herbert Lennartz, Theodor B.

Stark.
India. D. R. D. Wadia, A. H. Dalal, Terry A. Adams, Harry J. Dent.
Irish Free State. Ron. C. Bradley.
Iraq. Hagop Kouyoumdjian.
Italy. A. Passini, Dr. Guglielmo Tixy.
Japan. Masall Satow, Tomonobu Masuda.
Malta. Edgar J. Vassallo.
Mexico. Felipe L. Saldana, Manuel Ortiz Gomez.
New Zealand. Dr. G. Campbell Macdiarmid, Kenneth H. Moffatt.
Newfoundland. Frank Nosworthy.
Norway. Per Torp.
Palestine. W. E. Frost.
Panama. Albert Palacio.
Peru. Ramon Masias.
Philippine Islands. Victorino Leonen, Johnny Torres.
Portugal. Jose Fernandes Patrae, Jr.
Scotland. Duncan T. Donaldson.
South Africa. Mike Kruger, A. C. Lyell, H. Mallet-Veale, C. McCormick.
Spain. Jose Ma. Maranges.
Straits Settlements. C. R. Devaraj.
Sweden. B. Scheierman.
Switzerland. Dr. Max Hausdorff, Ed. J. DeLopez.
Turkey. Herman Freiss, M. Seyfeddin, A. K. Onder.
Venezuela. Francisco Fossa Anderson.
Applications for Official Observers in the remaining countries should be sent in immediately to the DX Corner.



WORLD SHORT WAVE TIME-TABLE



(Continued from the Previous Page)

Hours of transmission for the World's Short Wave Broadcast Stations

FILL IN LOCAL TIME												EASTERN STANDARD TIME												GREENWICH MEAN TIME																							
8	9	10	11	M	1	2	3	4	5	6	7	8	9	10	11	N	1	2	3	4	5	6	7	13	14	15	16	17	18	19	20	21	22	23	00												
01	02	03	04	05	06	07	08	09	10	11	12																																				
HOURS OF TRANSMISSION												HOURS OF TRANSMISSION												HOURS OF TRANSMISSION																							
<i>(Grid with transmission symbols for Eastern Standard Time)</i>												<i>(Grid with transmission symbols for Eastern Standard Time)</i>												<i>(Grid with transmission symbols for Eastern Standard Time)</i>																							
<i>(Grid with transmission symbols for Greenwich Mean Time)</i>												<i>(Grid with transmission symbols for Greenwich Mean Time)</i>												<i>(Grid with transmission symbols for Greenwich Mean Time)</i>																							
Wave-length Meters												Call Letters												Frequency Kc.												City Country											
47.0												YV4RC												6375												Caracas, Venez.											
47.4+												HIZ												6315												San Domingo, D. R.											
47.5+												VUC												6300												Calcutta, India											
48.1+												OAX4G												6230												Lima, Peru											
48.1+												HJ1ABH												6225												Cienaga, Colombia											
48.4+												H11A												6188												Santiago de Los Caballeros, D. R.											
48.5+												HJ3ABF												6180												Bogota, Colombia											
48.7+												CJRO												6150												Winnipeg, Manitoba											
48.7+												HJ2ABA												6150												Tunja, Colombia											
48.7+												YV3RC												6150												Caracas, Venezuela											
48.7+												HJ5ABC												6150												Cali, Colombia											
48.7+												CO9GC												6150												Santiago, Cuba											
48.8+												W8NK												6140												Pittsburgh, Pa.											
48.8+												CR7AA												6135												Lourenzo Marques, Mozambique											
48.9												ZGE												6132												Kuala Lumpur, F. M. S.											
48.9+												COCD												6130												Havana, Cuba											
48.9+												CT1GO												6130												Paredo, Portugal											
49.0+												W2NE												6120												New York, N. Y.											
49.0+												HRP1												6115												San Pedro Sula, Honduras											
49.0+												HJ1ABE												6115												Cartagena, Col.											
49.0+												VE9HX												6110												Halifax, N. S.											
49.0+												GSL												6110												Daventry, England											
49.1+												W3XAL												6100												Bound Brook, N. J.											
49.1+												W9XF												6100												Chicago, Ill.											
49.1+												HJ4ABB												6100												Manizales, Col.											
49.1+												ZTJ (JB)												6098												Johannesburg, Africa											
49.1+												CRCX												6090												Toronto, Can.											
49.3+												CP5												6080												La Paz, Bolivia											
49.3+												W9XAA												6080												Chicago, Ill.											
49.3+												ZJH												6080												Penang, S. S.											
49.3+												CQN												6073												Macao, Asia											
49.3+												OER2												6072												Vienna, Austria											
49.3+												HH2S												6070												Port au Prince, Haiti											
49.3+												VE9CS												6070												Vancouver, B. C.											
49.4+												HJ4ABL												6065												Manizales, Col.											
49.4+												VQ7LO												6060												Nairobi, Kenya, Afr.											
49.4+												W8XAL												6060												Cincinnati, Ohio											
49.4+												W3XAU												6060												Philadelphia, Pa.											
49.4+												OXY												6060												Skamlebaek, Den.											
49.5+												GSA												6050												Daventry, England											
49.6												HJ3ABI												6045												Bogota, Colombia											
49.6+												HJ1ARG												6042												Barranquilla, Col.											
49.6+												W1XAL												6040												Boston, Mass.											
49.6+												W4XB												6040												Miami, Fla.											
49.6+												PRAR												6040												Pernambuco, Brazil											
49.7+												HP5B												6030												Panama City, Pan.											
49.7+												VE9CA												6030												Calgary, Alberta, Can.											
49.8												DJC												6020												Zeeseen, Germany											
49.8+												ZHI												6018												Singapore, Malaya											
49.8+												HJ3ABH												6012												Bogota, Col.											
49.8+												COCO												6010												Havana, Cuba											
49.9+												HJ1ARJ												6006												Santa Marta, Col.											
49.9+												VE9DN												6005												Montreal, Canada											
49.9+												XERT												6000												Mexico City, Mex.											
50.1+												HIX												5985												San Domingo, D. R.											
50.1+												XECW												5975												Xantocam, Mexico											
50.2+												HVJ												5969												Vatican City											
50.5+												HJ1ABE												5930												Medellin, Colombia											
50.8+												HJ2ABC												5900												Cucuta, Colombia											
50.9+												VY8RV												5880												Barquisimeto, Ven.											
51.2+												VY5RMO												5850												Maracaibo, Ven.											
51.6												VY7RMO												5810												Maracay, Ven.											
51.6+												VY2RC												5800												Caracas, Ven.											
51.8+												OAX4D												5780												Lima, Peru											
52.4+												VY10RSC												5720												San Cristobal, Ven.											
70.2												RV15												4273												Khabarovsk, Siberia											
79.5+												HB9B												3770												Basle, Switzerland											
79.9+												CT1CT												3750												Lisbon, Portugal											

List of Symbols

- A—Thursday, Sunday
- B—Sunday, Monday, Wednesday, Friday
- C—Monday, Wednesday, Friday
- D—Daily
- E—Tuesday, Thursday
- G—Tuesday, Thursday, Saturday
- I—Irregularly
- K—Monday, Friday
- L—Wednesday, Saturday
- N—Monday, Wednesday, Thursday
- O—Monday, Tuesday, Wednesday, Friday
- P—Except Tuesday, Wednesday
- R—Thursday, Friday, Saturday

- S—Sunday
- T—Tuesday
- Th—Thursday
- V—Sunday, Wednesday
- NTh—Except Thursday
- Z—Tuesday, Friday
- AB—Tuesday, Wednesday, Friday, Saturday
- AC—Monday, Thursday, Saturday
- AD—Monday, Thursday, Friday
- AE—Tuesday, Friday, Sunday
- AF—Saturday, Sunday
- AG—Tuesday, Sunday

- AH—Monday, Wednesday, Saturday
- AL—Except Monday, Sunday
- AM—Monday, Thursday
- AN—Tuesday, Saturday
- M—Monday
- Sa—Saturday
- XA—Except Saturday, Sunday
- XM—Except Monday
- NR—Except Thursday, Saturday
- XS—Except Sunday
- XSa—Except Saturday
- XX—Tuesday, Thursday, Friday
- XY—Except Tuesday, Sunday



The DX Corner (Short Waves)

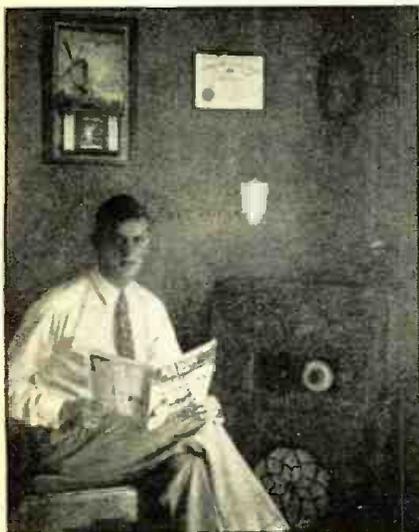
(Continued from page 351)

of standardization) it would be better to change back to "legal" frequency rather than for the latest technical accuracy. Will our Listening Post Observers kindly, in their next report, vote on making the change (say yes) and on leaving it the way it is now (say no). This will allow us to start out the new year in accordance with our members' wishes.

Another important matter comes up, as this is the last issue of the year 1935. Since November 1st we have received many applications for new member Listening Post Observers. Rather than send the old 1935 appointments for a matter of two months, these will be issued as of 1936 and will be mailed out January 1st. The bulk of our 1935 Listening Post appointees will want to be reappointed and to obtain a new certificate for the 1936 period. All Listening Post Observers who desire to be reappointed and who will carry out their duties in keeping RADIO NEWS the foremost publication on authoritative short-wave data should indicate that they desire to carry on the work. This can be done also in your next report. Only a few of our Official Observers have

IN THE DUTCH EAST INDIES

Here is the DX Corner of Official Observer J. H. A. Hardeman, who keeps our readers advised on changes in the transmissions of the Java stations.



MEET OBSERVER MARSHALL!

Here is Charles B., Jr., 17 years old, and our youngest L.P.O., at his DX Corner in Washington, Pennsylvania. His receiver is a Philco Model 16. Notice the proudly displayed certificate.

been lax in sending in reports during the past year. We ask anyone who cannot carry on the work to notify us so that these names can be taken off the lists for 1936. A few of our members during 1935 failed to send in reports (with a very logical excuse such as illness, traveling, vacations, etc.). These are all explained satisfactorily and we hope the bulk of our Observers will start the new year with the enthusiasm and encouragement that our editors feel, in the rapid growth of this organization and all that it has meant (and will mean) in establishing short-wave communication throughout the world. So write to your Short-Wave DX Editor and let him know your feelings.

And last, but not least, we apologize to any of Observers for unanswered letters during the past year. The growth of our mail has been so phenomenal that often three or four thousand letters are handed to your editor in a batch and it is difficult to send a personal answer to each one within a short time. But please feel sure that all of the dope that you send in is correlated and checked and every bit of useful material finds its way into the magazine for all our readers' interest and possible enlightenment.

Listening Post Observers and Other Fans Please Notice

Listed on next column is this month's partial information regarding short-wave stations heard and reported by our World Wide Listening Posts. Each item in the listing is credited with the Observer's surname. This will allow our readers to note who obtained the information

A NEW JERSEY DX CORNER

The layout of Listening Post Observer Paul B. Silver's record-breaking establishment at Woodbridge, N. J.



given. If any of our readers can supply actual Time Schedules, actual Wave-lengths, correct Frequencies, or any other Important Information regarding these items, the DX Corner Editor and its readers will be glad to get the information. There are some hard stations to pull in in these listings, but we urge our Listening Posts and other readers to try their skill in logging the stations and getting correct information about them. When you are satisfied that you have this information correct, send it in to the editor; or if you have received a "veri" from any of the hard-to-get stations, send in a copy of the "veri" so that the whole short-wave fraternity may benefit. The list containing this information follows:

CTIHO (or **CTIHL**) believed to be Invicta Radio, Oporto, Portugal, is a new station heard in England evenings and heard once at the Westchester Listening Post on 5790 kc. (about 51.79 meters). Has anyone got the correct call or schedule? (Lawton, Westchester.)

HBO, Prangins, Switzerland, 26.35 meters and **HBJ**, 25.6 meters, heard testing and probably to broadcast to Australia. (Styles, N. C. Smith.)

FYA, Pontoise, France, has the following 10-minute transmissions: at 01:10 G.M.T. for Canada in French; 01:20 G.M.T. for the United States in English; 03:00 G.M.T. for South America in Spanish; 11:00 G.M.T. for Australia and New Zealand in English; 16:30 G.M.T. for the Near East in French. (Styles.)

EAQ, Madrid, Spain, 9860 kc., 30.4 meters, now extends its programs to 9 or 9:30 p.m. and programs start at 5:15 E.S.T., and they are also heard 1-2 p.m. E.S.T. Saturdays. (Zarn, Reilly, Skatzes, V.D.S., Adams, Paul, Mowbridge, Chambers, Libby, Schumacher, Craft, de Marco, Peters, Boord, Pilgrim, Belt, Harris, Neupert, Messer, N. C. Smith, Stark, Millen.)

HAS-3, Budapest, Hungary, 19.52 meters, 5 kw., reported on the air 14-15 G.M.T. Sundays. (Sholin, Messer, Baadsgaard, Belanger, Ledbetter.)

HAT-4, Budapest, Hungary, 32.88 meters, 9125 kc., reported heard well on Sundays 6-7 p.m. E.S.T. (Sholin, Baadsgaard, Belanger, Harris, A. E. Smith, Gleason, Messer, Wickham.)

GSL, Daventry, England, 49.0 (Turn to page 356)

IN THE KENTUCKY HILLS

Greetings from ORNSWLPLO Charles Miller of Covington, Kentucky, as he welcomes you into his DX Corner for short-wave reception.



NEW BOOK



MAKING A LIVING IN RADIO

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NOW you can learn just what opportunity there is for anyone with a real interest in radio as a vocation. What jobs are there? How much do they pay? How should you train for them? How can you break into the game, and then get ahead? This book tells you. It covers not only technical jobs in radio, but also the fields of writing, broadcasting, salesmanship, etc.

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The DX Corner (Short Waves)

(Continued from page 354)

meters, 6110 kc. on the air now 6-10 or 11 p.m. E.S.T. (Ledbetter, Peachy, Skatzes, Young, Libby.)

I2RO, Rome, Italy, reported on the air 25.4 meters, 8:15-9 a.m., 9:15-10:15 a.m., 12 noon-1 p.m., 1:45-2:30 p.m. on 31.13 meters on the air daily 2:30-5 p.m. on Mondays, Wednesdays and Fridays, 6-7:30 p.m. E.S.T. and 7:45-9:15 p.m. E.S.T. (Ledbetter, Partner, Baadsgaard, Coover, Reilly, Peachy, N. C. Smith, Hyde, Robinson Marshall, Boord, de Marco, Scheirman, Mallet-Veale, Edbrooke, Styles, Paul.)

PDK, Kootwijk, Holland, 10420 kc., reported heard 2-3:30 p.m. E.S.T. (Flynn.)

HB9B, Basle, Switzerland, 7118 and 3770 kc. transmitting Mondays, Thursdays and Fridays, 10:00 p.m. to 00:00 Malta Standard Time. (Vassallo.)

PLP, PMM, PK3BR, these Java stations are used on 27 meters, 11000 kc. and 29 meters 10,260 kc. and 98 meters, approximately 3 megacycles, respectively, simultaneously 8-9:30 a.m. and 8-9 a.m. E.S.T. The first one is taken off the air at 9:30 a.m. to contact Dixon as PLV. (Chambers, Baadsgaard, Ledbetter, and Lawton.)

PMY, Bandoeng, Java, 5140 kc., reported heard daily 5-9 a.m. E.S.T. (Partner, Mallet-Veale.)

PLE, Bandoeng, Java, 15.93 meters, reported heard Tuesdays, Thursdays and Fridays, 16-16:30 p.m. Malta Standard Time. (Vassallo.)

YDA, Tandjongprick, Java, now reported transmitting on 3040 kc. (Craft, Lawton.)

YDB, Soerabaya, Java, reported heard on 44.70 kc. 5-11 a.m. E.S.T. (Craft.)

YDE2, Solo, Java, 62.37 meters, 4810 kc., reported heard 5-8 a.m. E.S.T. (Craft, Lawton.)

ZCK (ZBW), 34.29 meters, 8750 kc. and 55.46 meters, 5410 kc., 250 watts, transmitting 10:30-2:15 p.m. and 5-11 p.m. Honolulu Time. (Illenberg.) Observer Craft says they are on the air transmitting 3-6 a.m. on Mondays and Thursdays and also from 6-9 a.m. Tuesdays, Wednesdays, Fridays and Saturdays. (Craft, Dalal, Marshall.) When writing, write to Hongkong Broadcast Committee,

MONITORING THE AIR WAVES

This is the DX Corner of J. Nemeth, of Bucaramanga, Colombia, who keeps his eyes open and his ears peeled for short-wave transmissions in South America.

Post Office Box 200, Hongkong, China.

JVM, Nazaki, Japan, 10740 kc., on the air now every night 1:40-2:20 a.m. E.S.T. with Japanese news; on again from 3:45-4:30 a.m. E.S.T., once more from 4:40 to 7:30 a.m. News in English is broadcast at 3:55 a.m. E.S.T. The station relays JOAK. (Bundlie, Craft, Ross.)

JVT and **JZG** on 6750 kc. and 6330 kc. respectively, will again be in use now for the evening programs during the winter. (Craft.)

JVH, Nazaki, Japan, 14600 kc., has an English news program at 12:15 a.m. E.S.T. They are on the air from 12-1 a.m. E.S.T. (Gallagher, L. M. Jensen, Craft, Ledbetter, Peachy, Baadsgaard, Partner.)

JVU, Nazaki, Japan, on about 15.5 meters, is heard at 2:15 a.m. E.S.T. then faded out and was heard again from 3 a.m. to 5:15 a.m. E.S.T. (Burakowski.)

VUY (VUB), Bombay, India, 9565 kc., is reported now on the air Mondays, Wednesdays, Saturdays, 15-17:30 G.M.T. (Scheirman.)

ETA, Addis Ababa, Ethiopia, has been heard on 24.69 meters, 12.15 megacycles, at 7 p.m. E.S.T. contacting New York with press reports about the war. (Sanders, Westchester.)

ICK, Libya, Africa, 9.46 megacycles sometimes using other frequencies of 5.8 megacycles and 10.24 megacycles at from 5 to 7 a.m. with war news. (Radio Fellowship, McMenamy, Andrews.)

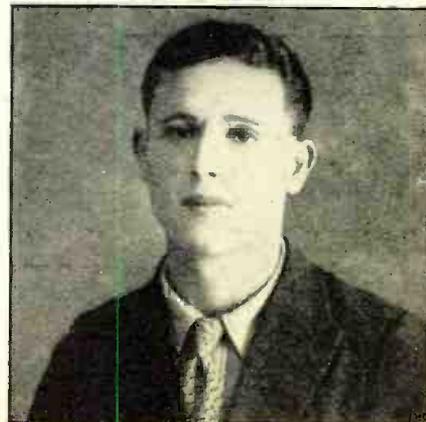
IQA, new Italian station believed to be in Eritrea, 14700 kc., has been heard transmitting music and also talking to Buenos Aires, also occasional war news, 4:15 p.m. E.S.T. (Wickham, Westchester.)

IRG, Massaua, Eritrea, reported heard on about 20 meters in early mornings broadcasting opera and sometimes war messages. (Smith, Anderson.)

Rhodesia Postal authorities are broadcasting from Salisbury on 50 meters and from Bulawayo on 31 meters Tuesdays, 19:15-21:15 p.m., (Turn to page 367)

HE LISTENS AT MALTA

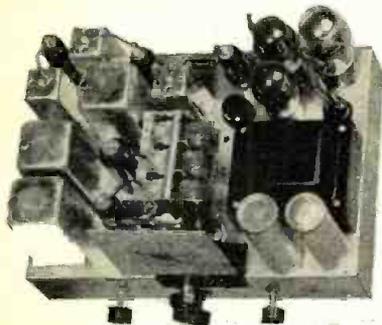
Meet I.P.O. Edgar J. Fassallo, who has contributed so very many fine reports of wide-world short-wave reception on the Island of Malta.



