RADIO'S FOREMOST MAGAZINE

RADIO NEWS AND SHORT WAVE RADIO

IN CANADA 30¢

SEPTEMBER, 25¢

The U.S.Navy's POWERFUL VOICE S EARCHLIGHT

SEE PAGE 140

WHAT SETS TO BUY!

A Publication Devoted to Progress in Radio

Television
Broadcasting
Electronics
Applications

Service Work
Experiments
Measurements
Engineering

Amateur Activity
Short Waves
DX Reception
Set Building

HERE'S THE RECEIVER SHORT-WAVE LISTENERS HAVE BEEN WAITING FOR

THE NEW 1936 GENERAL ELECTRIC RADIO

The invention and development of all-metal tubes by General Electric engineers opened up new possibilities in short-wave and long-wave reception not thought possible before. So phenominal were the results obtained that they inspired the design and manufacture of a completely new line of General Electric receivers. Experimenters who go DXing with a 1936 General Electric Radio will receive a new thrill in world-wide reception.

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FEATURES OF MODEL A-82

NEW METAL TUBES

More effective shielding and short leads result in higher I.F. gain with greater stability—less harmonic distortion on high modulation—less audio gain required — quieter operation.

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"Easy to read as a ruler." Only one band visible at a time. Variable ratio drive for easy tuning.

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All coils mounted directly on band control switch — Minimum length of Leads — Maximum Efficiency.

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And many additional outstanding features.

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GENERAL ELECTRIC RADIO

MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT

RADIO NEWS

Edited by LAURENCE MARSHAM COCKADAY

S. GORDON TAYLOR, *Managing Editor* — WILLIAM C. DORF, *Associate Editor*

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JOSEPH F. ODENBACH, *Art Editor*

Vol. XVII September, 1935 No. 3

Reading Guide to this Issue—

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Next Month

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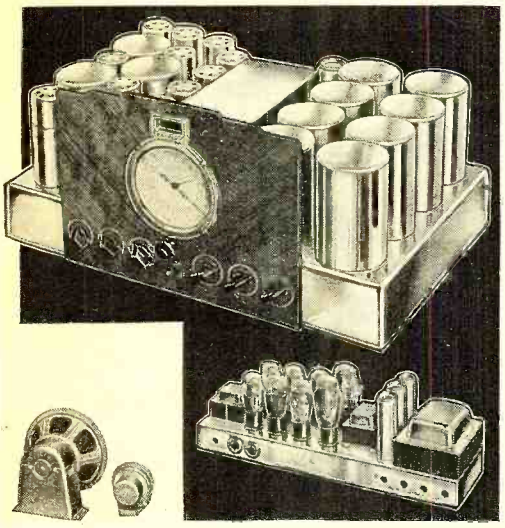

We knew it was good, But . . .

. . . When the first Silver MASTERPIECE IVs went into action a month and a half ago, our feelings were those of a proud parent. We knew, after the most rigid tests in our own laboratories, that the new MASTERPIECE IV could outperform any other all-wave receiver in existence, *at any price*. Now, reports pouring in from enthusiastic owners *prove* beyond a shadow of a doubt that

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CHICAGO, ILL., U. S. A.

CABLE ADDRESS "CHIRACLUB"

ALFRED G. LUOMA
GRAND PRIZE WINNER 1932 SCOTT INTERNATIONAL DX CONTEST
3851½ North Kedvale Avenue, Chicago
TEL. AVENUE 4403

MEMBER'S CORRESPONDENCE

June 25, 1935.

McMurdo Silver Corporation,
3354 N. Paulina Street,
Chicago, Illinois.

Dear Sirs:

Since I have had the new MASTERPIECE IV I have put it to a very severe test, and will say it far surpasses anything on the present market.

The tone quality, both high fidelity and sharp, is excellent, and it reproduces the piano and organ as if they were being played in the same room.

The noise level is very low to signal ratio. With antenna disconnected I heard Europeans without the slightest trace of noise.