NEW 1936

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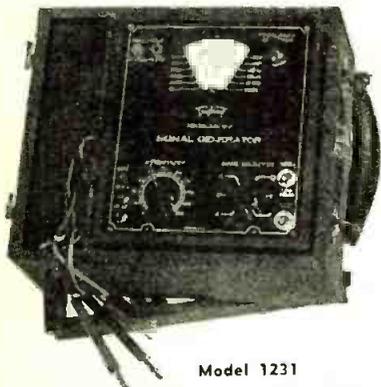


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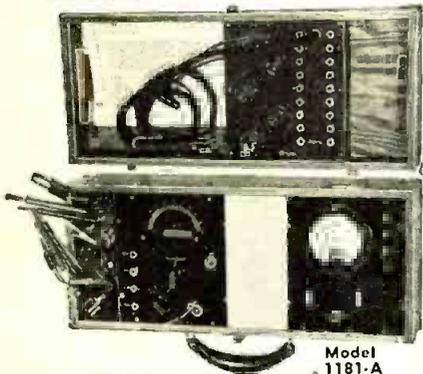
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 Model 1232 same except use 110-60 cycle A. C. Dealer Net **\$26.67**



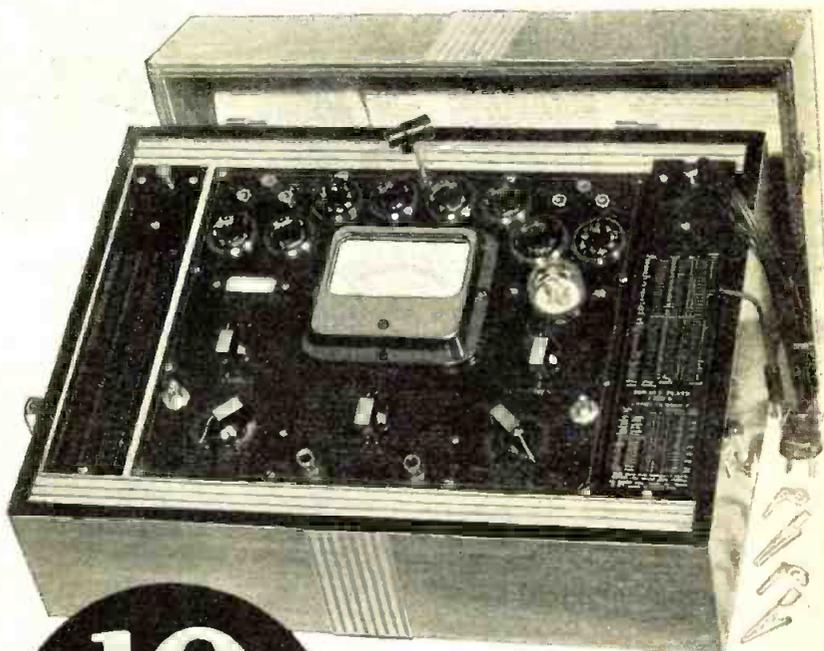
Model 1181-A

FREE POINT TEST SET Model 1181-A combines three essential units: No. 1125 Volt Ohm-Milliammeter, 1131 All-Wave Oscillator, 1106-A Free Point Auxiliary Set Tester—units can be purchased separately, if desired. Dealer net price **\$38⁰⁰**



Model 1206

MASTER UNIT COMPLETE Model 1206. A complete, up-to-date laboratory contains Nos. 1200 Volt-Ohm-Milliammeter, 1210-A Tube Tester, 1220-A Free Point Tester, 1231 or 1232 All-Wave Signal Generator and No. 1204 Case. All items can also be purchased separately and complete unit built up over period of time. Dealer net price **\$82⁶⁷**



**10
INSTRUMENTS
IN ONE**

PRECISION WITHOUT
EXTRAVAGANCE

Model 1501 **\$46⁶⁷**
DEALER NET

THE NEW MULTI PURPOSE TUBE TESTER MODEL 1501. Radio service dealers have always wanted a tube tester that would test tubes under conditions approximating their use in a radio set. Here it is! Model 1501 combines in one unit ten instruments that are needed by radio servicemen in their daily work. Here are the ten instruments:

1. Test all type tubes (New Power Output Test)
2. Neon short test
3. Separate Diode Tests
4. Neon Paper Condenser Tests
5. Electrolytic Condenser Leakage
6. D. C. Voltmeter and Milliammeter
7. Ohmmeter
8. A. C. Voltmeter
9. Decibel Meter
10. Impedance Meter

TESTS ALL TYPES—old style, new style, both metal and glass-metal—specially constructed against obsolescence.

Bring on your trick tubes that get by other testers—try them in TRIPLETT'S new Power Output Tester—see for yourself how this instrument can save you time in hunting for troubles and help you to sell more tubes. Each tube is measured by output test, that is, the tube is fully loaded and does not have an opportunity to re-heat for an instantaneous test. It will definitely help you sell more tubes by finding more bad and weak ones.

Model 1500 is a power output tube tester with neon short test and shadowgraph line voltage indicator—Same case as Model 1501. Dealer **\$36⁶⁷** net price

THE TRIPLETT ELECTRICAL INSTRUMENT CO.
BLUFFTON, OHIO



ELECTRICAL INSTRUMENTS

TRIPLETT MANUFACTURES

a complete line of electrical instruments for radio, electrical and general industrial purposes—both standard and custom built. Write for Catalogue. See them at your jobbers.



TEDDY BERGMAN

BENAY VENUTA



FRANK PARKER



HELEN MARSHALL

Backstage in Broadcasting

By Samuel Kaufman

TEDDY BERGMAN, youthful comedian who has bobbed up prominently in supporting roles every now and then, is now starred on the CBS "Harv and Esther" program along with Jack Arthur and Audrey Marsh. The program has a backstage locale and a musical drama motif is employed. Victor Arden's Orchestra and the Rhythm Girls round out the cast of this half-hour Thursday feature.

LILY PONS and Nino Martini, two leading personalities of the Metropolitan Opera Company, are stars of the new Chesterfield series of CBS. With Andre Kostelanetz's orchestra, the vocalists will be heard on alternating programs, Miss Pons appearing Wednesdays and Martini on Saturdays. David Ross, medal-winning Columbia announcer, has the distinction of being engaged exclusively for the Chesterfield series.

BENAY VENUTA, blonde songstress, and Freddie Rich, the conductor, are co-starred in the new Penthouse Party programs of CBS, Sundays. In addition to Rich's orchestra and the warblings of the fair Benay, there will be renditions by a variety of guest artists. Miss Venuta, a comparative newcomer to the airwaves

and footlights, had a meteoric rise which consummated in her succeeding Ethel Merman in a leading role of the Broadway musical smash hit "Anything Goes" when Ethel hied to Hollywood for talkie engagements.

HENRY HALL, the conductor to whose strains the entire British Empire dances, recently made a swift trip to the U. S. A. to study American music conditions for the B. B. C. Hall, who is director of music of England's radio system, spent considerable time at the NBC and CBS studios. We ran into him at CBS and enjoyed a chat on his short-wave programs. He said he was astonished at the popularity of his Empire short-wave broadcasts in this country. He had no idea whatsoever that his programs are keenly followed in the U. S. A., just as they are in British colonies. It was obvious that he was quite pleased with the fact that he had earned a considerable following in the U. S. A. with owners of

all-wave sets. And, in turn, he told us that American short-wave programs are also gaining large British audiences, even though it means staying up way past midnight to hear our early evening features.

KATE SMITH, billed as "radio's most popular personality," is the star of the new coffee program sponsored by the Great Atlantic & Pacific Tea Company over CBS Tuesdays, Wednesdays and Thursdays. On the thrice-a-week feature, Kate, besides singing, will interview various personalities in the news of the week. Jack Miller's Orchestra supplies the musical background. Another stellar vocalist to obtain a new CBS spot is Frank Parker. He is featured Saturdays on "The Atlantic Family," sponsored by the Atlantic Refining Company, in both a singing and dramatic role. Guest stars and speakers are slated to play an important part on this program.

SIGMUND ROMBERG'S Swift program has returned to NBC on a Tuesday schedule with the industrious Deems Taylor as commentator and Helen Marshall—the program's discovery of last year—as the leading soprano. Others in the cast include Morton Bowe, tenor, Rise

LILY PONS

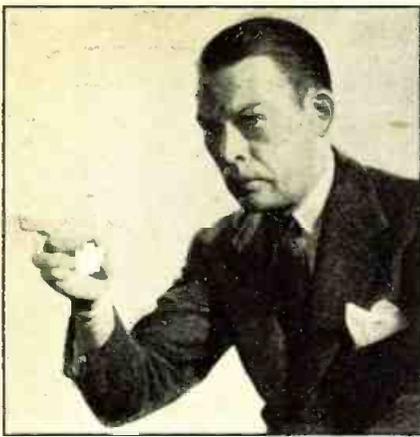


SAMUEL KAUFMAN AND HENRY HALL



AUDREY MARSH





FRED ALLEN

Stevens, contralto; George Britton, baritone, a choral group of twelve voices and a large concert orchestra. Romberg added a dignified, yet popular touch to last season's schedule and his return to the air was warmly welcomed by network listeners.

THE Fall season marks the return to the air of those three inimitable funsters—Jack Benny, Fred Allen and Phil Baker. Not on the same program, of course! Benny is back on his Sunday night NBC Jell-o program while Allen is once again clowning on NBC Wednesday nights for Ipana Toothpaste and Sal Hepatica. But Phil Baker, just to be different, has swerved his microphone allegiance from Armour's meats to Gulf Gasoline. His Sunday Gull broadcasts are presented over CBS. Phil steps into his new program as a substitute feature for the late Will Rogers whose sudden death caused deep-felt sorrow to every radio listener. The supporting cast of Jack Benny has undergone some change with Michael Bartlett the featured vocalist and Johnny Green's Orchestra supplying the musical background.

AFTER a long period of clowning for a cigar manufacturer, Georgie Burns and Gracie Allen have signed for a new CBS Wednesday series in the interests of Campbell's Tomato Juice. The silly antics of Gracie and her constant harrassing of Georgie before the microphone led to a sensational rise to radio and movie stardom four years ago. Prior to that they had a successful vaudeville record. The pair laid claim to receiving 360,000 fan letters in a four-day period and even a sponsor would have to admit that that's satisfactory response to a program.

JACK BENNY



Actions Speak LOUDER Than Words!



The manufacturer of the famous 4-Pillar Radio Tubes is making and delivering *all* types of the new Metal Tubes as initial equipment for 1936 receivers and for jobbers' and dealers' replacement stock.



SEEING IS BELIEVING...

but one can't see if METAL TUBES are even "lit", much less tell by simple examination if they are *perking* properly. This is where the good service men plus good test equipment come in. Each radio development makes good servicing more necessary. Raytheon's service deals give service men a wide range of instruments from which to choose. Write for full details. Also get the new Technical Tube Chart: 8th Edition (including all metal tubes). It's free!



RAYTHEON
TRADE-MARK
4-PILLAR RADIO TUBES

RAYTHEON PRODUCTION CORPORATION

30 East 42nd Street, New York, N. Y. 445 Lake Shore Drive, Chicago, Illinois
55 Chapel St., Newton, Massachusetts 555 Howard Street, San Francisco, Cal.

RAYTHEON PRODUCTION CORPORATION
Dept. D-12, 30 East 42nd Street, New York, N. Y.

Please send 8th Edition Tube Chart

Name.....

Address.....

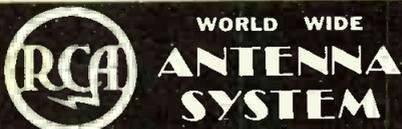
City.....

"Put It Up"

say customers when you tell them what the RCA World Wide Antenna System will do

When you sell an all-wave receiver, and when you go out on a service call, it is good business to tell the wonderful story of RCA Antenna Systems. These systems, designed by RCA engineers, provide much louder signals, ending complaints about weak foreign reception when due to an inefficient antenna. They also greatly reduce man-made static, including automobile interference, and almost always cure noisy reception. Not difficult to erect, but beyond the skill of the average listener, so you generally get the job. RCA Antenna Systems are available in several forms, complete or in kits of parts, as you prefer. Reasonably priced. Write for booklet, "Antenna Facts".

RCA Parts Division, Dept. RN
RCA Manufacturing Co., Inc., Camden, N. J.



WHEN CHOOSING A RADIO SCHOOL

RCA Institutes, with its reputation firmly established by 26 years service, is an institution recognized as an important factor in the radio industry.

Whether elementary radio principles or advanced subjects, sound applications, mathematics or practical radio engineering, RCA Institutes is prepared to give you the instruction you need.

Resident Schools at New York and Chicago

Modern Apparatus and Laboratory Equipment—Conveniently Located—Day and Evening Classes—Tuition Rates \$3 to \$10 Weekly.

Extension courses for home study on convenient "no obligation" plan. Examination and technical advisory services. Free post-graduate practical training at resident school with modern equipment under instructing engineers.

Write for Catalog.

RCA INSTITUTES, Inc.

Dept. RN-35

75 Varick Street
NEW YORK

1154 Merchandise Mart
CHICAGO

Recognized Standard in Radio Instruction Since 1909

THE SERVICE BENCH

tells YOU something about

ACTUAL SERVICING

Conducted by Zeh Bouck, Service Editor

Another Soldering Iron Kink

WE have spent the last few weeks browsing around New England service shops, picking up an idea here and there which we shall, in the course of events, pass on to you. One of the smartest devices we ran across was in a modest shop just out of Springfield, Mass., whose proprietor, equally modest, requests that his name be withheld. We handed him a check then and there, and the opus is presented in Figure 1.

It is another of these soldering iron gadgets, whose legion seems to be numberless, and the utility of which is on the same scale. A few words will supplement the almost self-explanatory drawing. In essence, it is an automatic "on-off" switch—that will save electricity, not to mention the iron—and at the same time keeps the iron cord from entangling with the elbow and sundry parts on the service bench.

A hole about one inch in diameter is drilled in the service bench close to the wall to admit the cord. This is sanded smooth on the forward surface to reduce friction and its attendant wear and tear. Two hooks are fastened to the wall to support the iron by its head. The lower hook is of such a height that the handle of the iron rests in the hole, and the upper so spaced from the lower that the handle is about five inches above the surface of the bench. The lower hook is the "off hook" and the upper one the "on hook". The hooks were made from closet clothes-hanging hooks, though several other sources of supply are obvious.

The soldering iron cord is looped under the bench and permanently plugged into a socket a foot or two forward from the hole (the cord being clamped to prevent strain on the plug). A knife switch is mounted between the hole and the socket. The switch prongs are bent so that it opens and closes easily, and is held closed by a light spring. The iron cord is run through a pulley, with a suspended weight, the pulley being connected to the handle of the switch with a string.

When the iron is in the off hook, the weight and string open the switch which is wired in series with the socket—thus turning off the iron. When the iron is in

use, or on the on hook, the weight is raised and the spring closes the circuit.

The tension on the cord is just enough to keep the wire out of the way when working. The iron, when not in use, is placed on the on or off hook, depending upon how soon it will again be required. (See Figure 1.)

SERVICE NOTES

The Precision Apparatus Corporation of Brooklyn, N. Y., offers an unusually in-

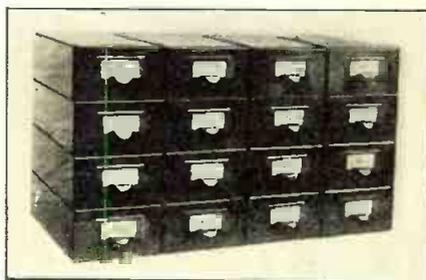
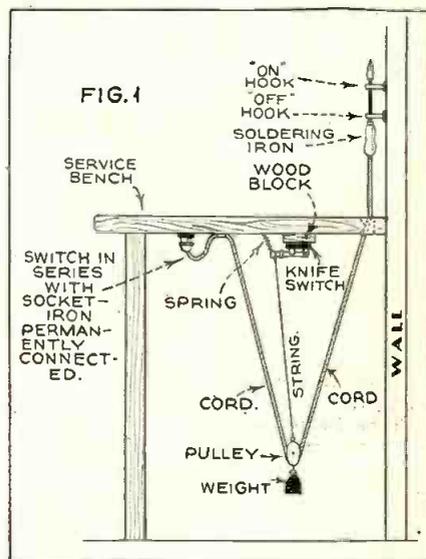


FIGURE 2

CIRCUIT DIAGRAM OF A SUCCESSFUL SERVICE MAN

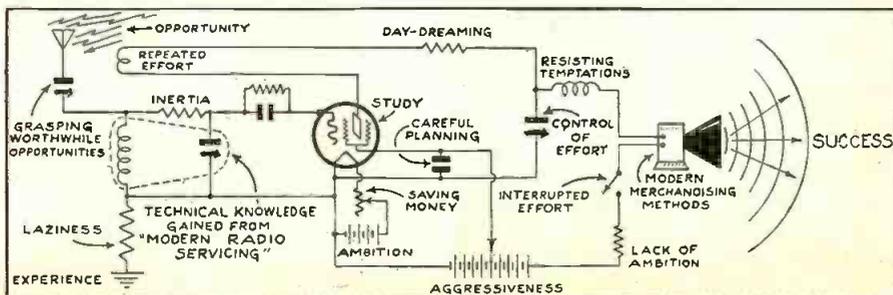


FIGURE 4

RADIO NEWS is offering five cash prizes of \$10.00, \$5.00, \$4.00, \$3.00 and \$2.00 this month for photographs and descriptions of service shops. We and our readers are as much interested in seeing where you work as in knowing how you work. Elaborateness will not be the deciding factor. Ingenuity and neatness will count the highest. Send in your service bench photo. Describe your equipment and anything unusual you have done with it in 100 words or less. All material used will be paid for, whether prize-winning or not. Address contributions to, yours for better servicing—

The Service Contest Editor.

Interesting service to servicemen in the modernization of old model analyzers. The modernized analyzer shown in Figure 3 is—or rather was—a Jewell 199. Similar modernizations are available for practically all popular types at a cost from one-third to one-half that of a new, up-to-date analyzer. Current, voltage, capacity and resistance scales, with adaptors for all tubes, including metal tubes.

While air conditioning is a far more serious undertaking than the modernization of a receiver, or the replacement of a shorted filter condenser, it is by no means beyond the scope of the progressive service organization. Service folks who believe they could handle this sort of a thing should secure the booklet published by Frigidaire entitled "A Guide for Those Who Contemplate Air Conditioning." While this is primarily a consumer publication, it also provides an excellent first step in finding out what air conditioning is all about and the factors that govern its practicability from the radio serviceman's point of view. (This booklet can be secured by writing to the *Technical Review*, care of *Radio News*.)

Tobe Deutschmann offers a new aid to the serviceman in the form of their "add-a-unit" steel cabinets, shown in Figure 2. These attractive green cabinets, with drawer-pull and cards, may be secured free of charge with kit purchases of condensers. A clever connecting arrangement permits them to be joined in any direction and built up into an expanding filing cabinet for small parts, etc. For further information see your jobber or regular mail-order house.

Two New Books for the Serviceman

The interesting diagram in Figure 4 is (Turn to page 363)

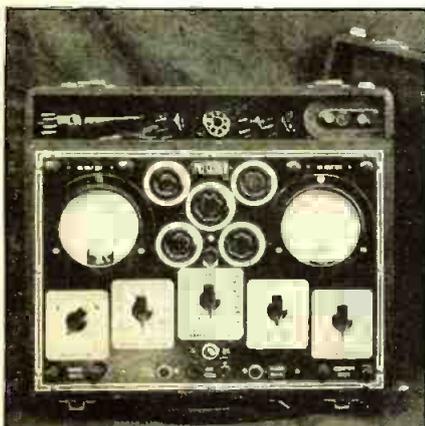


FIGURE 3

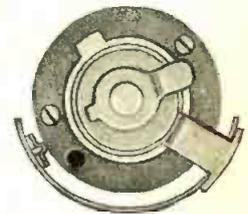
New-Type ELECTRAD CARBON VOLUME CONTROL

Smooth • Quiet • Long-Lived

"IT'S the TOP in replacement volume controls" is the enthusiastic endorsement service men are giving this new Electrad development.

A radically improved design and mechanism in which the carbon resistance element is fused to the flat outer rim of a sturdy Bakelite ring, over which a special-alloy floating contact shoe gently glides in a straight line. This results in smooth, quiet, long-lived operation never before attained, and which actually improves with use.

The molded Bakelite case, when mounted, extends only 1/2 inch back-panel. New-type power-switch (approved by underwriters) may be instantly attached or removed by a single screw. Long, easy-to-cut aluminum shaft saves time and trouble. All standard and special values.



Illustrating the complete working mechanism of the control, showing traveling position of contact shoe on the resistance element.

RESISTOR SPECIALISTS

Featuring:—Quiet Carbon Volume Controls, Vitreous Resistors, Truvolt Resistors and Power Rheostats.



Write Dept. RN-12 for New Catalog

New 100-Page VOLUME CONTROL GUIDE

FREE, if you send us the flap (part showing specification and resistance) torn from any new-type Electrad Carbon Volume Control carton, together with your business letterhead or card. Address Dept. RN-12.



6 1/4" x 9 1/4"



HG 417

4-Stage Amplifier

FOR general public address work and party call systems—schools, churches, theatres, etc.—this NEW 4-stage Amplifier for crystal microphone or phonograph is ideal.

Many Features

Self contained. Completely enclosed. Field excitation for two dynamic speakers. Output 17 watts. Tapped output transformer. Fader control system. Speaker and microphone connections terminate in polarized plugs. Tubes, 1 6C6, 1 53, 3 2A5's, 1 5Z3.

NEW!

Another Product of Webster Chicago

for Crystal Microphone or Phonograph

Sound Men! Dealers! HERE'S YOUR CHANCE

Increase Your Revenue with this new Webster-Chicago unit. Get complete details—NOW!

Write for Bulletin

THE WEBSTER COMPANY
3826 West Lake Street
CHICAGO, ILL.

There's Only ONE Webster-Chicago. It's IN! Chicago

TURN SCRAP INTO MONEY



The new and revised edition of "Auto Power" with all the ten original specifications and ten new ones is now off the press. Convert old generators into A. C. and D. C. generators and motors with voltages of 6 to 400 volts, for power, light, welding, and radio operation. Create new generators adaptable for home, automobiles, or trucks. They can be driven by fan belt, wind or water. This book, with complete illustrations, tells you how easily and economically these changes can be made. Also instructions for rewinding auto armatures. 350 definitions of electrical terms, etc. Already used and endorsed by thousands. Price \$1.00 postpaid. AUTOPOWER Dept. A 414 S. Hoyne Ave. Chicago

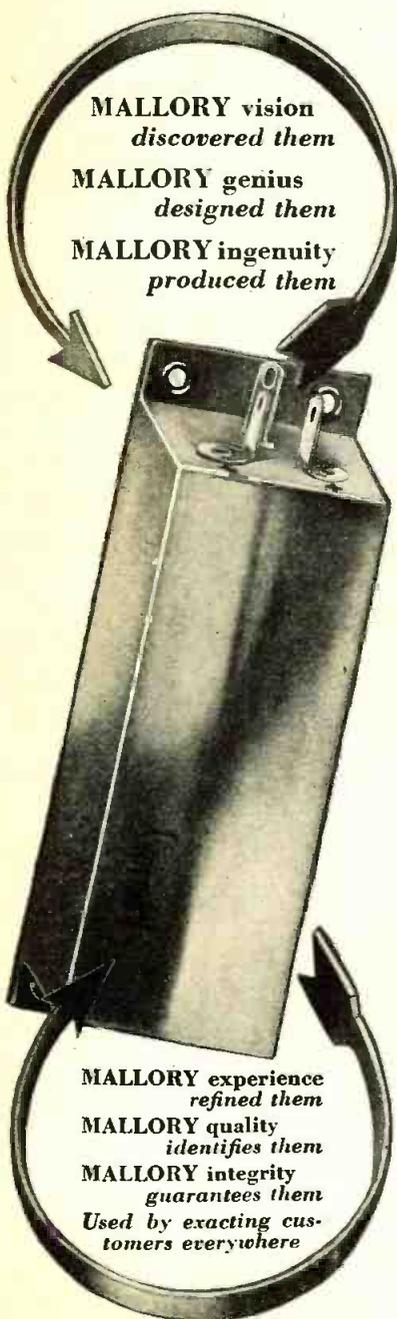


**Demanded
by those who
insist on the
best**

MALLORY

**DRY ELECTROLYTIC
CAPACITORS**

FOR RADIO AND INDUSTRIAL FIELDS



P. R. MALLORY & CO., Inc.
INDIANAPOLIS INDIANA

Cable Address—Pelmallo

Servicemen's
PRIZE CONTEST
Announcement of Awards

Zeh Bouck
Service Editor

FIRST PRIZE
Satisfying the Customer

"No one stunt, or single item of policy will build a successful service business. It takes a lot of things in one direction—the right direction—to do that. Here are a few points that keep my own cash-register



FIGURE 1

tinkling: The first is a slogan hung conspicuously in my service shop—"THE CUSTOMER MUST BE SATISFIED!" A satisfied customer is the best and cheapest kind of advertising—and that sign, psychologically, is the first step towards his satisfaction.

"The second is my business card (Figure 1) of which I always carry plenty around with me. It is a common mistake among

"Number four is the windshield sticker in Figure 3.

"An attractive window display and a methodical system of doing business also contribute to my success. My policies I observe religiously: Never 'gyp' the customer—never replace tubes or parts that don't need replacing. Make your price right. Avoid dropping tools in the customer's home. A piece of canvass or leatherette, about six feet square keeps the floor clean and protects it from scratches—points that will be appreciated and remembered by the lady of the house. Keep abreast of the times—don't ever let a customer stick you on something new! Give each customer an itemized bill of the work completed. Don't miss an opportunity

J. F. GRINNAN
718 FRANKLIN AVE.
SALEM, OHIO
RADIO SERVICE

FIGURE 3

to make new business contacts. Above all, be neat, clean and courteous, and don't waste your time."—*Johnny Grinnan.*

Quite a catechism—but it's the real McCoy.

SECOND PRIZE

A Novel Advertising Stunt

"I have borrowed an idea from the old nickelodeon days in the promotion of my

FIGURE 4

Radio Special

ANNUAL
INSPECTION
SERVICE

including

Thorough Cleaning and
Testing of Tubes,
Minor Repairs and
Balancing.

\$2.00 Per Year

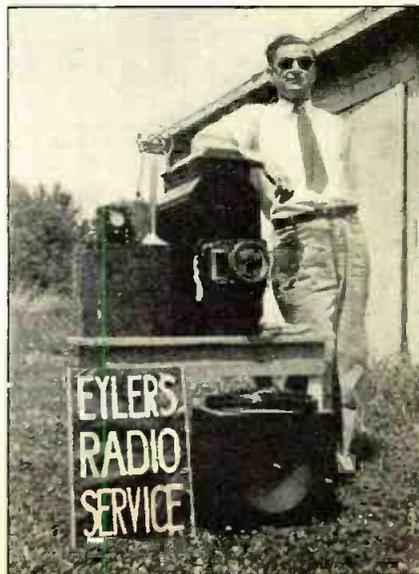
JOHNNY GRINNAN

The Radio Man
718 Franklin Ave. Salem, Ohio
PHONE 563 M

FIGURE 2

servicemen to have too much on their cards. White space is effective!

"Another item is my handbill shown in Figure 2. I also have cards printed the same size and wording, which are placed in store windows, restaurants, auto service stations, barber shops, doctors' and dentists' offices.



sales and service business. The serviceman should experience little trouble in acquiring an old lamphouse with a slide holder from a rural movie theater. I secured mine as a trade-in on a new auto radio installed in the local theater owner's car.

"Make up your own slides and project them on a neighboring wall, or even the sidewalk. The outfit can be readily transported for special occasions.—R. H. Eyer.

Mr. Eyer, with his projector and public-address equipment, is shown in Figure 4.

**THIRD PRIZE
A Useful Reminder**

Murl E. Beauchamp hands out the little note-books shown in Figure 5—his advertisement on the attractive green cover.



FIGURE 5

These note-books are about the size of stamp books—just right (or is it "write") for the vest-pocket or a lady's bag.

Mr. Beauchamp states—"Two months ago, I spent \$17.00 for 5,000 of these books. I still have about 1,000 on hand. The rest have been distributed, and I can already trace \$157.60 worth of business directly to them—and they have not yet begun to exhaust their possibilities!"

FOURTH PRIZE

Who Owns the Oldest Radio?

Fred E. Kunkel tells of an enterprising serviceman-dealer who wanted to build up a live mailing list of prospects for new receivers or modernization jobs. A series of small ads were composed offering fifty dollars in cash prizes to the owners of the oldest radio receivers in operation. These ads were placed under the births section one day, below the obituaries the next, then on the sports page, editorial page, comics—every place they would be sure to find an audience. This was kept up for a month, and from this single idea, the names of several hundred folks were obtained who thought they had the oldest radio in town. *What better prospects could you want for a new set or modernization jobs?*

It is on record that practically all the prize winners invested their cash with the dealer who offered it!

FIFTH PRIZE

An Experiment Worth Trying

"Try this one. I found it worth-while. I invested one dollar in government post-



FIGURE 6

cards. I typed my name and address on one side, and the following on the other: "Please call at the address below at....."

THIS MONTH'S WINNERS

FIRST PRIZE—To Johnny Grinnan, "The Radio Man," 718 Franklin Avenue, Salem, Ohio—\$10.00 for a general policy of satisfactory servicing and concrete examples of what he is doing to live up to it!

SECOND PRIZE—To R. H. Eyer, Radio Service Laboratory, Darlington, Wisconsin—\$5.00 for novelty—not to mention the faculty of keeping one's eye open for advertising stunts!

THIRD PRIZE—To Murl E. Beauchamp, Murl's Radio Service, Muskogee, Oklahoma—\$4.00 for utility to the customer—and, on the rebound, to the serviceman! One of these reminder ideas—but one that sticks longer than the blotter.

FOURTH PRIZE—To Fred E. Kunkel, 3807 Military Road, Washington, D. C.—\$3.00—again for novelty! Going to the obituary columns for a live mailing list of new set and modernization prospects!

FIFTH PRIZE—To Herbert Seligson, 2547 Aqueduct Avenue, Bronx, N. Y.—Last, but by no means least, \$2.00 for a new slant on an old idea, at the same time saving a bit of postage!

to test all tubes in my radio. I own a model. THIS DOES NOT OBLIGATE ME IN ANY WAY other than to purchase tubes if needed.

"Name.....
"Address.....
"I dropped the cards in neighboring letter-boxes, the owners of which I was reasonably certain had radios."—Herbert Seligson.

The Service Bench

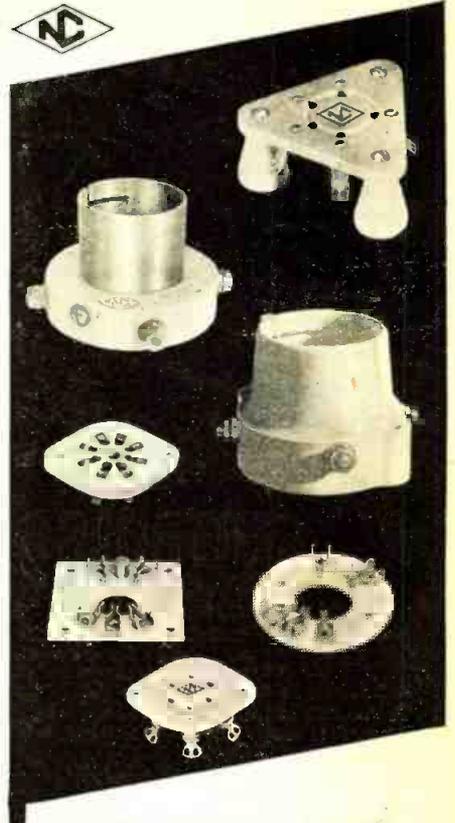
(Continued from page 361)

reproduced from the front page of a 6-page folder which describes "Modern Radio Servicing", a 1300-page book and a supplement 240-page book entitled "Radio Field Service Data." The first book is by Alfred A. Ghirardi, well known author and teacher and the second by Mr. Ghirardi and Bertram M. Freed, radio service consultant. The diagram in radio schematic form emphasizes the need for every serviceman to be an up-to-the-minute technician if he expects to keep his shop open. The folder itself gives detailed information on the contents of these new books and explains how thoroughly they cover the new technique of radio servicing. Servicemen can obtain a copy of this folder free of charge by writing to RADIO NEWS, 461 Eighth Ave., New York City.

When Owners Meddle

"In cases of trouble, the causes of which are not immediately apparent, it's a good idea to ask if anyone has been playing around with the set. I have run into several instances where a radio was apparently okay up to the speaker, and yet absolutely dead. It looked at first like a shot output transformer or voice-coil. However, upon inquiry, I discovered that the speaker plugs had been removed (in one case by accident in the course of dusting, and in another just for fun by the

(Turn to page 384)



SOCKETS . . . for Short or Ultra Short Wave Use

The National Group of High Frequency Sockets includes a type for nearly every tube and purpose. At the top right above is the JX-100, a big wafer-type low-loss socket for power pentodes such as the RK-28 and RCA-803. Below it are two fifty-watt sockets with sturdy sidewise contacts. Type XC-50 is entirely of low-loss Steatite; while Type NM-50 employs the more conventional metal shell and is lower in price. To the left of the fifty-watters is the new Isolantite wafer-socket for octal metal tubes. Two sockets are available for the little acorn tubes. One for the acorn pentodes, is assembled on a square aluminum base and has built-in by-pass condensers for stable high-frequency operation. For the acorn triode, the socket is of Isolantite. Both sockets employ special constant impedance clips. At the lower left is the old favorite, the receiving tube socket. It is made in 4, 5, 6 and 7 prong types as well as a special 6-prong coil model.

The new National General Catalog No. 250, just off the press, describes these and many other quality components in detail. Send for your copy.

COUPON
National Company, Inc.
Malden, Massachusetts

Gentlemen:
Please send me your General Catalog No. 250. I enclose 6 cents to cover mailing costs.

Name

Address

RN-12-35

RADIO PHYSICS COURSE

ALFRED A. GIRARDI

Lesson 47. Vector Relations

IN practical circuits in which there exists not only capacitance but resistance also, it is necessary not only to know how to calculate the capacitive reactance but also how to combine it with the resistance. The impedance in ohms of a circuit containing a capacitance and resistance may be expressed as:

$$Z = \sqrt{R^2 + Z_C^2}$$

$$\text{or } Z = \sqrt{R^2 + \left(\frac{1}{2\pi f C}\right)^2}$$

Since capacitive reactance is 90 degrees out of phase with the current, and resistance is in phase with the current, there is a difference of phase of 90 degrees between

(X_C) line BD, is drawn below the resistance line AB, one fourth as great as the inductive reactance (X_L) line BC which is drawn above the resistance line. Since the inductive reactance predominates, the current will lag the voltage. The net reactance is represented by BE and is equal to $X_L - X_C$. The impedance line is drawn from the left-hand end of the resistance line to the E point three-fourths up on the inductive reactance.

In the diagrams such as those of Figures 1 and 2, the angle of lag between the current and the e.m.f. in the circuit is the angle BAC formed by the impedance line and the resistance line. Its value may be calculated from the other known factors in the triangle by means of trigonometry. If the vector diagrams are drawn as shown, and the angle comes out above the resistance line, it indicates that it is an angle of lag, i.e., the current variations in the circuit lag behind the e.m.f. variations by that part of a cycle. If the angle comes out below the resistance line as in Figure 1, it is an angle of lead, i.e., the current variations lead those of the applied e.m.f.

It is obvious from a consideration of Figure 2, that when the values of inductance and capacitance in a circuit happen to be such as to make X_L and X_C equal, the difference between them is zero, making the impedance Z equal to $\sqrt{R^2}$ which is simply equal to R . Under these conditions, the circuit operates as though there were neither inductance nor capacitance present, the current rising and falling in unison or in phase with the applied e.m.f.

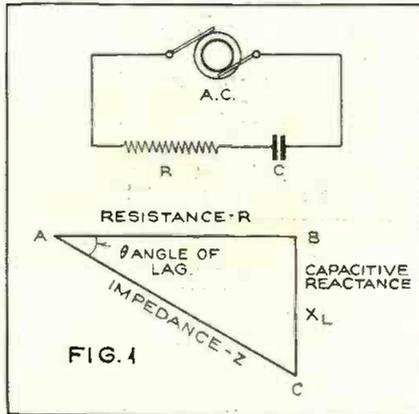


Figure 1. Vector relations of resistance, reactance and impedance in an A.C. circuit.

them, as shown in the vector diagram at the right of Figure 1. It is customary to draw the line representing capacitive reactance below the resistance line as shown, because in circuits containing both inductance and capacitance, the inductive reactance line is drawn above the resistance line as shown in Figure 2, since the effects of both, on the e.m.f. and current in the circuit, are directly opposite. The impedance is represented by the hypotenuse AC of the triangle (to scale).

When a circuit contains inductance, capacitance and resistance, the net reactance, X , is equal to the arithmetical difference between the inductive reactance X_L and the capacitive reactance X_C or $X = X_L - X_C$. In any case the smaller reactance is subtracted from the larger one and the net reactance has the characteristics of the larger one. Therefore the net impedance of a circuit containing inductance, capacitance and resistance, is equal to

$$Z = \sqrt{R^2 + X^2} = \sqrt{R^2 + (X_L - X_C)^2}$$

$$\text{or } Z = \sqrt{R^2 + \left(2\pi f L - \frac{1}{2\pi f C}\right)^2} \quad (18)$$

When a circuit contains both inductance and capacitance, the difference between the lengths of the lines representing the inductive and capacitive reactances will represent the result of net reactance, X , of the circuit as shown at the right of Figure 2. Here the capacitive reactance

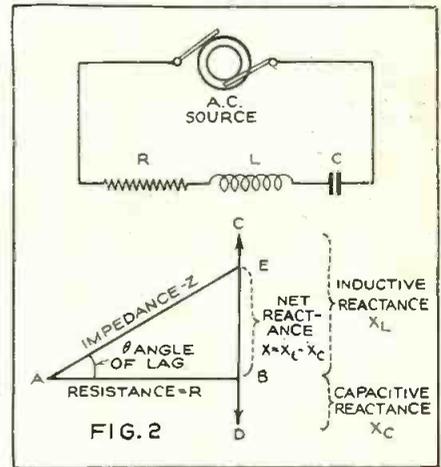


Figure 2. Vector relations of resistance, capacitive reactance, inductive reactance, and impedance in an a.c. circuit.

Referring to Figure 2, if the lines X_L and X_C were of equal length, their difference would be zero, and the impedance line would be identical with the resistance line. Such a circuit is said to be in resonance or tuned with the impressed alternating e.m.f.

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The DX Corner (Broadcast Band)

(Continued from page 344)

23 of which are outside North America."

J. F. Edbrooke (Buenos Aires): "The new Argentine station LRI, 1070 kc., 50 kw. has been testing from midnight to 1 a.m. daily. This station is located in Buenos Aires and its address is Calle Rio de Janeiro 300. It is owned by the Buenos Aires newspaper 'El Mundo'."

Observer McVey (Maryland): "Have recently heard: 1YA, 4:43-5:30 a.m.; YVIRG, 6 p.m.; PRB9, 3:25-4:10 a.m.; Rennes (France) 1 a.m. Rennes on 1040 kc. is at times as loud as KNN on the next channel."

Bob Gaiser (New Jersey): "WKAQ, 1240 kc., is on the air every day 11-12 a.m. and 5-9 p.m. Their address is Radio Station WKAQ, Telephone Building, San Juan, Porto Rico."

Observer Buitekante (New York): "The best time to hear KGA is 2-3 a.m. They leave the network at 2:30 EST and can then be logged for verification purposes."

Observer Truax (Illinois): "CKTB, the 100 watt at St. Catharines, Ontario, sends a beautiful letter as a verification."

Observer Hunt (California) reports TP's coming in best the last hour before daylight and can often be heard for a few minutes after sunrise. He further reports that up to Sept. 18th the TP's being heard on the West coast were the same that had been breaking through during the summer. About the only exception was XGOA which passed out completely during the summer.

Observer Covert (California): "KGDM has discontinued their midnight-6 a.m. (PST) Owl broadcast. Finished the Trap Circuit Tenammer last night. I expect a lot from this unit and it looks as though I will not be disappointed. It appreciably removes static from KSL's and KNN's signals. This happens to be my first attempt at building any radio part but I had no difficulty whatsoever in following the blueprints. Does anyone know what Carolina station was signing off at 3:50 a.m. EST on Friday morning Sept. 6th on 1300 or 1210 kc.?"

Observer Watson (New Zealand): "A new 60 kw. broadcast station is now being erected at Titahi Bay, New Zealand and will be in operation before the end of 1936."

Observer Sheppard (New Zealand): "1ZV, 1ZJ and 1ZL are now off the air. Owing to a dispute over the broadcasting rights on recordings it is possible that several other New Zealand stations will be compelled to close down. Construction on the new 10 kw. transmitter at Dunedin is proceeding rapidly. When completed it will replace the 500 watt transmitter now operating on 790 kc. Other new stations soon coming on the air are 2GR, 550 kc.; 6WA, 560 kc.; 3WV, 580 kc.; 4QN, 600 kc.; 2NR, 700 kc.; 6CF, 720 kc.; 3GI, 830 kc.; 4PM, 1360 kc.; 7BU, 1360 kc. and 3XY, 1420 kc." (Some of these stations will probably be on the air by the time this is read.)

Observer Mathie (New Zealand): "TNT is heterodyned by KGU early in the evening and later by IOBK. The best time to hear it is just after KGU signs off."

Taylor-Cockaday "Ocean Hopper"

(Continued from page 345)

Wave-length Meters	Call Letters	Frequency Kc.	City Country
31.3	VK3LR	9580	Lynchhurst, Victoria, Australia
31.3	GSC	9580	Davertry, England
31.3+	W1XK	9570	Springfield, Mass.
31.3+	DJA	9560	Zeesen, Germany
31.4+	DJN	9540	Zeesen, Germany
31.4+	W2XAF	9530	Schenectady, N. Y.
31.5+	VK3ME	9510	Melbourne, Australia
31.5+	GSB	9510	Davertry, England
31.5+	PRF5	9501	Rio de Janeiro, Braz.
31.8	COH	9428	Havana, Cuba
44.6+	TIEP	6710	San Jose, Costa Rica
46.2	HJ5ABD	6490	Cali, Colombia
46.5	HJ1ABB	6447	Barranquilla, Col.
48.7+	VV3RC	6150	Caracas, Venezuela
48.9+	COCD	6130	Havana, Cuba
49.0+	W2XE	6120	New York, N. Y.
49.0+	VE9HX	6110	Halifax, N. S.
49.1+	W3XAL	6100	Bound Brook, N. J.
49.1+	W9XF	6100	Chicago, Ill.
49.1+	CRCX	6090	Toronto, Can.
49.4+	W8NAL	6060	Cincinnati, Ohio
49.7+	HP5B	6030	Panama City, Pan.
49.8	DJC	6020	Zeesen, Germany
49.9+	HJ1ABJ	6006	Santa Marta, Col.
49.9+	NEBT	6000	Mexico City, Mex.
50.3+	HJ4ABE	5950	Medellin, Colombia
51.2+	VV5RMO	5850	Maracaibo, Venez.



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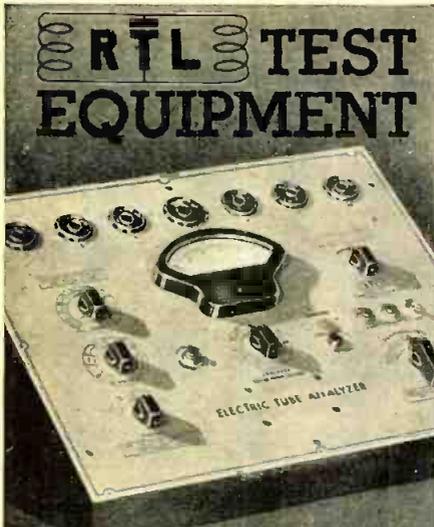
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Capt. Hall's

SHORT-WAVE PAGE

ALTHOUGH the real s.w. DX season is over, many short-wave listeners, including the writer, are very pleased with the prevailing conditions. We have passed, recently, through a spell of poor reception that was to be expected at that time of the year. As the seasons change so do reception conditions. In fact, many short-wave listeners will agree when we say that there were days when not one "foreigner" was heard and entire bands would be dead. All this has passed by and now we are back with our receivers in full swing and the seashore and country resorts are deserted for the home-like hearth and the short-wave radio always within easy reach.

In our mind's eye we pictured the average listener spending many hours at the dials and "running down" those stations that a year or two ago were considered "out." The reason we are rather optimistic about this is that the real fan has gone carefully about the purchasing of a real new receiver and no amount of sales talk can hood-wink him into buying a set without first finding out just how much of the "talk" is true and authentic. Some fans used to boast of throwing a piece of wire out the window and pulling in the world, but we often wonder just what they called the world!

During the past few weeks we spent not hours but days on our roof "over hauling" our aerials and putting up several of the latest in transmitting sky wires. As to the efficiency of these we cannot go into detail as yet because we have not tried them out to any extent. Our 20-meter antenna is directional and when we say this we mean it in the full sense of the word. Our poles are about 30-feet from the roof and put up in ship-shape fashion. Naturally our nautical training has come in handy both in the necessary rigging and knowing where the countries lie that we went to contact.

Much of this work is really a review, as for many years we experimented with directional receiving antennas. We are one of those strong believers in directional antennas and find them "priceless" when you are going out after real DX. Just what we, in the Eastern part of the States consider DX, the boys in England or Australia may look on as locals. But we really think that the eastern and western listeners will agree that the most difficult of all continents to log is Africa.

Just about when every listener had decided that all that was left on that continent to hear, now that CNR, Rabat, Morocco, has decamped, was the Cairo and Leopoldville commercial phones, two new Africans popped into view. One is definitely on the air and the other is expected daily. The first rumors of a newcomer came when it was worded around

that the Empress and Emperor of Ethiopia would speak from the station ETA, Addis Ababa. Without much more than this to go on the station was logged on 7.6 meg. and although a portion of the program was re-broadcast over one of our American chain networks the short-wave listener was overjoyed to hear a great deal more than his broadcast-band cousin.