The bass and treble tone controls are certainly wonderful, both for tone control and noise suppression, also for controlling speech from a lot of the more poorly modulated short wave stations.

The weak small stations come in now with much better volume and quality; all the bands are very hot, even the high wave length band on which I heard Alaska the first night I tuned it. The broadcast band is very good, and the three short wave bands are what I would call perfect.

Having had two of your previous sets, and many other custom built sets as well, I know what to expect from this one.

Allow me to congratulate you on the MASTERPIECE IV - it most certainly deserves its name.

Sincerely,
Alfred G. Luoma
Alfred G. Luoma

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is definitely the finest radio of all time!

25 NEW, EXCLUSIVE FEATURES!

The Silver MASTERPIECE IV introduces 25 entirely new engineering advancements and refinements, including

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Two Tuned R.F. Stages on all 5 tuning bands.
All R. F. and I. F. circuits air tuned thruout.
Controllable Selectivity.
Double High Fidelity on both foreign and local.
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19 Tubes that do the work of 23.
And in addition—the new Silver MASTERPIECE IV retains those important basic features which made its three precedessors the overwhelming choice of the most critical users—engineers, professionals, musicians—the world over.

Arthur Maitland, of the Lamb's Club, New York City, says "The tone is beautiful; in fact, as fine as I have ever heard—and I have heard most all of them, even the $900.00 ones. I really think it is a fine job—far and above anything you have ever done before. In one evening heard 51 stations on D band" (25, 31 and 49 meter broadcast bands—just off Times Square in d.c. New York). William Seaman, of Hamburg, Pennsylvania, writes "Say, is the Four a Masterpiece!" And from Alfred G. Luoma of Chicago, winner of an International DX Contest and champion DXer, comes a letter which is reproduced herewith.

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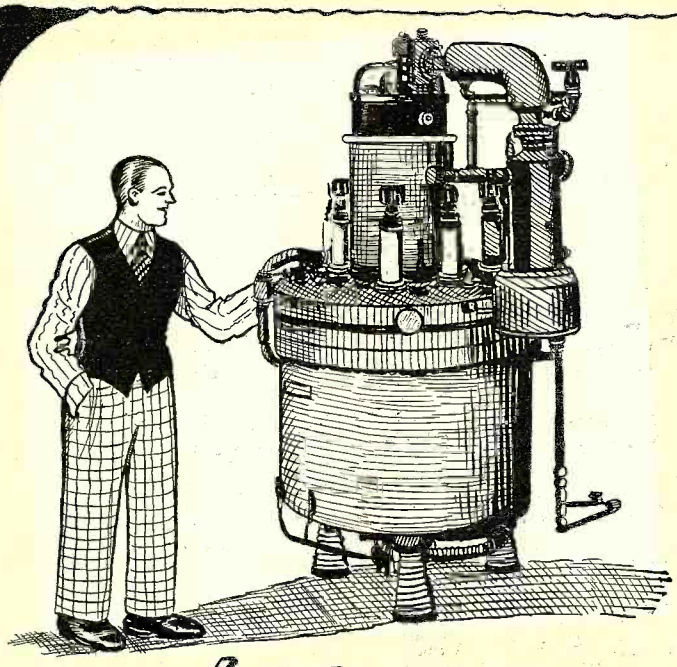
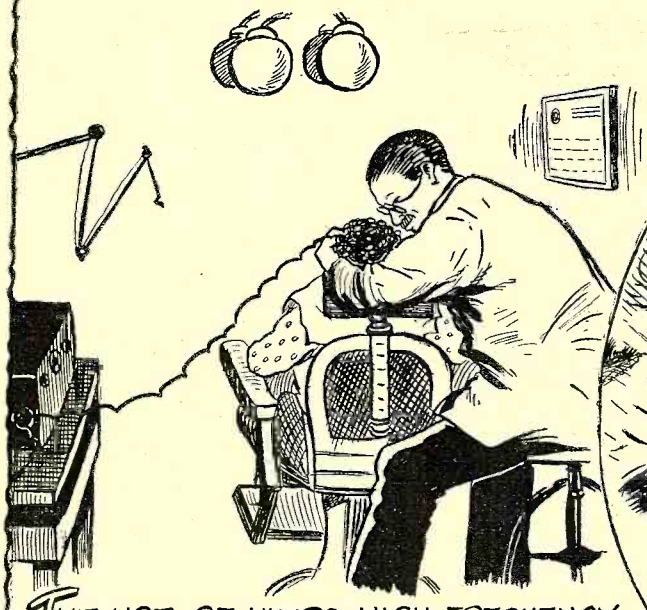
RADIO FACTS and ODDITIES ....