Another newcomer will be ON4CSL. When we first logged this station we were informed by other listeners supposed to be "in the know" that we had logged a "pirate!" Finally a letter arrived from the owner-operator, C. R. Stegall who verified our reception of his 14 meg. transmission and informed us that he had now closed down but expected to be back on the air just as soon as new equipment en route from the States reached him. Mr. Stegall has been in the Belgian Congo for 20 years and when he returns to the air we will be able to feast our ears with native music supplied by the natives whom ON4CSL will bring to the microphone.

Yes, New York is hearing ZHJ, Penang on 39.3 meters although some listeners who have not been fortunate enough to log it, insist that this real DX station is operating on 49.34 meters. Authentic information on this station's move to a lower band was received by the writer from four of his most reliable correspondents all of whom logged and had verified their 39.3 meter reports. But don't think a piece of wire from the window to a fence will bring in this catch even if you do live in Dxers Paradise!

Looking over our log for the past few weeks we have these to report. The French commercial phones have a three note flute like sound similar to the Javanese.

France transmits simultaneously on 11.90 meg. and 15.25 meg. for Australia and New Zealand listeners. This broadcast is preceded by the striking of a midget "Big Ben" at 5 a.m. EST.

RNE, 12 meg. Moscow now an almost daily visitor from 3 to 5 p.m. At 4 p.m. (Turn to page 367)

The DX Corner (Short Waves)

(Continued from page 356)

and on Fridays, 16-17 p.m. Malta Standard Time. (Vassallo.)

KTO, Manila, Philippine Islands, 16.24 megacycles, reported heard at 1 a.m., 2 a.m. and at 6:30 p.m. E.S.T. (Gallagher.)

VPD, Suva, Fiji Islands, 13075 kc., is heard Sunday nights sometimes 15 minutes earlier than their schedule. (Gallagher and Ledbetter.)

TFJ, Reykjavik, Iceland, 24.5 meters, 12235 kc., reported heard 3 and 4 p.m. E.S.T. (Westchester.)

Listen for the Thursday Morning Club, an amateur organization working on 75 meters. Paul Potter, W6HXP, of Los Angeles, is master of ceremonies and has arranged to have South, Central American, Hawaiian, Cuban and possibly Australian amateurs come in on the chain. Here is a great chance for DX listeners. (L. M. Jensen.)

W9XBS, Chicago, Illinois, 46.69 meters, 6425 kc., 2.5 kw., is heard

Capt. Hall's Page

(Continued from page 366)

the Kremlin Chimes are broadcast.

HBP, 7.80 meg. Geneva, should be tuned for when you want to know where "that special" broadcast is being re-layed from.

OPM, 10.14 meg, Belgian Congo, is active every morning from 1.30 to 3 a.m. calling Brussels.

ORG, 1921 meg. Russelede, Belgium, can be heard around 3 a.m. but not regularly.

XBJQ, a new Mexican station insists they are operating on 11.00 meg. but we would be more likely to say they are on 11.60 meg. They requested reports to be sent to P. O. Box 2825, Mexico City.

The Iceland station is on 12.235 kc. and **TFJ**, is the call while **TFK** is for 9060 kc. The former frequency is very active.

The **EAQ**, Madrid announcer asks the gullible listening public to send them one dollar and, "we will send you one special verification card!" Out of curiosity we sent for it and what a shock! It is just an ordinary white card with pale blue letters and the hemispheres outlined in the same color. In the left-hand corner are pictures of three of the station's performers. The magazine that you also receive for the money is supposed to be in English and Spanish but 99 percent of the reading matter is in Spanish.

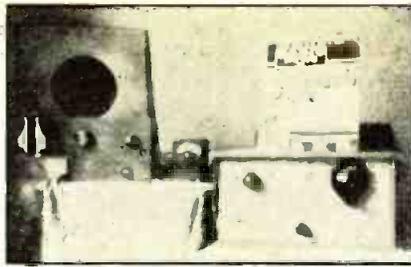
CEC, 10.67 meg. Santiago de Chili has been an excellent signal every Sunday from 8.30 to 9 p.m.

VPD, 13.07 meg. Suva, Fiji Island "takes the cake" for erratic reception. Heard off-and-on from 12.35 to 1.30 a.m. but mainly off.

GSL, 6.11 meg. Daventry, England has resumed their nightly broadcasts coming on the air at 10 p.m. just as **YV2RC**, also 6.11 meg., Caracas, Venezuela, goes off.

HVJ, 15.12 meg. Vatican City is now a regular from 10.30 to 10.45 a.m. with English transmissions on Tuesdays.

R. Siglin, Chief of the radio station in Moscow will verify correct reports on the Khabarovsk (RV15) station's transmissions. Please address the "Chief" as "Comrad" or "Madame" or "Miss" as Comrad Siglin happens to be a lady!



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Thursdays only, 1 p.m.-6 p.m. E.S.T. (A. E. Emerson, Millen; A. E. Smith.)

W4XB, Miami, Florida, 6040 kc, is back on the air for the winter, 12 noon to 2 p.m. and 5:30 to midnight E.S.T. (Seli, A. E. Smith.)

W9XBY has been reported heard on 195 meters. (Bundlie.)

W6XAI, a high-fidelity station on about 1560 kc., has been reported heard after 9 p.m. (Cachim, Bundlie.)

WORK, a broadcast-band station in York, Pa., now has a special DX tip program Thursdays at 8 p.m. E.S.T. (Hersowitz.)

CRCX is the new call of old **VE9GW** of Bowmanville, Ont. (Craft, Munz, A. E. Emerson, Scihal, Wood, Williamson, Trzuskowski, Cook, Robinson, Johnson, Partner, V.D.S., Skatze, Nevins.)

W1XAL, Boston, Mass., 6040 kc., is now on their winter schedule Sundays 4-6:45 p.m. E.S.T. and Tuesdays and Thursdays 7:30-9 p.m. E.S.T. (Chambers.)

VE9BK, Vancouver, B. C., heard irregularly on 4795 kc. (Craft.)

TIPG, San Jose de Costa Rica, 6410 kc., on about 46 meters, reported heard 9-11:15 p.m. E.S.T. Observer Deeter says it is **TIGP** and they are heard after 10 o'clock, still other listeners say 9:30 to midnight. (Johnson, Young, Hersowitz, Libby.)

TIGPH, San Jose de Costa Rica, reported heard on 51.52 meters, 5820 kc., from 7 to 12 p.m. E.S.T. (Libby.)

La Voz de San Ramon, San Ramon, Costa Rica, 5500 kc., reported heard evenings. Does anybody know the call? (Betances.) (Might not this be **TI5HH** in San Ramon, Nicaragua on 5520 kc.? (Westchester.)

HI4D, Santo Domingo, D. R., reported heard on about 6590 kc., 6-8 p.m. E.S.T. (A. E. Smith, Hersowitz.)

HRN, Tegucigalpa, Honduras, 5875 kc., reported heard Sundays 9-11:20 p.m. E.S.T. (Gleason, Hersowitz.)

TGX is the short-wave call of the Guatemalan long-wave station according to L.P.O. Gomez. He says they are on the air 8-10 a.m., 1-2:30 p.m. and 8 p.m. to 12 midnight E.S.T.

TGWA often relays **TGW** of Guatemala on 6000 kc., 3-4 a.m. Who knows the schedule, address, etc., of this station? (Twomey, Johnson.)

XBJQ, Mexico City, Mexico, 27.3 meters, is a new station owned by the National Bank of Mexico, P. O. Box 2825. It has been rebroadcasting **XEW** from 9-10 p.m. E.S.T. (Wilson, Butcher, Sanders, Peters, Gleason, Graf.)

CO9GC, Santiago de Cuba, has increased its power to 2 kw. operating on 48.7 meters, 6150 kc., daily 3:30-10:15 p.m. and Fridays 12-1 a.m. E.S.T. (Young.)

CO9WR, Sanctus Spiritus, Cuba,

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MASTER TELEPLEX—"The Choice of Those Who Know"

on about 29.3 meters, 10200 kc., has been reported as heard as early as 6:40 p.m. and also at 8:30-9:20 p.m. E.S.T. (Libby, Chambers.)

CO9JQ, Camaguey, Cuba, is now operating on 36.72 meters, 8170 kc., 8-9 p.m. E.S.T. except Saturdays and Sundays. (Singate, Johnson, Messer, Craft, Harris, A. E. Smith, Haws, A. Emerson, Betances, Ross, Gallagher.)

COCD, Havana, Cuba, 6130 kc., 48.9 meters, has relayed CMCD from 9:30 until about 11:30 p.m. or midnight E.S.T. (Johnson, Kentzel, Cook, Gallagher, de Laet, Skatzes, Neupert, Dickes, Stancer, Millen, A. E. Emerson, Pasquale, Reilly, N. C. Smith, Self Robinson, Betances, Libby, Ross, Bundlie.)

VP3MR, Georgetown, British Guiana, 7.08 megacycles, reported heard Sundays 7:45-10:15 a.m., Mondays 3:45-4:45 p.m., 6:45-7:45 p.m., Wednesdays 6:45-7:45 p.m., Thursdays 5:6:45 p.m. and Saturdays 6:45-7:45 p.m. E.S.T. (Munz, A. E. Emerson.)

HJ5ABE, Cali, Colombia, frequency is now stated to be 21.2 meters, 14120 kc. (Libby, Scheierman.)

YV2RC, Caracas, Venezuela, has changed frequency to 5800 kc., using 1 kw. power. (Chambers, Deater.)

YV5RM, Maracay, Venezuela, reported heard on 7.1 megacycles, 1:30 a.m. E.S.T. (Gallagher.)

YV5AM, 40 meters, 7105 kc., reported heard. (N. C. Smith, Ross.)

YV6RV, Valencia, Venezuela, 6520 kc. now on the air 4-6 p.m. (Sholin, Vassallo.)

YV8RV, Barquisimito, Venezuela, 5880 kc., reported heard. (Sholin, A. E. Smith.)

YV9RV, Elvalle, Venezuela, 6400 kc., is reported soon to be on the air with 500 watts.

YV10RSC, San Cristobal, 5720 kc., reported heard at about 10 p.m. E.S.T. (Sholin, Betances, Partner.)

LSX, Buenos Aires, 10350 kc., reported active broadcasting 8 p.m. (Twomey.)

CEC, San Diego, Chile, 10670 kc., 4 kw., reported on the air Thursdays and Sundays at 8:30 p.m., E.S.T. Other listeners say Friday and Monday 8-9 p.m.; still other listeners say every night irregularly. (Libby, de Laet, Sholin, V.D.S., Partner, Chambers, Neupert, Schradieck, A. E. Emerson, Johnson.)

OAX4D, Lima, Peru, 4780 kc., reported on the air daily 9-11 p.m. E.S.T. and Thursdays and Sundays it is 11:30 p.m. E.S.T. (Sholin.)

International DX'ers Alliance

This club has three months to go to complete its 3-for-1 membership drive, one new member a month for each existing member. Get busy, fellows. Let's put I.D.A. over the top!

United States Radio DX Club

The management of this club asks a question of its members would it like a program devoted to DX over one of our local broadcasting stations with short-wave tips from its official organ, the "DX Reporter". The club invites members and non-members to send in short-wave DX reports for the official organ.

National Radio Club

This club is announcing a new big prize contest for verification of special programs. Write in to the club for news.

The Globe Circlers DX Club

Officers of the club offer cordial greetings and best wishes to the following new members: Carl Forestieri, John Kofron, Jr., A. J. Paul, Bernard Murray, Jr., Herb

Diedrich, James Richardson, Jr., and Art Ling. This club also has a membership drive on and offers a prize to those members bringing in the largest number.

Swiss Short-Wave Society

This society is to radiate special programs the first Monday of each month dedicated to countrymen abroad on several stations of the Swiss Short-Wave Society (USKA) and over the station of the Society of Nations at Geneva at the following times: 21:10 to 22:15, Central European Time, or 3:10 to 4:15 p.m., Eastern Standard Time, over the USKA stations: HB9B, 14,236 kc.; HB9H, 7005 kc.; HB9J, 1440 kc.

The transmission will be repeated 24:00-01:00, C.E.T., of the same day by HBL, 9595 kc., and HBO, 7797 kc., and over HB9B, 14,236 kc., and HB9AT, 14,290 kc. These programs are scheduled for the following dates: Nov. 4th, Dec. 2nd, Jan. 6 1936, Feb. 3rd.

International 6000- to 12,500-Mile Short-Wave Club

A new vice-president, Mr. Thomas F. Tynan, is announced in place of J. H. Miller for this organization. The club is growing fast and many new members with real DX records have become affiliated.

NVVR

The NVVR (Dutch Society for Radio Telegraphy) has now opened a new short-wave department, including a QSL Department and a QRA Department. The club has 2000 members. QSL Bureau address is P.O. Box 800, Rotterdam. The QRA Bureau address is Herenstraat 26 bis, Utrecht.

Society of Wireless Pioneers

Extensive arrangements are being made by the twin city radio organization for entertaining D. R. D. Wadia, visiting America soon from India. All British Colonial and European members please forward news items to Henry B. Shields, Associate Director of British Colonial and European Affairs, 35 Bluestone Road, Monston, Manchester, England. Mr. A. Fabius of Honolulu, T. H., is now in charge of Honolulu affairs and all prospective members in the territory will kindly contact him at P.O. Box 411 for establishing a chapter in Honolulu.

Use of the Terms S.W. Listening Post Observer

There are a number of terms now being commonly used in DX circles which, so far as the editors have been able to determine, were originated by RADIO NEWS. Among these terms are "listening post" as applied to radio reception, "listening post observer," "official listening post," "official listening post observer." These terms are copyrighted by RADIO NEWS and have been in use in this publication regularly since 1932.

During the past year or more some of these terms have been quite commonly adopted by the various DX clubs. More recently, however, newspapers and other magazines have been following the lead and are also making free use of these terms. RADIO NEWS has no objection to their use by DX or short-wave clubs and hereby extends permission to any and all clubs to use them freely. However, it is suggested that commercial publications desiring to make use of these terms make written application to the editors of RADIO NEWS for permission.

Readers Who Are Awarded "Honorable Mention" for Their Work in Connection with This Month's Short-Wave Report

E. S. Darlington, Harold J. Self, W. A. Shane, Edgar J. Anzola, Rudolph Kuré, Joe Stokes,

Oliver Amlic, G. G. Petric, Alex N. Chalmers, Theodore J. La Chapelle, Jr., Richard Zenick, Hans Bergner, Michelangelo C. Michaelson, Bob Gaiser, Chas. B. Marshall, Jr., Leo Herz, J. P. Edbrooke, Eric Butcher, Harold P. Gilmour, Caleb Wilkinson, Hugh W. Kaupilla, Marshall, J. Terry Atkinson, Earle R. Wickham, A. J. Paul, Mrs. I. R. Ledbetter, J. Herbert Lyde, Donald Robinson, Louis T. Haws, Carl Schradieck, Louis Alexander, Thaddens Grabek, Gilbert W. Dixon, D. R. Wingate, Glenn Deater, Hilbert Jensen, Bill Bundlie, A. D. Ross, Carl P. Peters, E. Scala, Jr., Fred M. Craft, Walter L. Chambers, O. P. Stancer, N. C. Smith, Edward Poltlig, L. C. Styles, M. Keith Libby, Walter F. Johnson, Arthur Evans, Manuel E. Betances, G. W. Twomey, M.D., Edgar J. Vassallo, R. C. Messer, J. Wendell Partner, A. B. Baadsgaard, Douglas S. Catehin, Alan E. Smith, Sam J. Emerson, Edward DeLaet, A. E. Emerson, George Hlenberger, Sydney G. Miller, L. M. Jensen, R. L. Young, Manuel Ortiz G., Boris Scheierman, F. Crowder, Spencer E. Lawton, Merton T. Meade, Chas. C. Moody, B. A. Peachey, Geo. Pasquale, L. Hintzbergen, O. Hersowitz, Edward Graf, H. Mallet-Veale, Theodor B. Stark, Walter G. Germann, W. Howe, H. H. Parker, Howard T. Neupert, Lionel E. Gleason, M. L. Gavin, Frank D. Andrews, R. Lawton, Roy Sanders, Harry M. Mohridge, F. W. Alfred, A. Belanger, George Munz, Bill Schumacher, Joseph Johnson, John Gildea, N. C. Smith, Donald Graf, Fred A. Pilgrim, F. T. Reilly, Eddie C. Zarn, W. E. Frost, C. H. Skatzes, V.D.S., Jack Cook, Robert J. Flynn, Arthur Leutenberg, Howard Adams, Jr., Arthur B. Coover, Vincenz Wood, Stephen Scabal, Joseph V. Trzuskowski, J. Wilson, G. L. Harris, Dwight Williamson, Orval Dickes, A. H. Dalal, P. H. Burakowski, Louis Horwath, George Charles Sholin, Kenneth Board, S. G. De Marco, M.D., Phillip R. Belt, and Harry E. Keutzel.

fer, there is a shield over this wire and this is the common ground lead between tuner and amplifier. Next, obtain a "B" voltage of about 150 volts from the old set or P.A. system to which it is connected. The approximate current consumption at this voltage for all 6 tubes is 30 ma.

The operating controls shown on the front of the panel are reading left to right: first the selectivity control; second the main tuning control; and under this, the wave-band switch and at the extreme right the volume control and power switch.

Checking Up on 5-Meter DX

(Continued from page 335)

The way of practical communication was carried out as late as Saturday, September 21st, when during one of these tests where 5-meter stations were being worked under the call of W2QZ portable from the Westchester Listening Post at Pelham, N. Y., a contact was made with Mr. Harry Lockwood operating a transmitter on 20 meters under the call W2HFS. Through Mr. Lockwood's cooperation a 5-meter contact was maintained with the 20-meter amateurs in the neighborhood, duplex communication being established. A while later the 5-meter transmitter, working through W2HFS on 20 meters, established communication with W9BJ in St. Louis. The 5-meter signals being picked up by W2HFS, about 5 miles away and rebroadcast quite clearly on the 20-meter wave to St. Louis. A 20-meter receiver at the Westchester Listening Post brought W9BJ signals back and rebroadcast them on 5 meters to W2HFS, so that all parties could talk back and forth. It is quite possible that further practical applications of 5-meter radio telephony could be arranged, with one large station on the higher wavelengths working over great distances and several 5-meter stations, located at nearby points with both 5-meter and higher wavelength receivers. We merely point this out as a possibility for a new kind of amateur work for future reference.

All-Wave Tuner

(Continued from page 347)

The circuit of this tuner is shown in the accompanying diagram and it will be noticed that the new metal type tubes are used in all stages. A type 6K7 tube is used in one stage of r.f. preselection, a type 6A8 as a first detector, a type 6C5 as an oscillator, two 6K7's in the two i.f. stages and a type 6H6 as second detector and a.v.c. tube. Both plate and grid circuits of the i.f. inductances are tuned and the first two i.f. amplifier coils are of the variable coupling type which is used for maintaining high-fidelity performance. The coupling of these two coils is controlled from a knob mounted on the front panel. The i.f. amplifier is tuned to 470 kc.

The tuner has a wavelength range, in four bands, from 12 to 2100 meters. The radio frequency preselector stage is employed on all bands and it is of material assistance in reducing cross-talk interference and in minimizing noise. The tuner is equipped with an attractive 4-inch airplane type dial of the latest design and this dial offers a choice of either a 40 to 1 ratio tuning action or a micro-vernier action of 125 to 1.

The unit has its own filament transformer and supplies the necessary filament voltages to all tubes. When the unit is ready for installation it is only necessary to connect the antenna and ground leads, then connect the white wire to the control grid of the first tube in the audio ampli-

The Equipment Used

The Peak X4 56-60 mc. radiophone transmitter used in these tests was operated from the Peak N3P heavy-duty power supply. The transmitter uses one type 76 and three type 6A6 tubes with an 83 rectifier connected in the circuit shown in Figure 1. The job was completely 110 volt 60 cycle a.c. operated except for a microphone battery. The receiver used was Peak Q5 ultra-high-frequency "superhet," using one 6C6 tube, two 6D6 tubes, one 85 tube and one 42 output tube. The set was used with a suitable a.c. power supply unit. With this receiver it was found that much better DX reception on 5 meters could be obtained and there was no trouble from signals being too weak to break down the characteristic "rush" on some of the other super-regenerative receivers that were being tested out at the same time. It is the writer's opinion that the 5-meter ham bands offer definite possibilities for experimentation and exploitation during the coming year and if the amateurs will really get down to steady work on this range, the results will prove not only interesting but entirely worthwhile.

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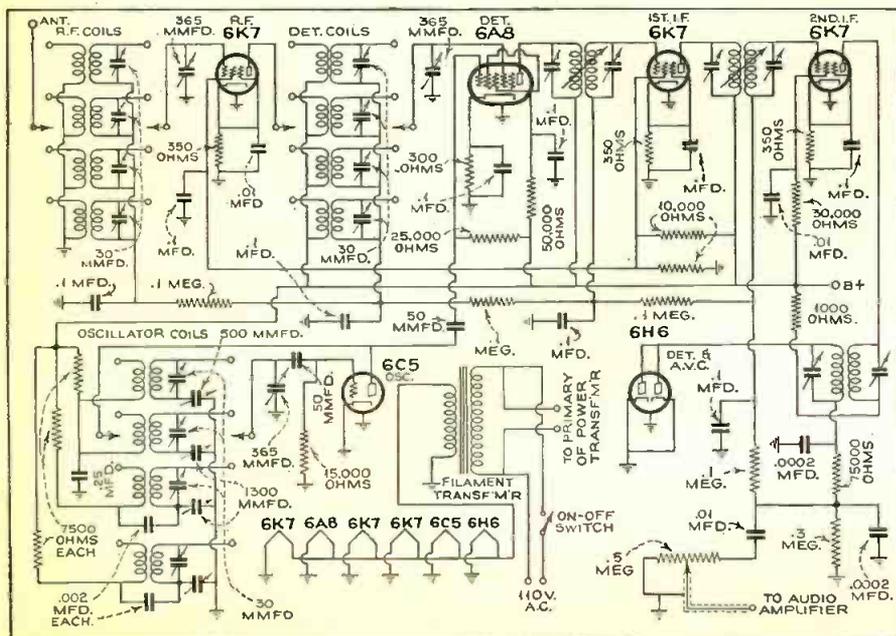
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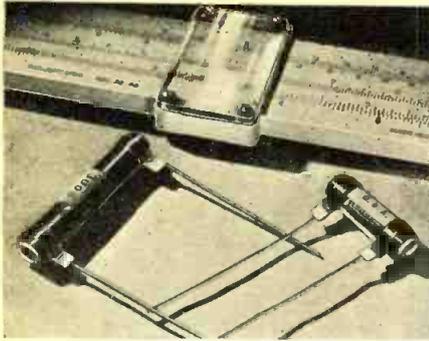
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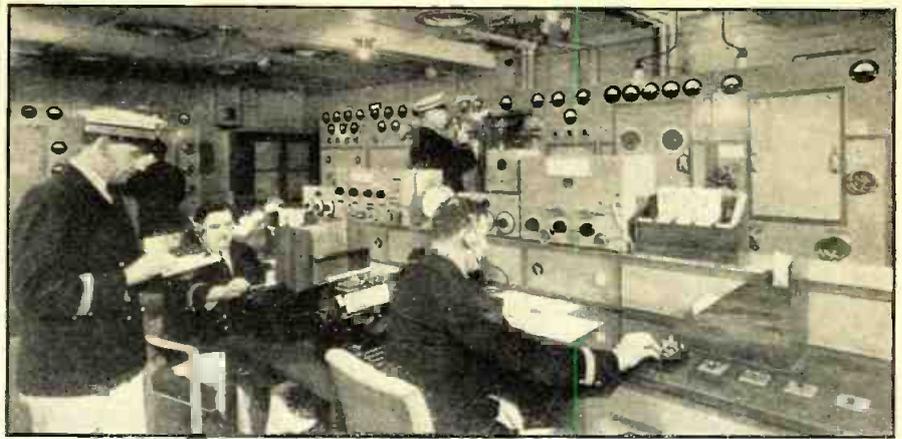
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QRD? QRD? QRD?

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IT IS indeed pleasant to hear from various parts of the country anent the progress that is being made in bettering the morale of the lowly radio technician. Large and small locals of the ARTA with a 100 per cent enrollment seem to be fairing better than those with memberships of a meager amount, which is, of course, understandable. Recently, L. W. Briggs, secretary of the Utica, N. Y. local, advised us, by hurry-up postal card, that this magazine and column were FB and that an agreement was copped with WIBX. Not so bad, what?

AH, how good the miles and the grass in the other operators' back yard looks. Across the briny deep (yeh poetical) comes a long drawn sigh for the joy of being an operator under the Stars and Stripes. We sit around these heah parts wishing we were there in deah old Wellington, New Zealand, from whence cometh this strange sigh and he, by a strange quirk of fate, gazes longingly towards these coasts also wondering and wishing. Brother B. E. Graham-Goodger now sitting on top (or is it the bottom?) of the world does now seem to know that at the present time ops. are having some tough sledding trying to get billets. Shipping has slowed down a bit in all parts of the world but is expected to pick up shortly. At that time there may be room for others, but now. . . . Almost like Mussolini in Italy replying to a like request to an Italian American operator who married a girl in Italy, "First we must take care of our citizens."

The photograph reproduced in our heading this month is a view of the Radio Room of the SS *Normandie*. It was completely soundproofed by the De Vilbiss Co. and should prove a boon to radio operators.

Amongst my souvenirs we find this epistle. . . . "then to my amazement found out that there was an awful lack of manhood among broadcast men. This I think is the real reason for the failure of these technicians to get anywhere. There are indeed some very FB broadcast men but the others prevent them from making any sacrifices to gain their much-needed better conditions. . . . You tapped a new thought when you mentioned the boys who give the impression of big salaries when they are actually struggling along on seventy dollars per stipends. . . . There is never a class of workers who are so continually broke as the broadcast men. Perhaps it is the association with under-paid self-glorified announcers that helps lower the standards of the radio profession in that field. . . . In contrast is the splendid spirit of the ship-men and I am thankful that I had the opportunity to climb aboard every ship that entered San Pedro harbor." Catch on?

To be an iconoclast in the business world is highly commendable, but not, in our opinion, practical. J. Richard Meloan, former delegate for the ARTA in the broadcast field on the West Coast, is now chief instructor of the Kelsey-Jenny Radio School in San Diego, and insists that only by being honest with a prospective student can one gain the confidence of said person. Brother Meloan is absolutely correct in his assumption that a radio instructor must be honest, first with himself, but does not seem to realize that *proper advertisements to explain his methods of instruction must be presented to the embryonic op before he can be convinced of the efficiency of the school*. It is to be hoped that Brother Meloan's naive manner will win him many friends and students and plenty of success in his new field.

The RCA is proposing to meet nature in her occasional turbulent moods with the sheer brute force of man-made radio power. Apparatus more powerful than any ever built for this service is being made ready to harness kilowatts to the task. It is expected that this xmtr, a 200-k.w. short-wave job under construction at the company's station at Rocky Point, Long Island, will be available for commercial use by this fall. By means of this tremendous short-wave power, which is five to ten times the intensity usually employed in international communication, it is proposed to "battle the ionosphere with kws" and over-ride certain natural obstacles which to date have limited the signal strength under abnormal conditions. What the engineers expect to determine is whether the hours of usefulness of one or more of the wave bands used in long range communication may not be lengthened and the effects of magnetic storms minimized by the use of increased power. The xmtr will work on 28 meters or in the neighborhood of that wavelength.

A bit belated but nevertheless timely is the story of the strike and victory of the ARTA against the IMM lines. To those who have not heard or read of the account of this short but dramatic struggle for better conditions we set forth the meat of the whole fight. The SS *Manhattan*, the newest and finest floating palace of the

IMM Line, due to sail at twelve noon, was delayed until almost five P.M. while negotiations were carried on between Franklin of the IMM and Haddock of the ARTA. Due to deadlocks the able assistance of B. Golden of the Federal Labor Relations Board had to be brought into the situation and a compromise was agreed on whereupon the ship sailed but carried a complement of five instead of the usual three ops. Wages were adjusted and conditions were bettered. The wages were almost up to the level which was first suggested by the ARTA and if shipping does pick up and these wages prevail, and there is no reason for them being lowered if operators stick together, many broadcast and airways ops will shoot back to the high seas very pronto.

It is noted that a young lady, Anne Smalley, went a' scabbing on the struck Cities Service Toledo. The line must have been in an awful position to have resorted to the services of a YL whose knowledge of radio consisted of a bit of operating and very little of apparatus. If it is publicity she craved, then this column confers upon her space which could be used for much better subject matter, but willingly presents her with it if she will only go home and tend to her knitting, permitting men to do a man's job. So, toodleoo, Annie, old girl, take an old salt's advice and never dirty the fo'c's'le when your part of the ship is the well deck.

And now, me hearties, 'tis time for the old bunk and sweet memories of salty days, blue-sky nights and coffee on the bridge with the helmsman, riding high and falling softly with no thoughts on the mind but the next port of call and the gal we left behind us. More dough in our jeans, the batteries out of the quarters and a more pleasant "Hello" is all we want right now and it won't be long if the gang keeps sticking together, all-for-one and one-for-all. And now that the festive season begins, it is timely to suggest that only the meat around the bone of the turkey should be devoured and not the bone. Bones don't turn corners, see? Also, leave a bit of the gravy for sister or brother, and remember that we always have something to be thankful for if only for the strength we have had carrying on . . . so ge . . . 73 . . .GY

"Ham" Set Uses Dual Regeneration

(Continued from page 333)

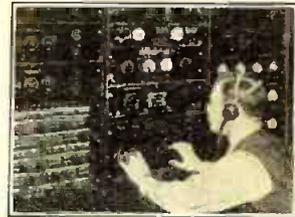
delivers 115 volts d.c. to the single section filter consisting of filter choke L2 and 16 mfd. condensers C12 and C13. Filament current is obtained through the use of a resistor-cord-plug of the type usual to a.c.-d.c. sets. Hum is zero due to ample filtration and no possibility of a.f. induction.

For c.w. operation, the lower right hand (second detector regeneration) control is advanced to just beyond oscillation (indicated by the usual "plunk" sound in the headphones), proper coils inserted and tuned to the desired band by means of the upper detector and oscillator tuning knobs, and the first detector regeneration is adjusted by the left hand lower knob to just below oscillation. Careful adjustment of the lower right knob to just beyond oscillation gives selectivity such that single-signal c.w. reception is had in terms of practically complete rejection of the second beat note or audio image, for signals as strong as K9, if the set has been tuned to yield a 1000 cycle beat note due to second detector oscillation. For phone reception this lower-right knob must be adjusted below the point of oscillation. Construction is simple in the extreme—a screw driver, cutting pliers and soldering iron do the job, which should only take an hour or two at most. Yet the final assembly is ship-shape and commercial in the extreme, with all parts mounted to provide shortest possible wiring as can be seen. Kits are available for either battery or line operation, or either model may be obtained in built-up form, ready for use.



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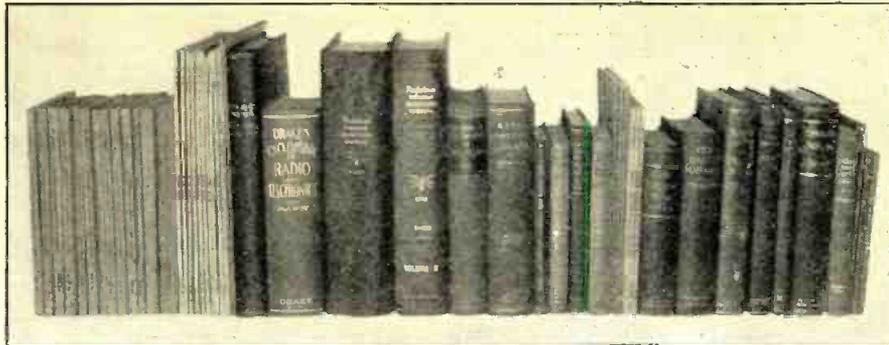
Foundation Kit as described on Page 237 of October 1935 issue of RADIO NEWS consists of the following: 1 set Special Radio News DX, Converter Coils, Tuning cond. 3 gang 405 mmfd.; Hammarlund midget condenser; 4 plate 50 mmfd.; Special Padding cond. 800-1600 mmfd.; Mica condenser .0065 mfd.; Cadmium plated drilled chassis, with panel welded in position; 4 tube sockets, 3 tube shields, 2 binding post strips. Your Cost **\$10.95**

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THE TECHNICAL REVIEW

CONDUCTED BY ROBERT HERTZBERG

Measurements in Radio Engineering, by F. E. Terman; McGraw-Hill Book Co., 1935. Making reliable measurements at radio frequencies has always been an unusually difficult problem. Many books on the subject have been highly mathematical and theoretical, leaving many a reader still unable to make the required measurements. Professor Terman has succeeded in giving more practically useful information in his book than is customary in similar treatises. Yet, it is not in any sense a "popular" book. Mathematics is used sparingly and the text is so clear that careful students of the contents will feel confident that they can perform most of the described measurements.

Besides describing the methods of measurements with their respective merits, the author also gives very valuable information on the design and construction of laboratory apparatus such as oscillators, multivibrators, etc. The opening chapter deals with the measurement of voltage, current and power, first of direct current, then of a.c. and at radio-frequencies. Right in the beginning one learns the proper way to connect shunts to a milliammeter so that the switch contacts are not in the shunt and the meter cannot burn out. It is also shown where to put fuses so as not to influence the accuracy of the instrument. Following chapters discuss the measurement of circuit constants first at audio frequencies, then at radio frequencies. Here, for instance, one will find several methods of measuring the distributed capacity of a coil. Continuing, the author leads one to all sorts of measurements such as frequency, wave form and phase, vacuum tube characteristics, a.f. amplification, receiver performance, oscillator, power-amplifier and modulation measurements, measurements on radio waves, antennas and transmission lines. Final chapters discuss laboratory oscillators, cathode-ray tube applications and laboratory experiments.

Practical Radio Communication, by A. R. Nilson and J. L. Hornung; McGraw-Hill Book Co., 1935. This is a text book for radio operators of all classes. It thoroughly discusses the fundamentals of radio theory and describes the working, construction and operation of commercial equipment now in use on radio stations on ships, airplanes and on land. Old radio operators will be envious when they see the books available for present day students. In their time, books on radio were very scarce and they could of course not compare with those offered today. The author goes deeper into the theory than has been done in books for operators in this country. For the first time there is an account of the complex algebra to solve a-c networks; the text contains many vector diagrams and one occasionally encounters calculus.

There would not be sufficient room here to enumerate all the subjects in this 750-page book. In general, it begins with the theory of electricity and magnetism, continues with introduction to vacuum tubes, transmitting circuit principles, receiving circuit principles, antennas and wave propagation. Then follows broadcast station equipment, communication transmitters, radio receivers, radio aids to navigation. The last part of the book is devoted to power supplies; rectifier units, dynamo-electric machinery and storage batteries. This is rather an unorthodox procedure, but the author believes that the reader wants to be introduced to radio at once and does not care to wade through chapters on power supplies first.

The prospective radio operator as well as all radio operators and many engineers will find in this book a complete description of present day apparatus at various types of radio stations with directions on maintenance, adjustment and repair.

Radio Amateur Call Book Magazine. The Fall 1935 edition of the Radio Amateur Call Book is a fat, 296-page book that every transmitting amateur and short-wave broadcast listener will want to have on his operating table. It is the only thing of its kind in print, and is absolutely indispensable to the serious listener who wants to be able to identify the various stations that he hears.

In addition to all American amateur stations, the book includes high-frequency commercial stations, foreign amateurs by countries, amateur prefixes, international abbreviations and signals, U. S. radio inspection districts, high-frequency time and weather stations, and a lot of other incidental information of value.

Review of Articles Appearing in the September, 1935, Issue of the Proceedings of the Institute of Radio Engineers

Aircraft Radio Equipment for Use on European Air Lines, by A. D. Hodgson. Description of a compact receiver-transmitter unit, of English design, intended for small and medium size aircraft. Electrical remote tuning is used for the receiver, and automatic volume control on both telegraph and telephone signals is provided. The whole installation weighs only 60 pounds.

Parasites and Instability in Radio Transmitters, by G. W. Fyler. This paper describes several types of parasites or spurious oscillations and other forms of radio transmitter instability, and discusses methods of locating and eliminating parasitic circuits.

The Grid Coupled Dynatron, by F. Malcom Gager. A short paper dealing with an improved oscillatory system wherein the

dynamic excursion is associated with the secondary emission region of the vacuum tube characteristic, plate current vs. plate voltage. A more or less conventional dynatron oscillator, using a tetrode, is improved by feeding back some of the output power to the inner grid. The maximum increase in oscillatory power was found to be about 50% above the same system with a static control-grid potential.

Optimum Design of Toroidal Inductances by Grote Reber. Two fundamental types are analyzed, and equations and curves for condition of maximum Q and parallel resistance are set forth. The determination of r.f. resistance, operating conditions and possible uses are discussed.

Development of Transmitters for Frequencies Above 300 Megacycles, by N. E. Lindenblad. Including many clear photographs and diagrams and much practical data, this paper on ultra high-frequency transmission is one of the best that has appeared in many months. Advanced amateurs would do well to read it carefully and study the methods and equipment used by RCA Communications.

Some Possibilities for Low Loss Coils, by Frederick Emmons Terman. Professor Terman, whose books on radio and communication are achieving world renown, discloses that a toroidal coil wound with a flat conductor, so curved that the flat side follows exactly the surface of the toroid, has remarkably low losses. He discusses the practical difficulties of realizing the theoretical possibilities and shows that the mechanical construction must have a perfection comparable to the skin depth of current penetration.

Dissipation in Phase-Compensating Networks, by A. T. Starr. The effects of dissipation in the lattice-type, phase-compensating network are considered, and several methods are suggested for avoiding such troubles as attenuation and variation of the image impedance.

Review of Contemporary Literature

Electrical Engineering, for August 1935, contains several articles pertaining to radio: The Hawaiian Radiotelephone System by W. I. Harrington and C. W. Hansell. An account of the ultra-shortwave telephone circuits between the Hawaiian islands.

Ship-to-Shore Radio in Puget Sound Area by E. B. Hansen. A description of radio telephone apparatus used on small ships for communication with a landstation with relays to the telephone network.

Recent Research in Radio Communication by F. Hamburger. A bibliography of literature on advances in research on wave propagation, television, the properties of antennas, and investigations of high fidelity.

A Radio Interference Measuring Instrument by F. O. McMillan and H. G. Barnett. Description of an instrument to measure the crest and effective values of interference field strength.

Electronics, September, 1935. This issue comes to the reader as a pleasant surprise, for the magazine has been increased appreciably in size, a finer grade of paper is used, the illustrations are clearer and more striking, the format is simpler and more attractive and the articles are longer and more numerous than before. The overall improvement seems to justify the increased price.

What's in a Circuit by George Grammer, *QST*, October, 1935. A discussion of some of the theoretical and practical problems encountered in building a simple oscillator-amplifier transmitter for amateur use.

Simple Methods of Measuring Resistance and The Proper Use of Resistors to Extend Meter Ranges, appearing in the July and August, 1935, issues, respectively, of "The Aerovox Worker". Two excellent articles of considerable practical value to radio experimenters, service men and amateurs.

A Simple Low-Cost Transmitter, by W. W. Smith, *R9*, September, 1935. An efficient, versatile and economical rig for the newcomer in amateur radio.

R.F. Measurement of Resistance, Reactance and Impedance, by T. C. Macnamara. "The Wireless Engineer" (London), September, 1935. The method described by the author consists of injecting a voltage of the desired frequency into the circuit to be measured, and measuring the applied voltage and also the resultant current.

New All-Wave Noise Reducing Antenna System, by T. Lundahl, *Service*, September, 1935. This system was designed to provide efficient, noise-free reception on both broadcast and short waves by means of a simple doublet type antenna, using coupling devices at the antenna proper and at the radio receiver.

An Analysis of Coupled Tuned Circuits at Radio Frequencies, by L. A. Kelley. Proceedings of the Radio Club of America September, 1935. A thorough and highly mathematical treatise on a highly complicated subject, to be read with the aid of a slide rule and a lot of black coffee.

Technical Booklets Available

Yaxley Replacement Manual

The 1936 edition of the Yaxley Replacement Manual and Service Guide is a 160-page book that belongs in every serviceman's tool bag. It lists replacement volume controls for thousands of receivers, replacement vibrator units for automobile sets and other products. Because of its great cost of preparation, this book is offered free only to men actually engaged in radio servicing work. Requests for copies will be honored only if they come on business letterheads indicating that the reader is a bonafide radio serviceman or dealer. Send requests to RADIO NEWS, 461 Eighth Ave., New York City.

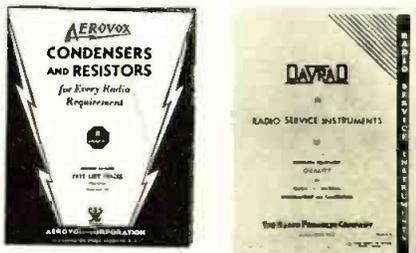


Latest Sound Equipment

The Webster Company 16-page catalog of amplifiers, microphones and numerous accessories for public-address work includes numerous illustrations and complete technical specifications. To obtain a copy free of charge, write to RADIO NEWS, 461 Eighth Ave., New York City.

Catalog of Condensers and Resistors

This is the third edition of the 1935 Aerovox catalog, which lists a very extensive line of condensers and resistors for all radio requirements. Copies of this publication are obtainable free from RADIO NEWS, 461 Eighth Avenue, New York, N. Y.



Latest 1935 Catalog

RADIO NEWS offers, through the courtesy of the Radio Products Company, an 8-page catalog which lists the complete line of Dayrad precision radio service instruments. The booklet describes portable and counter tube-testers, a multi-range measuring instrument, analyzer, a vibrator tester and an all-wave signal generator. To obtain this catalog simply send in your request to RADIO NEWS, 461 Eighth Avenue, New York City.

RADIO NEWS Booklet Offers Repeated

For the benefit of our new readers, we are repeating below a list of valuable technical booklets and manufacturers' catalog offers, which were described in detail in the June, July, August, September, October and November, 1935, issues. The majority of these booklets are still available.

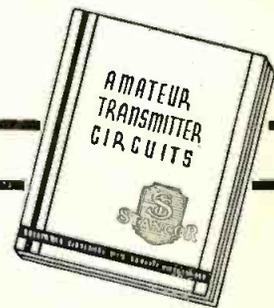
(Turn to page 381)

A New Book for the Amateur and the Experimenter

Every amateur and experimenter should have a copy of the new "Radio Handbook" for his radio library. Containing 296 pages, it is packed full of valuable practical data on short-wave receivers, transmitters, transceivers and antenna systems of all types. There are numerous diagrams and illustrations and the values of the parts and the coil specifications are also included. Fundamentals of radio are given and every phase of amateur activity from learning the code to operating a one kilowatt outfit is told very thoroughly and capably. The charge for this fine book is one dollar (\$1.00) and any of our readers desiring a copy can obtain same by forwarding his remittance to RADIO NEWS, 461 Eighth Avenue, New York City.

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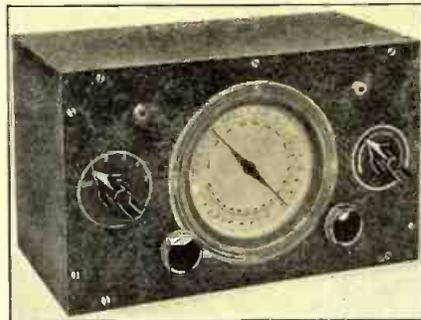
WHAT'S NEW IN RADIO

(Continued from page 329)

features an airplane-type dial with dual-ratio drive, a wavelength range from 13 to 550 meters and an 8-inch electrodynamic speaker. The set incorporates automatic volume control and a tone control. The dimensions are 21 by 13½ by 10½ inches.

All-Wave Signal Generator

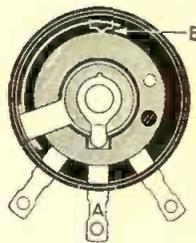
The new model 339 oscillator produced by the Radio Constructors Laboratories is direct reading, operates from either a.c.



or d.c. current and has a fundamental range from 54 to 17,000 kcs. By the use of harmonics this range can be increased to about 100 mc. The instrument employs a neon tube for the audio oscillator.

New Departure in Variable Resistors

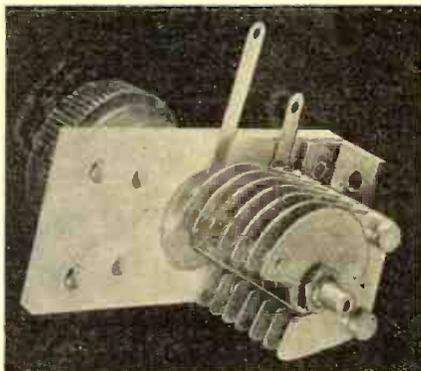
The Electrad Company has recently introduced a supplementary control which, when affixed to their standard control will form a tandem unit and thereby increase



the control range. It is so constructed that it can be easily and quickly attached to the single unit. The model S203 shown here is a tapered 500,000 ohm unit which can be applied to many circuits.

New Condensers for Ultra Short-Wave Fans

This new midget condenser is made by the National Company for use in ultra high-frequency circuits. A balanced-stator

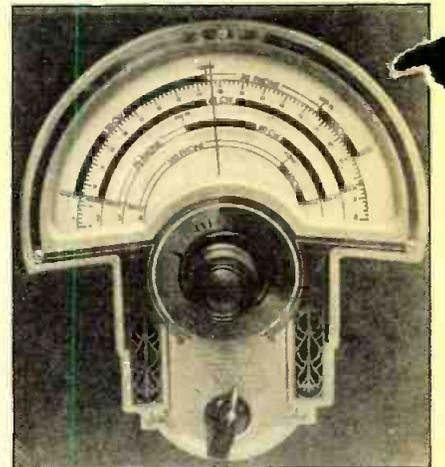


model is also available, in which two stators act upon a single rotor. The single space condensers are available in 15, 35, 50 and

75 mmfd, and the double-spaced and balanced-stator, single-spaced units in 25 mmfd. capacity.

New Dial for Communication Receiver

Directly below is a close-up of the new tuning dial for the Tobe 7-tube amateur receiver. In connection with the wide band-spread feature of the receiver, the dial spreads each of the 4 amateur bands over a wide area. The scale shows the limits of the different bands and indicates the c.w. and phone sections. The



small or mechanical band-spread pointer is geared directly to the condenser, permitting accurate logging.

For Locating Interference

It is possible with the new Sprague interference analyzer to tell exactly what condensers or chokes are needed to eliminate noise from motors, oil burners, or other types of electrical equipment causing interference. A serviceman or dealer can easily and quickly connect the analyzer into the circuit of the electrical appliance and show his customer how interference may be eliminated by the use of the proper filtering components. The service-

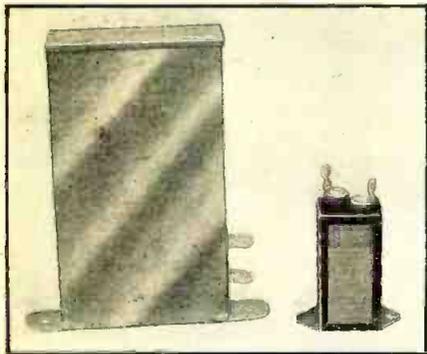


man simply notes the position of the analyzer switch and refers to the instruction chart which accompanies the instrument. There are shown the parts numbers of the condensers or chokes required to get exactly the same filter combinations.

New Midget Size Oil-Filled Condensers

To demonstrate its unusually small size the new Cornell-Dubilier type TF non-inductive, oil-filled condenser rated at 1000 volts is shown in the photograph beside a standard paper condenser of the same rating. These new condensers are available in capacities of .05, .1, .25 and .5 mfd. The

dimensions are 2 inches high by 1 inch square. They are designed for use in high-



fidelity amplifiers, transceivers, aircraft receivers and transmitters.

Tube Tester with Index

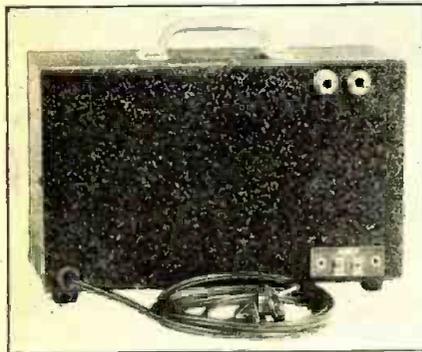
Accommodating both glass and metal type tubes, this new Radio Products Company, "Dayrad" portable series 20 tube checker includes an index system that pro-



vides complete settings for the particular tube under test. The instrument can also be used in servicing radio receivers, as it has an ohmmeter range up to 40,000 ohms and a 400 volt d.c. voltmeter range.

A.C.-Operated Pre-Amplifier

This compact pre-amplifier is designed to be used with crystal microphones and the Audio Development Company, manufactures of this new unit, supplies the following specifications: gain 35 db.; fre-



quency response, within 2 db. from 30 to 10,000 cycles; input impedance, 5 meg-ohms; output impedance, 200 ohms; tubes required—one type 74 and one type 84.

A New Instrument for the Serviceman

The new Solar capacitor analyzer utilizing the Wien Bridge method of capacity measurements should be a great aid to the serviceman for detecting leaky, shorted, open and intermittently defective condensers. The capacity range extends from .00002 to 70.0 microfarads.

Farnsworth Television

(Continued from page 331)

a regular succession of space elements and convert them into corresponding signal currents adequate for routing over but one signal channel.

Current impulses are amplified by an electron multiplier (E) which is an integral part of the valve, and by vacuum tube amplifiers (F and G) to produce signal voltages great enough to modulate a radio carrier. Mr. Broly explained further that the connections (H and K) between the scanning circuits and the amplifier, provide signal impulses which automatically synchronize reproducers tuned to the transmitter.

The cathode-ray tube (M) is the heart of the reproducer. It converts the received electric impulses into corresponding light variations and arranges them in orderly space-sequence to reproduce the image at the transmitter. This is done with the use of the scanning system comprised of the coils (N-N), the associated oscillators (O-O) and the tube (M) itself. Once more the scanning oscillators are joined to the signal channel as shown by P to make possible automatic control from the transmitter. Mr. Broly points out that amplification compensates for the inefficiencies of translation and transmission while the series of processes is completed by propagation of the signal.

It was also explained that the focussed electron image in the dissector is scanned by displacing it in its own plane by means of transverse magnetic fields which sweep the image across a fixed aperture, thus allowing a small area of the picture element to produce a current in an electrical circuit, where it may be amplified and transmitted over wire lines or by radio. A resultant field which is inclined to the axis of the tube is obtained by the addition of a transverse magnetic field to the focussing field. Electrons starting from given points on the cathode travel in spiral paths directed along the resultant magnetic field and come to focus at a point displaced by the transverse field.

It was pointed out that the pictures at the receiving end could be black-and-white, a fluorescent green and black or possibly other colors. It seems that there is a public objective toward black-and-white pictures. It is not because black-and-white images are more natural, but rather on account of the fact that the public has learned to accept black-and-white as natural through constant attendance at motion-picture shows. The color of the picture through the Farnsworth methods depends on material utilized to produce the fluorescence of the cathode-ray tube screen. In the Farnsworth tests, pictures with a greenish tone were obtained through the use of a zinc orthosulfate screen. To reproduce images in black-and-white, a combination of substances, including calcium tungstate, is employed.

At Farnsworth's test transmitting point (for both wire and radio), the apparatus includes his cathode-ray "camera", or "dissector", an amplifier for the minute impulses and an ultra-short-wave transmitting outfit. And, as noted, the receiver also embodies the cathode-ray tube and its allied equipment.

Experiments have reached the stage where home model receivers have been designed in attractive cabinets. The featured model seen at the Philadelphia demonstration for the Radio News staff has the screen end of the cathode-ray tube framed neatly at eye level from a sitting posture (Figure 3). The arrangement of the apparatus can be seen in the rear view, Figure 4. Commercial rack mountings of Farnsworth equipment have also been designed (Figure 5).

The recent tie-ins accomplished by the Farnsworth firm with the Baird interests of England and the Fernseh A.G. group of Germany will eventually result in a pooling of the best features of all three systems in a single set. The outward similarity of the new Fernseh set to the Farnsworth home model can be noticed in the German model shown in Figure 6. The modern encasing enhances the appearance of the set while doors hide the control knobs.

The "Oscillight Tube", as the receiver cathode-ray tube has been named, is shown in Figure 7. The flat, broad end is the fluorescent screen and the electron gun is toward the end of the funnel-shaped valve. In and around this cylindrical end of the funnel is also mounted the focussing and horizontal magnetic deflection coils and the vertical deflecting magnet.

One of the chief things to be ironed out in television as Mr. Farnsworth was quoted in last month's article, is "standardization." This, he declared, must precede commercialization. Also, he said, that his firm will not manufacture television equipment, but will issue non-exclusive licenses to other companies. Philco already is sanctioned to make Farnsworth-type receivers while Heintz and Kaufman has permission to make visual transmitters. Although the Farnsworth demonstrations were warmly received by the press, company engineers are already at work on improvements. Instead of the 24-frame-per-second image used at the demonstrations, a speed of 48-frames-per-second will soon be used, although this will actually be an interlacing of two 24's.

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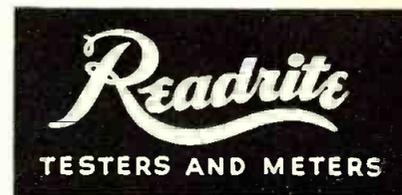
Double Grid Cap for metal and glass-metal tubes. Shadow-type A.C. meter for adjusting line voltage. Leakage and short test. Tubes tested under load. But four simple operations required. Handsome portable quartered oak case with all-metal panel having silvered letters on black background. Especially constructed against obsolescence.

Model 430 complete with Triplett instrument having direct reading GOOD-BAD scale, protected against damage.
Net Dealer's Price **\$18.00**

Model 431—same as Model 430, except has Readrite direct reading GOOD-BAD meter. **Dealer's Net Price** **\$14.40**

Readrite also manufacture all types of testers used for servicing radio sets, including: Set Testers, Tube Testers, Resistance, Continuity and Capacity Testers, Point-to-Point Testers and inexpensive Indicating Meters.

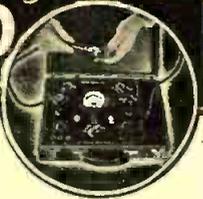
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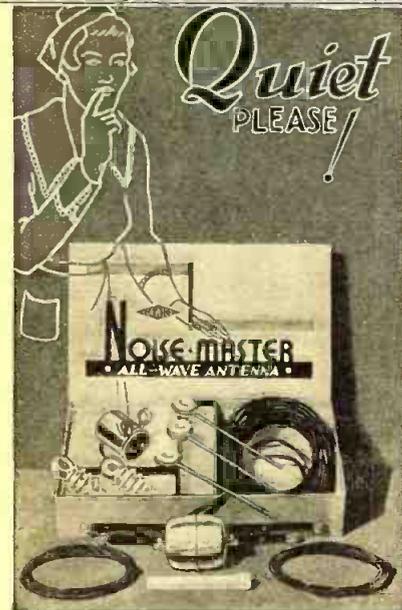
Right now while hundreds are looking for work where there isn't any, the radio service field can use trained men. With the proper training and the necessary equipment, you can enter this field and make a comfortable living. We include with our course this modern set analyzer and trouble shooter without any extra charge. This piece of equipment has proved to be a valuable help to our members. After a brief period of training, you can take the set analyzer out on service calls and really compete with "old timers." We show you how to wire rooms for radio—install auto sets—build and install short-wave receivers—analyze and repair all types of radio sets—and many other profitable jobs can be yours. Teaching you this interesting work is our business and we have provided ourselves with every facility to help you learn quickly yet thoroughly. If you possess average intelligence and the desire to make real progress on your own merits, you will be interested.

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The "Ham" Shack

(Continued from page 332)

SMILES FROM JAPAN

A 17-year-old Japanese, S. Kanda, in his radio shack, with QSL cards from all over the world.

told him of the emergency," continues W4CVQ. "All co-operated eagerly, and went off the air."

"The following were heard handling emergency traffic: W4AWD, W4BNI, W4AFQ, W4BON, W4BAC and W4ACZ. I am sure that I have missed lots of you fellows," W4CVQ says, "for I could not hear all that went on as I was busy most of the time."

The account forwarded by W4COS cites the excellent work done by Francis Wagoner, W4AVQ, of Lakeland, working on 75 meter phone with W4CQJ and W4CQK, who operates on the 160 meter band. They assembled storm and barometric data, relaying traffic and were of general usefulness at all times. W4AVQ had nearly sixty hours of continuous operation. The 160 meter phones co-operating were W4CTS, at Tampa, W4CPG, at New Port Richey, W4JZ and W4CWR at St. Petersburg. They continued operating as long as they had power.

"Tuesday brought an advisory that the storm was moving north along the Florida west coast toward Cedar Key," continues W4COS. "The situation was under control from a standpoint of 'ham' radio so Ray Caubron, W4CPW, of Ocala, headed north toward Lake City where he picked up W4BIN, of White Springs—transmitter, antenna, motor generator and all—and headed north toward Cedar Key, where they were furnished battery power to operate the thirty-two volt generator used to put W4BIN (portable) on the air."

"That night they set up at Otter-Creek. Unfortunately, their frequency was the same as W4AKI. Fortunately the storm had subsided by the time it reached Cedar Key and no lives were lost, but amateur radio was on the ground and ready before the storm hit and handled communication until land line communication was restored."

"James Beville, W4TO, operating portable at Bradintown, handled all the traffic out of that district all day Wednesday and Thursday. The western division of the Florida Power & Light Company was out. No power and plenty of damage. Beville did a good job of getting help, materials and news to their Miami headquarters through St. Augustine and Lakeland."

"N4AFC and N4AGR of West Palm Beach, W4CLW and W4CAN, of Orlando and W4AGU of Vere Beach, W4NN, W4DOY and W4DU, of Jacksonville, and several others were doing their part at this time."

"We could hear the C.W. boys on 3875 kilocycles doing their 'stuff' but did not follow their operations very much so the record of their work is somewhat neglected in this account. We do know that W4AO, W4BGL, W4NF and many others were on the job."

The time record of some of the Florida stations during the emergency as compiled by W4COS includes W4COT, Alonzo Bliss, 130 hours; W4AKI, Fred Bassett, 54 hours; George Hill who assisted Bassett, seventeen hours; W4EB, Frank P. Duckett, fifty-four hours; W4DER, Hill G. Higgs, twenty-four hours; Dean H. Cross, ninety-six hours; W4CNV, Frank R. Green, forty-two hours; W4CNA, George F. Klein, forty-one hours; W4CFC, Edward Doll, unknown; W4BOD, Cecil Bales, twelve hours; W4CZX, Joseph Dumpnd, thirty hours; E. G. Little, fifty-six hours; W4DMX, Peter Towle (fifteen years old), thirty hours; W4ED, Floyd Norton, thirty-one hours and C. R. Gray, a commercial operator, twenty hours.

Describing the work done by Bliss, W4COT and Bassett, W4AKI, W4COS says: "Monday night the wind wrecked the electric service lines in and around Miami. Frantic calls hour after hour failed to bring any response. No news was obtainable from the press. Communication lines were down. On Tuesday morning things began

to happen. The American Legion storm relief committee called upon the Miami Amateurs for communications with the devastated area on the keys."

It was then that Bassett and George Hill who has a sound truck with a portable power supply headed south. They got on the air shortly thereafter at Tavernier Key and called Miami. Power was furnished W4COT soon afterward and it was then the news began to filter through.

"Wednesday morning W4AKI reported too much time was being consumed bringing messages from Miami miles down the keys, so the portable was knocked down and loaded on a boat and set up again on Mateconkey Key," W4COS continues. "W4AKI was forced to share time with a coast guard station. They shared time on an alternate fifteen minute basis."

Later W4AKI was ordered off the air by a Coast Guard officer whereafter the portable station was returned to Tavernier Key and resumed operations.

"E. G. Little, a former amateur, was with W4AKI and George Hill was the main go-getter, keeping the message files and chasing all over wherever he could do the most good," continues W4COS. "During all this Bliss (W4COT) and his helpers were doing a wonderful job; making telephone calls to and from Red Cross Headquarters, civil authorities, military authorities, worried relatives and friends."

Winding up his interesting account, W4COS says, "That's the story as far as I know it. I may have neglected some of the fellows, in fact, I know I have, for it was impossible to hear and gather all the information as we would like to have."

This epic piece of work is only one of many which justifies the amateur and brings home to the public his resourcefulness and value to the world in general in times of emergency. Our hat is off to those who took part in this great work. They did a swell job.

Broadcast Interference Kink

Most amateurs sometime during their career are troubled with broadcast interference complaints, particularly those who operate telephone transmitters. A wave trap will solve the problem in all cases. However, this involves the use of a variable condenser and coil, and some labor. Frequently, cases of broadcast interference can be appeased with the simple installation of a choke coil of the radio frequency variety in series with the antenna lead to the receiving set. The size of course will depend on the band in which the transmitter is operated. Usually a choke coil of about 2.5 millihenrys inductance will cure the interference.

If a choke coil of this size does not eliminate the interference, a few turns of wire wound on a one-inch form will solve the problem. Generally about twice the number of turns needed for a normal wave trap will answer. However, the writer has found stock r.f. chokes cure about 90 per cent of the cases.

This method of eliminating broadcast interference is simple and inexpensive. It has many advantages, too. There is, of course, no tuning, and therefore it is possible for the operator to change frequency or the band on which he desires to operate without having to visit his neighbors and make wave trap adjustments. The choke will work effectively regardless of frequency used.

Calls Heard

By N. C. Smith, Forge House, High Street, Fooks Cray, Sidcup, England, on 20 meter C.W.: W9MV, W4MR, CX1CG, W2EBA, W1QB, W3JXF, W4CFJ, W3DCG, LY1X W9LNK,

W5AXF, W3JA, W9IU, W9AEH, W5QW, W5CUJ, W8CAR and W4HE.
 On 40 meter C.W.: W2CQU, W8ANR, W9NSP, W8LSA, W81VI, LU6AX, W4DLM, W2GZS, W2GIC, K5AG, W4ADN, W1CJS, W11DU, W3BQJ, W1JCE, W4SW, U4OG, Z4IE, LU7AZ, U4BIH, LU3EZ, OE6OB, W1HPT, W1TS, W2FHS, W4CDE, W4DGO and W9JL.

On 20 meter phone: EA7AO, W1BIC, W9BEZ, W1AF, LAIG, W2DVU, W1KK, W1AJZ, W1CND, W8ERY, W3BFH, W2COV, W4AHH, W9DNJ, W3APO, W3MD, K4SA, W2CCP, W8HTF, W2HFS, W3AMD, T13AV, CO2HY, W2HHU, EA8AB, W1AAB, W1GPE, W3XV, W2GG, W2MB, W2ZB, CO2WZ, CO2RL, W2GNO, W2EDW, W1CV, W1CRH, W1CJB, W3BSH, W3BPH and W3DLL.

By F. W. Gunn, Ox Yard, Gosfield, Essex, England, on 20 meter phone: W2CLS, W2OA, W2DST, W8BFD, VK2EP, W9CVN, W6BTH, W61TH, W6BYW, W5BDB, W7ALP, CO8YB, X1G, W5YW, W7DAA, W4ALG, W3BSY, W9DNE, W9BIF, W5ACT, OH2NE, W2PNE, W3BSY and SU1TN.

By Charles R. Stegmuller, 500 Liberty Street, Newburgh, N. Y., on 20 meter phone: ON4AC, G2DV, G5VM, G5NI, VE5HY, CT1BY, ON4CH, X1G, ON4ZA, G5ML, VF51N, X2AH, EA4AO, HPIA, G2HK, CO6OM, G5AI, HHS1A and ON4AU.

By William Bundie, 614 North Sixth Street, Grand Forks, N. D., foreign amateur phones on 20 meters: CO2SV, CO8YB, T12RC, T13AV, VE2HG, VE2CA, VE2FI, VE3DF, VE3QS, VE51N, X1G, X1K and X2AH. On 75 meter phone: VE4GA and VE4QV.

RADIO NEWS Sponsors New Opportunity for Code Practice at Home

RADIO NEWS takes pleasure in publishing the following schedule of code transmissions in the United States especially for those who wish to learn the code over the air. All one has to do is to tune in to the proper frequency as specified at the proper time and day and start copying the special code transmissions for practice. A daily schedule is given for the present month (beginning November 1st and ending December 1st). In the first column is the time (a.m. or p.m.); in the second column are the symbols, E, C, M and P (where E is used for E.S.T., C for C.S.T., M for M.S.T. and P for P.S.T.); in the third column are the call letters of the transmitters of amateur members of the Guild and the fourth column contains the frequencies of transmission in all cases, except where otherwise noted. Each CSCG transmitting station will begin his program at stated time by sending "CSG" 6 times, followed by his station call repeated 3 times, slowly. At intervals of 5 minutes, he will repeat "CSG" 6 times and his call letters 3 times. All who listen to CSCG programs are requested to write a card to the transmitting station telling him how his signals come in and, if possible, sending him copies of transmissions.

MONDAY

8:30 A.	E.	W1AMH	56,100-3536 1/2
9:00 A.	E.	W3AEJ	3785
4:00 P.	E.	N1FNM	3510
5:00 P.	P.	W7WE	3637-7274
6:00 P.	E.	N1DUZ	3638
6:00 P.	E.	W8MHE	3830
6:00 P.	E.	W8EEZ	3598
6:30 P.	C.	W9LKK	3757
7:00 P.	E.	W2HCP	3786
7:00 P.	C.	W3AEJ	3785
7:00 P.	E.	W9SFT	3585
8:00 P.	E.	W8MCP	3580

TUESDAY

8:15 A.	E.	VE3U	3865
3:30 P.	E.	W9TE	7012
4:00 P.	C.	N1FNM	3510
6:00 P.	E.	W8MHE	3830
6:00 P.	E.	W8EEZ	3598
6:30 P.	C.	W9LKK	3757
7:00 P.	M.	W9HHV	7276
7:00 P.	M.	W6IQY	7090
7:30 P.	C.	W8IKT	3750
8:00 P.	C.	W5CPV	7149
8:00 P.	E.	W8MCP	3580
8:00 P.	M.	W7DBP	3607

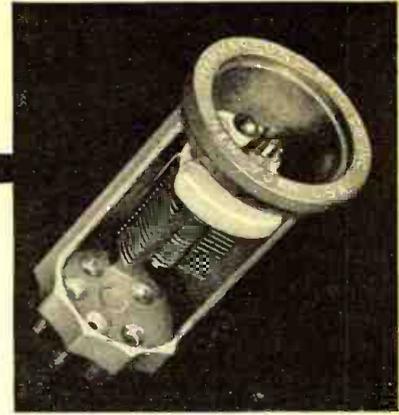
WEDNESDAY

6:00 A.	C.	W5DDC	7200
3:30 P.	E.	W9TE	7012
4:00 P.	C.	N1FNM	3510
5:00 P.	P.	W7WE	3637-7274
6:00 P.	E.	W8MHE	3830
6:00 P.	E.	W8EEZ	3598
6:30 P.	C.	W9LKK	3757

(Turn to page 379)

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THE NEW POLICE RADIO SYSTEM AT EVANSVILLE, IND. Seated at the control desk is Roy E. McConnell, Chief Engineer. Standing are: Operator Morris, at left, and Operator Montoux, at right.

Two-Way Police Radio

(Continued from page 328)

cars, is not new. Scores of American cities are using it today. Two-way systems, however, which operate with the same reliability and effectiveness as one-way, are very new. Such a system enables the motor patrolman not only to receive messages from headquarters, but to transmit messages himself back to headquarters. The man at the desk consequently becomes the true brain center in an organic body of mobile units. In directing the units, he has the benefit of instantaneous reports from them, reports of their exact positions, and their observations. While commanding a manoeuvre, he knows precisely what is going on. He can visualize an entire situation and direct it so that all cars can cooperate to the best effect. He has, in sort, eyes that see for him and voices that tell him.

It was an old army gag that the soldier in the trench knew less about the war than G. H. Q. behind the lines. As for strategy, that was true. And G. H. Q. had that superior knowledge because the liaison system fed back information from points on the front. The return channel in 2-way police radio performs the same service, telling the man at the desk what is happening on the line.

In cases of pursuit, of large fires, of riots, of any police action involving more than one unit and covering more than one spot, the return channel makes it possible to assemble data at a focal point, plan the correct move in detail, and issue the proper orders. To the man on motor patrol, the two-way system offers kindred advantages. He can make instant reports to headquarters at any time without leaving his car. Every motor policeman has at some time or other been faced by this vital decision—Shall I stop and phone in this information or is it more important for me to keep going? Late at night, even in the business section of a city, there may be blocks and blocks of locked doors, black windows, and—no telephone available. Shall he go out of his way to the police box, the drug store, the lunch wagon? How many seconds, minutes will it take him to get there, stop his car, jump out, get to the telephone, put in his call? Out in rural sections, should he stop, try to rouse a sleepy householder, get to the phone?

With 2-way radio the question does not come up. The motor patrolman has his telephone right with him; his car is a travelling telephone booth. In cases of pursuit, for instance, he can report his position without delaying the chase an instant and sometimes that instant marks the difference between the capture of a dangerous criminal or his escape.

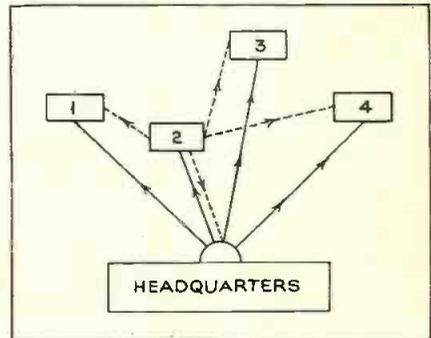
One of the most recently perfected 2-way police radio systems has been developed by the Bell Telephone Laboratories for the Western Electric Company. This system has already been adopted by Evansville, Indiana, and Nashville, Tenn. It operates on ultra-high frequencies in the band of 30-42 megacycles. In addition to a transmitter at headquarters and receivers in the patrol cars, it includes transmitters specially designed for the cars and a receiver at headquarters.

The car transmitters weigh only 20 pounds. They are only 11 by 7 by 6 1/2 inches in size and will fit into almost any unused space in the car. These transmitters are held to within .025% of their assigned frequency by the new AT-cut type of crystal. This crystal requires temperature control only below freezing. A heater automatically goes into operation at this point. A 6-volt battery, charged by the car's generator supplies power to the transmitter.

A flexible steel rod, affixed to the side or rear of the car, acts as a vertical radiator which performs the dual purpose of both transmitting and receiving. The rod projects somewhat above the top of the car reducing interference from the car itself.

A telephone, which is virtually the same as the familiar French hand-telephone of home and office, hangs on the dashboard. Relays which put the car transmitter on the air are operated by the patrolman's voice itself. The relays are so timed that they do not switch off during mere intervals between words but do so after a brief pause which indicates that the speaker is finished. The receiver then goes into operation automatically and is ready to pick up messages from headquarters.

The transmitter is precisely tuned when installed. No further tuning is required. All of the units in the transmitting equipment have been designed to withstand the rigorous conditions of police service. The transmitter uses four tubes, each containing five elements. These tubes are all of the same type but they perform different functions. The first, or oscillator tube, takes the precise frequency generated by the crystal



"CAR TWO CALLING HEADQUARTERS. PURSUING TWO MEN IN OPEN CAR ON STATE STREET"
"HEADQUARTERS CALLING ALL CARS. BLOCK HIGHWAYS LEADING FROM SECOND PRECINCT; LOOK FOR OPEN CAR WITH TWO MEN"

Diagram of a simple two-way police radio system operating on a single ultra-high frequency. In an elaborate system using many cars over a large area, two or more frequencies may be advisable.

and doubles it. A second tube again doubles this frequency, producing the ultra-high frequency which serves as the carrier on the air. A third tube takes the voice currents produced by the speaker in the telephone instrument and amplifies them. These enter the fourth tube where they are superimposed upon the carrier wave.

These transmitters are designed so that they may be used to convert any 1-way system readily to 2-way. The return channel from cars to headquarters may be added to a 1-way installation by equipping the patrol cars with transmitters, installing the vertical antennas and placing a receiver in headquarters. Besides talking from

(Turn to page 180)

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The "Ham" Shack

(Continued from page 377)

7:00 P.	E.	W2HCP	3786
7:00 P.	E.	W3AEJ	3785
7:00 P.	C.	W9SFT	3585
7:00 P.	M.	W9HHW	7276
8:00 P.	M.	W7DBP	3722
THURSDAY			
8:15 A.	E.	VE3UU	3865
3:30 P.	C.	W9TE	7012
6:00 P.	E.	W8MHE	3830
6:00 P.	E.	W8EEZ	3598
6:30 P.	C.	W9LKK	3757
7:00 P.	M.	W6IQY	7090
8:00 P.	M.	W7DBP	3607
FRIDAY			
9:00 A.	E.	W3AEJ	3785
3:30 P.	C.	W9TE	7012
5:00 P.	P.	W7WE	3637-7274
6:00 P.	E.	W8MHE	3830
6:00 P.	E.	W8EEZ	3598
6:00 P.	E.	N1DUZ	3638
6:30 P.	C.	W9LKK	3757
7:00 P.	E.	W2HCP	3786
9:30 P.	E.	W4BHR	3807
SATURDAY			
8:15 A.	E.	VE3UU	3865
8:30 A.	E.	W1AMH	56,100-3536 1/2
6:00 P.	E.	W8MHE	3830
11:50 P.	P.	W7WE	3637-7274
SUNDAY			
8:15 A.	E.	VE3UU	3865
10:30 A.	E.	W3EEY	3628
10:30 A.	C.	W5DDC	7200
11:00 A.	E.	W8KGM	3807
1:00 P.	P.	W7WE	3637-7274
6:00 P.	E.	W8MHE	3830
7:00 P.	ED.	W2HZJ	3577
7:00 P.	C.	W9LUS	3631
8:00 P.	M.	W7DBP	3722

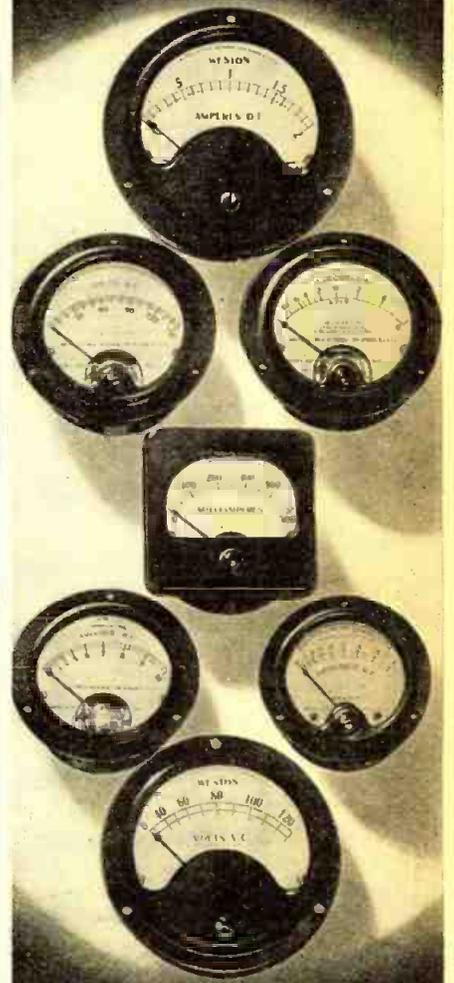
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- N1FNM—G. W. Wabrek, New Hartford, Conn.
- W2HCP—A. P. Bloser, 82 Dove St., Albany, New York.
- W2HZJ—Walter G. Germann, 905 E. 169th St., New York, N. Y.
- W3EEY—Dr. H. A. D. Baer, BAER HOSPITAL, Allentown, Penna.
- W3AEJ—Geo. W. Knowles, 82 Elgin Avenue, Westmont, N. J.
- VE3UU—Gordon Murray, 53 Elm Grove Ave., Toronto, Ont., Canada.
- W4BHR—James D. Randolph, Warren Plains, N. C.
- W5DDC—Herbert Leo, 1420 Hawthorne St., Houston, Texas.
- W5CPV—Grady L. Hardin, 132 Oak St., Hot Springs, Ark.
- W6IQY—E. L. Troutman, Box 85, Flagstaff, Ariz.
- W7WE—Loren C. Maybee, 3516 Hudson St., Seattle, Washington.
- W7DBP—F. W. Stuart, R. F. D. 2—Boise, Idaho.
- W8HKT—F. T. McAllister, 807 Michigan Ave., St. Joseph, Mich.
- W8MCP—Chas. Hedrich, 30 DeKalb St., Tonawanda, N. Y.
- W8MHE—Charles L. Gibson, 9 Sycamore St., Natrona, Pa.
- W8EEZ—Tauno M. Alanen, 512 New Street, Fairport Harbor, Ohio.
- W8KGM—E. J. Goodison, 300 E. Edward St., Endicott, N. Y.
- W9HHW—Denzel Begley, Box 46, Ft. Meade, S. Dak.
- W9SFT—Gerald Broughton, CCC Co. 735, Scammon, Kansas.
- W9TE—A. L. Braun, 5211 Brookville Rd., Indianapolis, Indiana.
- W9LKK—Sidney Schulz, 3132—4th St. S. E., Minneapolis, Minn.
- W9LUS—Clarence Read, 3401 Parnell Ave., Chicago.

Radio Directs Automobiles

SCHENECTADY, N. Y.—During the convention of the American Radio Relay League in this city, members arriving in the city with radio-equipped automobiles will be able to contact a radio station which will then instruct the driver on the best way of reaching the convention hall. This will be the first time that radio is used as the information bureau of the air directing strangers to their destinations.

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4387 BRONX BOULEVARD
NEW YORK, U. S. A.

Two-Way Police Radio

(Continued from page 378)

cars to the desk, cars can over considerable distance hear each other talk.

Evansville police started with a 1-way system. They have since begun to make use of 2-way operation. A comparison of Evansville crime statistics before and after the adoption of radio shows the following: Number of crimes in the first five months of 1934 (without radio) 719; and in the same period of 1935 (with radio) 602; a decrease of 17 percent. A similar comparison shows 134 arrests or 19 percent of the crimes against 179 arrests or 30 percent of the crimes. In other words there were 117 fewer criminal cases and arrests increased 60 percent.

In the long history of police communications—commencing with the early flashing signal lights and bell boxes and coming down to the modern telegraph, telephone and teletypewriter—radio is the final chapter. To this chapter 2-way radio adds another climax. Up to the present, it is the latest answer of the scientist to the advantages which the criminal has found in the machine age, particularly his ability to make a fast getaway in a high-powered automobile. In 2-way radio, many believe, society has gained the greatest single advantage over the criminal in the annals of organized policing.

Metal Tubes

(Continued from page 341)

triode section of type 75. Pin connections: grid connects to cap.

Heater voltage (a.c. or d.c.)..... 6.3 volts
Heater current..... 0.3 ampere
Plate voltage..... 250 max. volts
Grid voltage..... -2 volts
Plate current..... 0.9 m.a.
Plate resistance..... 66000 ohms
Amplification factor..... 100
Mutual conductance..... 1500 micromhos
Maximum overall length..... 3 3/4 inch
Maximum diameter..... 1 5/16 inch
Cap..... Miniature
Base..... small octal 7-pin

6F6—A power pentode similar to type 42. Pin connections: 4—grid number 2, — grid number 1, 8—cathode and grid number 3.

Heater voltage (a.c. or d.c.)..... 6.3 volts
Heater current..... 0.7 ampere
Maximum overall length..... 3 3/4 inch
Maximum diameter..... 1 5/16 inch
Base..... small octal 7-pin

Used as Class A amplifier

Plate voltage..... 250 max. volts
Screen voltage..... 250 max. volts
Grid voltage..... -16.5 volts
Plate current..... 34 m.a.
Screen current..... 6.5 m.a.
Plate resistance..... 100,000 approx. ohms
Amplification factor..... 220 approx.
Mutual conductance..... 2200 micromhos
Load resistance..... 7000 ohms
Total harmonic distortion..... 7 per cent
Power output..... 3. watts

6L7—A pentagrid mixer amplifier, having on glass equivalent. This tube is intended as a mixer, and not as a combination oscillator and mixer; consequently it does not have an oscillator anode (G2 in the 6A7) but it has a suppressor grid between screen and plate. So, from cathode to plate the 5 grids are: G1, control grid; G2 screen; G3 control grid; G4, screen, tied to G2; G5, suppressor, tied to cathode. When used as a mixer, the oscillator voltage is put on G3. This tube can also be used as an r.f. amplifier with variable mu. The signal is put on grid 1 and the a.v.c. voltage both on G1 and G3. This gives a better control than with the usual variable-mu tube. Pin connections: 4—G2 and G4, 5—G3, 8—K and G5, cap, G1.

Heater voltage (a.c. or d.c.)..... 6.3 volts
Heater current..... 0.3 ampere
Maximum overall length..... 3 3/4 inch
Maximum diameter..... 1 5/16 inch
Cap..... miniature
Base..... small octal 7-pin

Mixer operation

Plate voltage..... 250 max. volts
Screen (G2 and G4) voltage..... 150 max. volts
Typical operation:
Plate voltage..... 250 volts

Screen voltage..... 150 volts
Control grid (G1) voltage..... -6 min. volts
Control grid (G3) voltage..... -20 approx. volts
Peak oscillator voltage applied to G3..... 25 approx. volts
Plate current..... 3.5 m.a.
Screen current..... 8.0 m.a.
Plate resistance..... Greater than 2 megohms
Conversion conductance..... 325 micromhos
Conversion conductance at -45 volts on G3..... 2 micromhos

Amplifier operation

Plate voltage..... 250 max. volts
Screen (G2 and G4) voltage..... 100 max. volts
Control grid (G1) voltage..... -3 min. volts
Control grid (G3) voltage..... -3 volts
Plate current..... 5.3 m.a.
Screen current..... 5.5 m.a.
Plate resistance..... 0.8 megohm
Mutual conductance..... 1100 micromhos
Mutual conductance with -21 volts on G1 and -12 volts on G3..... 10 micromhos

PCA "Observer"

(Continued from page 347)

circited. This applies to primary and tickler as well as secondary windings. Thus, dead spots are entirely eliminated which might be caused by coil absorption.

A 3-gang tuning condenser is mounted on top of the coil catacomb. Each of the individual coils has its own trimming condenser so that correct alignment may be obtained on all bands. The 6K7 tube is used as an r.f. amplifier while the 6A8 is used as an oscillator mixer. The 6A8 metal tube is somewhat better as an oscillator mixer than the corresponding glass tube 6A7, for not only is its conversion conductance greater but it is apparently considerably quieter in operation.

All resistors, condensers, etc., associated with these tubes are mounted in the tuning catacomb of the Tobe P.C.A. Tuner used in the Observer which may be obtained as an integral unit.

The performance curves shown in Figure 1 give an indication of how the Observer will improve a radio receiver several years old. Figure 1 shows the sensitivity curves over the frequency spectrum of the Observer used in conjunction with a broadcast receiver whose volume control is turned so that the overall sensitivity of the broadcast receiver is 100 microvolts. It should be noted that the overall sensitivity of this combination is 1 microvolt or less. Not only is the sensitivity of the broadcast receiver improved by the use of the Observer, but also the set is materially sharpened so that stations on the broadcast band, that heretofore gave a considerable amount of interference, are readily separated. The improvement in selectivity can be appreciated by an examination of Figure 2. Curve A shows the selectivity of the broadcast receiver to which the unit was attached, while curve B shows the overall selectivity of the combination. It will be noted that the band width at a signal input of 100 times is reduced approximately 50% by the addition of the PCA Observer.

The tuned antenna circuit and the r.f. amplifier, however, have other function besides increasing overall selectivity. One of these functions is what is known as image suppression. It is generally known that image frequencies appear on any superheterodyne if the incoming signal is allowed to produce a voltage on the grid of the mixer tube, for a signal will be received whenever the difference between the incoming signal and the signal produced by the oscillator gives the intermediate frequency. Consequently, if the oscillator is tuned over a frequency range of twice the intermediate a repeat spot will be obtained. By employing a tuned antenna circuit and a stage of radio frequency amplification an appreciable voltage will only be produced on the grid of the mixer tube when the antenna circuit and r.f. amplifier are tuned to the incoming frequency. Below is the image ratio at a number of points in the frequency band covered by the PCA.

Frequency in megacycles	Image ratio
1.0	50,000 to 1
1.3	2,000 to 1
3.0	1,000 to 1
10.0	100 to 1

Another function of the tuned antenna circuit and stage of r.f. amplification is its ability to increase the signal-to-noise ratio. It has been found in superheterodyne design that if the intermediate amplifier is run at a low level and high gain is obtained in the r.f. amplifier preceding the mixer tube, that a material reduction in noise for a given amount of signal is obtained.

The parts for the PCA Observer may be obtained in kit form and assembled in less than two hours as all the wiring has been done on the tuning catacomb, r.f. amplifier, and oscillator mixer tubes. Consequently, the set-builder has only to mount the apparatus, wire the power supply, volume control, switches, etc.

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RADIO NEWS
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The Magic "Eye"

(Continued from page 331)

volume knob can remain down until the station is precisely tuned by visibility alone.

When the set is turned on, a stream of millions of electrons pound the fluorescent target in the valve's dome. This creates the greenish glow, leaving a dark electrical shadow in one spot. Incoming signal strength controls the width of the electrical shadow so that when the set is tuned most accurately, the electron stream varies and the shadow narrows into the very thin line.

Thus, another important radio task has been assigned to the cathode-ray principle.

The Technical Review

(Continued from page 373)

available to our readers free of cost. Simply ask for them by their code designations and send your requests to Radio News, 461 Eighth Avenue, New York, N. Y. The list follows:

- J1—Information on the Cornish Wire Company "Noise-Master" Antenna Kit. Free.
- J2—Booklet describing the technical features of the Hallicrafters "Super-Skyrider" short-wave superheterodyne. Free.
- J3—New 1935 catalog of the Hammarlund Manufacturing Co. Free.
- J5—Booklet on tube testing prepared by Supreme Instruments Corp. Free.
- J6—"Practical Mechanics of Radio Service," issued by F. L. Sprayberry. Free.
- J7—New 1935 parts catalog of Alden Products Co. Free.
- J8—Practical ham antenna design folder and leaflet on a new auto-radio under car antenna system, published by Arthur H. Lynch, Inc. Free.
- J9—Information on new radio courses given by the Capitol Radio Engineering Institute. Free.
- J10—"Radio Noises and Their Cure." A 75-page book. Price 50 cents.
- J12—New parts catalog of Birnbach Radio Company. Free.
- J14—"Increasing the Serviceman's Income," folder issued by Philco Radio & Television Corp. Free.
- J15—Transformer Bulletin of American Transformer Corp. Free.
- A1—Information on new Browning "85" receiver, issued by Tobe Deutschmann Corp. Free.
- A3—Data on a multi-testing instrument, published by Supreme Instruments Corp. Free.
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- S3—Bulletin of sound equipment, issued by Sound Systems, Inc. Free.
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- O3—Mutator Catalog of "Cantolm" wire-wound resistors. Free.
- O4—Cardwell condenser catalog. Free.
- N1—Resistors folders, issued by Erie Resistor Corporation. Free.
- N2—Latest resistor catalog of Electrad, Inc. Free.
- N3—Folder on resistance bridge, issued by the Muter Company. Free.
- N4—Free code charts, offered by Dodge's Institute. Free.

Light-Beam Phone

(Continued from page 337)

depends on the type of cell used. This window was fitted with a shutter. The entire inside of the box was lined with a 1/4-inch sponge rubber sheet. The bottom of the box was fitted with a stud, threaded to fit a camera tripod.

Great care must be used to avoid leakage in the photo-cell socket. To avoid this, we selected

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a high-grade porcelain socket and mounted it on a piece of 1/4-inch bakelite about 2 1/2 inches square. This type of mounting makes it possible to remove the photo-cell without pulling it out of the socket. Then, if necessary, the cell prongs can be soldered to the socket.

It is difficult to buy a cable that is suitable for connecting the photo-cell to the pre-amplifier. We made one by threading a piece of 3/4-inch chemical rubber tubing through a 1-inch copper shield. This provided a shielded insulator. The central conductor consisted of a highly insulated piece of No. 18 wire, threaded through the center of the tubing. The copper shield was completely soldered to the inside of the photo-cell housing. A flexible insulated lead was then soldered between this junction and the cathode connection of the cell. The central lead was left long enough so that it could be soldered to the anode of the cell. There is no objection to leaving these leads long enough to permit removing the socket from the housing, provided they do not touch each other.

The type of construction shown above permits the greatest mobility of the cell. The pre-amplifier chassis and battery supply can then be built as a single unit along the lines shown in the photograph. The entire unit was set in a rubber-lined sheet iron case, which is 18 inches by 7 1/2 inches x 13 inches high. The amplifier parts are on the upper shelf of the unit as may be seen in the illustration. The lower tray houses the batteries. The compartment to the left of the amplifier panel provided space for the photo-cell housing and cable, when the equipment was to be moved or stored.

When the pre-amplifier and photo-cell are to be mounted on a common chassis, the housing will have to be made correspondingly larger. We have built this apparatus into a sheet iron box 8 inches long by 5 inches wide by 6 inches high, and have had some room to spare. The entire inside of the box was lined with 1/2-inch sponge-rubber sheet. In the amplifier base we used a piece of 1/2 inch dural plate about 6 1/2 inch by 3 inch. All of the parts were mounted on top of this base plate. Flat-head machine screws were countersunk in the bottom, so that the amplifier could rest firmly on a cushion of sponge rubber.

Connection was made to the battery supply and output transformer by means of a 5-wire shielded cable. The cable connections were attached to a bakelite terminal strip mounted in one end of the box. Connections were made from the terminal strip to the chassis by means of well insulated flexible leads. About 10 feet of battery cable was used, and a sheet-metal box was built for the battery supply. This box was fitted with a filament switch.

In the case of either design, there are some important points to remember in assembling the amplifier. In the first place use only the best grade of parts. Otherwise you are apt to have a noise-level several decibels higher than the incoming signal. Ordinary radio parts will not give good results. All connections must be carefully soldered. Do not use the shield or chassis for any part of the circuit. The coupling resistors for the photo-cell should be mounted vertically on a small panel of 1/4-inch bakelite, thereby giving complete insulation. Other details regarding the specifications for parts are shown in connection with Figure 1.

In setting up the receiving system, it is important to ground the shield of the pre-amplifier. If an unbalanced line is used between the pre-amplifier and main amplifier, one side of this line should also be grounded. We have made no provision in the design shown here for a volume control. Most P. A. amplifiers are fitted with an attenuator that will suffice. If not, an external attenuator must be used in the line between the pre-amplifier and main amplifier.

When the receiving system has been set up, it may be tested out as follows:

1. Turn on the pre-amplifier and check the operating point of each tube. See to it that the filament rheostat has been set for 2.2 volts across the two tubes.
2. Close all shields, and turn up the gain to where a steady high frequency hiss can be heard in the loud speaker.
3. Focus a flash light or small lamp on the cell window, and interrupt this beam with a piece of cardboard or similar opaque object. This should give a series of sharp reports in the speaker.
4. By means of a collecting lens, focus the light from the transmitter upon the surface of the photo cell.
5. Feed a signal into the transmitter. This signal should be reproduced in the loudspeaker.
6. Reduce the output of the transmitter to the point where it does not distort. The volume of the system may then be controlled on the receiving end.

Complete List of Parts

- Basic Parts Required**
- 1 photo cell, Cetron type CE 2 or equivalent
 - 2 S S White resistors, type 16 X, R1 and R2, value 5 megohms
 - 1 S S White resistor, type 16 X, R6, value 1 megohm
 - 1 S S White resistor, type 16 X, R4, value .5 megohm
 - 1 S S White resistor, type 16 X, R3, value .1 megohm
 - 1 S S White resistor, type 16 X, R7, value .05 megohm
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- 2 tubes type 864
- 1 6 ohm filament rheostat, R5
- 1 filament switch
- 1 output transformer plate to line, Amertran D 61, or equivalent
- 2 1½ volt dry cells for A battery
- 4 45-volt batteries, B
- 1 4½ volt battery, C

Additional Parts for Separate Cell Mounting

- 1 cell housing as described in the text
- 1 photo cell cable described in the text
- 1 amplifier and battery case described in the text
- 5½ square feet sponge rubber, ½ inch thick
- 1 bakelite panel, size 7¼ inches x 9 inches x ¼ inch thick
- 1 filament voltmeter, 0-3 volts

Additional Parts for Mounting Cell in Amplifier Chassis

- 1 dural plate, ¼ inch x 4 inches x 6¼ inches
- 1 amplifier case, 16 gauge iron, 8 inches x 5 inches x 6 inches
- 1 piece bakelite, ¼ inch x 1 inch x 4 inches for terminal strip
- 240 square inches of sponge rubber for lining
- 1 battery case, 16 gauge iron, 11 inches x 7 inches x 7 inches
- 10 feet 5 conductor shielded condenser microphone cable

Selling Service

(Continued from page 339)

come all the way to your store. He is already in a receptive frame of mind, and he is entirely in your hands and on your own "home grounds." If you "play your cards right," he will sell himself. And here's how—

In the first place, your shop should be so laid out as to properly "merchandise" the services you have to offer (or the equipment you have to sell). It should be *impressive*, so as to inspire confidence in your ability. It should be *instructional*, so as to teach him as much as you want him to know about your services. It should *demonstrate* what you have to sell by placing it right in front of him—so he doesn't have to look far for it! It should be kept *clean, modern and progressive looking!*

In your own shop the most important sales technique you can use is to develop the prospect's confidence. You can do that—(1) by the good appearance of your shop; (2) by the impressiveness of your equipment; (3) by the information you pass on, and (4) by your personality. The last is very important. If you are friendly with your prospect and put him at ease, so that he won't feel you are going to try to sell him something he doesn't really need, you have already made more than half the sale of your services or your merchandise.

Many servicemen are naturally bashful and retiring. They shy away at the idea of personal contact, feeling that they aren't salesmen. They get tongue-tied at the mere suggestion of door-to-door canvassing. They'd much rather burn quarts of midnight oil trying to fathom the antics of a pesky all-wave superhet than spend two minutes calling on a possible prospect for their services—even though she may be good looking! But if you are a good radio technician you don't have to be a "natural-horn salesman" in order to build up a good service business. Nor do you need to be a smooth-tongued orator—you're better off if you aren't. In fact, it is really comparatively easy to sell the type of service you have to offer the public (you ought to try selling Fuller Brushes for a while if you don't think so)—for, fundamentally it is a service that the public *really needs*. Dress neatly but not flashily. Remove your hat when speaking! Be courteous in your manner. Remember that your doorbell ring may have called your prospect away from an important task. She may be annoyed. If so, don't irritate her further by any act or word of yours!

The first job in outside selling is to know whom you are going to sell. Lay out your campaign in detail in advance. Plan your work—then work your plan! Approach the job with the motto "It can be done." A systematized program is essential in this work. It is queer, but nevertheless a well-known fact that sometimes the most methodical and systematic of servicemen will carry-on their selling and advertising campaigns in a hit-and-miss fashion that does nothing for them but waste time and money. They would not think of expecting results if they went at their trouble-shooting or repair work in that way, yet they expect all sorts of wonderful things from outside selling campaigns that are carried on in sporadic fashion whenever the spirit moves them. "Outside" selling campaigns are serious undertakings that require considerable planning and plugging to put over, for many phases of them depend on

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Are you a Serviceman? Dealer? Expm?

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"Remember," writes a successful serviceman, "if filter condensers fail to supply the proper voltage (as many 'bargain' condensers do) nothing about a radio can be wholly right. Other essential parts will work far below their standard of efficiency. The set might play, but never with its greatest volume or best tonal quality.

"I was surprised to find what a whale of a difference Sprague Condensers actually made in pepping up the performance of 'sick' sets. That's why I use 'em on every job. Take it from me, they're cheaper in the long run—and they've helped me build a real reputation for getting better than average results from the average radio set."

Made in a complete line for every radio service and amateur need. Sold by leading jobbers. Write for catalog.

SPRAGUE PRODUCTS CO. North Adams Mass.

PRAGUE CONDENSERS

Made Right **SPRAGUE 600 LINE** Priced Right



A "NERVE SYSTEM" for YOUR RADIO!

Choking interference and a tremendously restricted range are the price you pay for using an improper antenna; especially for short-wave reception. For whether or not your set has a "Magic Brain" it needs a "nerve system". It needs a Brownie All-Wave antenna. The Brownie is the sturdiest, best-built antenna sold today, constructed by a famous manufacturer in the electrical field, on the famous Doublet System with a super efficient matching transformer. It will outreach any other antenna, bringing in loud and clear stations you never heard, and at any time of day. The Brownie adds new high fidelity to local broadcasts too, eliminating man-made interference. Fits any radio and is simple to install. Get a Brownie today and know what fine reception really is—on any broadcast band. See your dealer or write to:

Porcelain Products, Inc., Dept. E. Findlay, Ohio

BROWNIE ALL-WAVE ANTENNA

tirely upon the correct follow-ups to break down the sales resistance and human inertia of the prospect. Without these follow-ups, the initial efforts are doomed to failure at the very start. Large organizations spend millions of dollars annually to test out new ideas for "outside" selling campaigns and to follow them through. One method is found to work best in one type of community for one product—another is worthless for that type of community but is a world beater among a different class of people. Some weeks in the year are good for house-to-house canvassing, others are useless, etc. The serviceman should realize this before he starts any advertising ideas. Plan them carefully, then test them and make plenty of changes until you get the right ones for your particular conditions. Then—and not until then—go ahead.

Before you go out to canvass your prospects, make out a 3 by 5 inch card for every name, with the address and phone number, and space to record the type and condition of her radio and electrical appliances (if you can find this out) and to make a note as to her reaction to your canvass and the date when a call-back should be made. Check the name on your list with the name on the doorbell, to make sure you will address the prospect by the proper name. This will also give you the name of the new tenant at once if the old one has moved out.

Have a general idea of what you are going to say to your prospect before he or she opens the door. Some salesmen work best when they go through a regular routine with a memorized sales talk. Others sell better when they vary their talk to fit the prospect and the circumstances. Which method is better all depends on the individual salesman. In any case it is preferable to have an outline or a rough plan of how you are going to make your sale, whether it is the sale of a radio receiver or your services.

In personal selling, the most important thing you can do is make friends with your prospect, especially on your first call. Don't try to be smart or "flip." Don't annoy and antagonize your prospect with tactless bullying. Some salesmen have been very successful using "high-pressure" methods, but the average man is more successful when he avoids these methods entirely, and tries merely to tell a straightforward story in a natural, friendly way, expressing, without boasting, the self-confidence which every serviceman should have in his work. That is the easiest way to sell, and for most people the most profitable. Needless to say, you should take pains to make your personal appearance as pleasing as possible—without unnecessary "flash."

On all your calls carry a good kit with you, containing not only tubes, tools and some testing equipment, but also a few small electrical appliances as a sideline. Whenever you get inside the house to examine a radio, open up your kit conspicuously. It pays!

Alfred A. Chiyardi, author Modern Radio Servicing.
T. S. Ruggles, specialist in direct mail advertising.

The Service Bench

(Continued from page 363)

set owner!). The owners had replaced the plugs—wrong! Naturally they had been forced in. When the sets refused to function, the correct trouble was suspected, the plugs removed again and reinserted the easiest—and correct—way. But the prongs had been so sprung that no contact was made on two connections, the results being dead radios and hurry calls for the serviceman."—Harry Weyman, Erie, Pa.

Trouble With Philcos

G. H. Roberts, of Roberts Radio Shop, Irvington, Ky., writes regarding models 38 and 89: "I have encountered a bit of trouble with some Philco battery sets, particularly model 38. This set will play for a time, and then cut off—maybe three or four times a day. After a rest it will work okay for a short period. This is the model using the type 15 tube, and the trouble is in the blue, 6,000-ohm resistor. You will have no trouble in locating the offending resistor, as it is the only blue body, black end, red dot resistor in the set.

"I have also run into four cases of similar trouble in the 89. Again a resistor is at fault, but this time the 15,000-ohm resistor fastened to two terminals of a three-connection condenser in the front center of the chassis. Replacement of this resistor invariably effects a cure."

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601-3 GRANT ST. PITTSBURGH, PA. 30 TWELFTH ST. WHEELING, W. VA. Established 1919

NEW LOW PRICE on AMPERITE CURRENT AND VOLTAGE REGULATORS

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Convert your outmoded radio into a modern. All-wave, World-wide receiver at a fraction of the cost of a new receiver. Your jobber can tell you how or if he cannot write direct to **TOBE DEUTSCHMANN CORPORATION** Canton Massachusetts

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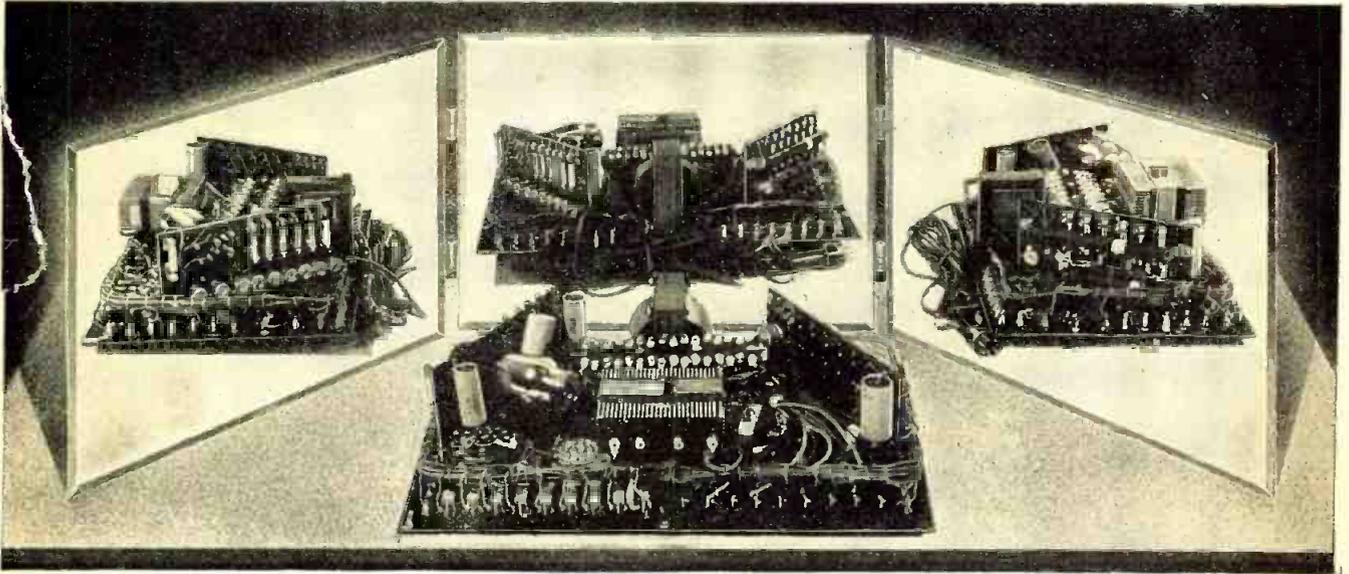
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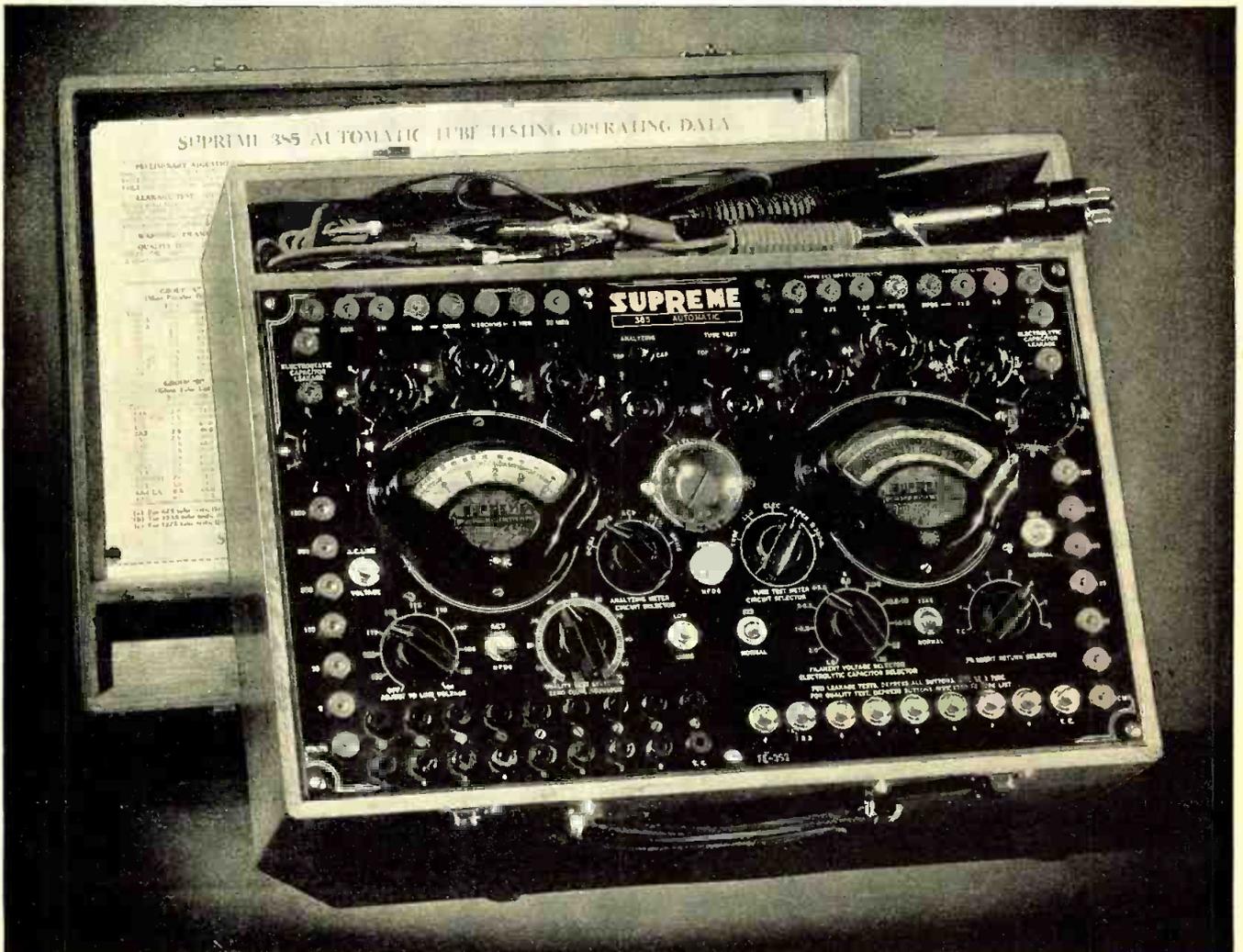
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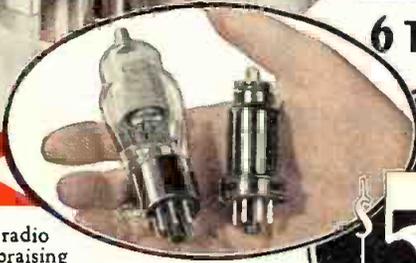
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...Establishes new radio style overnight! The V-Front Dispersing Vanes were developed by Midwest engineers as a result of a study of directional effect of the Midwest Full Scope High Fidelity Speaker. These Vanes spread the beautiful lacework of the "highs" throughout the entire room in a scientific manner... directing the High Fidelity waves uniformly to the ear. Send for new FREE 40-page catalog. It pictures the complete line of beautiful 1936 Acousti-Tone V-Spread consoles... and chassis... in four colors.

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Concert Tone
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V-FRONT

EVERYWHERE, radio enthusiasts are praising this amazingly beautiful, bigger, better, more powerful, super selective, 18-tube 6-tuning range radio. They say it is a tremendous improvement over Midwest's 16-tube set, so popular last season. It is sold direct to you from Midwest Laboratories at a positive saving of 30% to 50%. (This statement has been verified by a Certified Public Accountant who conducted an impartial survey among representative Ohio, Kentucky and Indiana radio retailers.) Before you buy any radio, write for FREE 40-page 1936 catalog. Never before so much radio for so little money. Why pay more? You are triple-protected with: One Year Guarantee, Foreign Reception Guarantee and Money-Back Guarantees! This super Midwest will out-perform \$200 to \$300 sets on a point-for-point comparison. That is why nationally known orchestra leaders like Fred Waring, George Olsen, Jack Denny, Ted Fio Rito, and others use Midwest sets to study types of harmony and rhythmic beats followed by leading American and Foreign orchestras.

80 ADVANCED 1936 FEATURES

Scores of marvelous features, many exclusive, explain Midwest super performance and thrilling world-wide all-wave reception... enable Midwest to bring in weak distant foreign stations, with full loud speaker volume, on channels adjacent to locals. Only Midwest offers so many features... only Midwest tunes as low as 4½ meters... only Midwest gives the sensational new Push-Button Tuning feature, etc. See pages 12 to 21 in FREE catalog for description of the 80 features. Read about advantages of 6 Tuning ranges... offered for first time: E, A, L, M, H and U. They make this Super De Luxe 18-tube set the equivalent of six different radios... offer tuning ranges not obtainable in other radios at any price!

DEAL DIRECT WITH LABORATORIES

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SAVE UP TO 50%



Thrill to new explorations in sections of radio spectrum that are strangers to you. Every type of broadcast from North and South America, Europe, Asia, Africa and Australia is now yours. Send today for money-saving facts.

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Long Island, N. Y.—After comparing many different makes, I finally decided upon Midwest. It out-performs other radios costing almost twice as much. The crystal-clear tone is so life-like that it sounds as though I am in the studios, actually hearing artists performing.



TODAY'S FINEST RADIO SAYS TED FIO RITO

My new Midwest is finest radio I have had pleasure of hearing. Bass-Treble control is marvelous... enables one to hear every instrument in orchestra.



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This Midwest is engineered from the ground up to see either the new METAL tubes or glass-metal counterpart tubes. Octal sockets and newest circuits permit use of either type... just as you desire.

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