(Send in your Radio Oddities to "Elmo" and see them illustrated)



THE WORLD'S LARGEST RECTIFIER TUBE, RECENTLY DEMONSTRATED AT MILWAUKEE, HAS AN OUTPUT OF 1,000,000 WATTS AT 25,000 VOLTS, D.C. IT IS CAPABLE OF RECTIFYING ENOUGH ELECTRICAL ENERGY TO LIGHT EVERY HOME IN AN AVERAGE CITY OF 65,000 PEOPLE!!

A RESIDENT OF GLENDALE CAL. CANNOT LISTEN TO THE RADIO, UNLESS HE GROUNDS HIMSELF!



THE USE OF ULTRA HIGH FREQUENCY RADIO WAVES TO KILL GERMS OF DECAYING TEETH, WAS RECENTLY ANNOUNCED..... THE TEETH WERE EXPOSED FOR PERIODS OF 5 MINUTES TO AN HOUR !!!

CONTRARY TO A POPULAR NOTION, RADIO DOES NOT AFFECT THE WEATHER ..... BUT THE WEATHER AFFECTS RADIO, RESULTING IN STATIC AND FADING !!

A great tube salesman!

Here's real *merchandising* appeal in a *real* tube checker. This new Weston Model 770 sets a new standard in tube selling and servicing; yet, it's priced so every dealer and serviceman can afford it. In fact, with its striking design and rich three-color combination, no dealer selling tubes can afford to be without its customer appeal. And as a tube checker, it's a perfected emission type which actually tests tubes under load . . . provides a neon short check . . . a neon indication of condenser leakage if desired . . . makes individual tests on all plate circuits . . . tests all tubes, including the metal tubes, and has many other exclusive features. *Ready for immediate delivery.* Get the facts on Model 770 before you buy. See it at your dealer's, or return the coupon for complete data . . . . . Weston Electrical Instrument Corporation, 615 Frelinghuysen Avenue, Newark, New Jersey.

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Send me complete data on Model 770 and other WESTON radio instruments.

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CHECKING TELEVISION PROGRAMS ABROAD

Here is the program manager of the Berlin television station selecting the feature picture stories for the coming week. The test desk is a complete transmitter and receiver so that the pictures which are viewed in the small central screen are seen just as they would be received in the home.

DOTS • • • • • and — — — DASHES

Short but Interesting Items from the Month's Radio News the World Over

TELEVISION is a word that one hears, now, on the lips of every radio-man. The whole world seems to have gone "television crazy" and rumors of one thing and another about television are being passed back and forth.

THERE is no doubt but that television is worrying the moving-picture industry today, just as "sound" worried it in 1927. Mr. H. R. Lubcke, Director of Television for the Don Lee Broadcasting System, as guest speaker of the Research Council of the Academy of Motion Picture Arts and Sciences recently said, "The hue and cry that television will destroy the motion picture industry is needlessly disturbing. Our television-motion-picture activities have long since passed the stage of conjecture. As early as 1932 we were making special tests on special films for television on the lot of a major producer."

Sam Goldwyn, noted film producer, is quoted as stating that television will use up a motion picture in one night and thus might create a greater demand for good films. He is also credited with saying that television may mean an audience of twenty or thirty million persons reached in two or three nights, instead of a seven to twelve months period.

According to the *Television Times* two new television companies have been organized in Detroit to start production on television receivers in the fall.

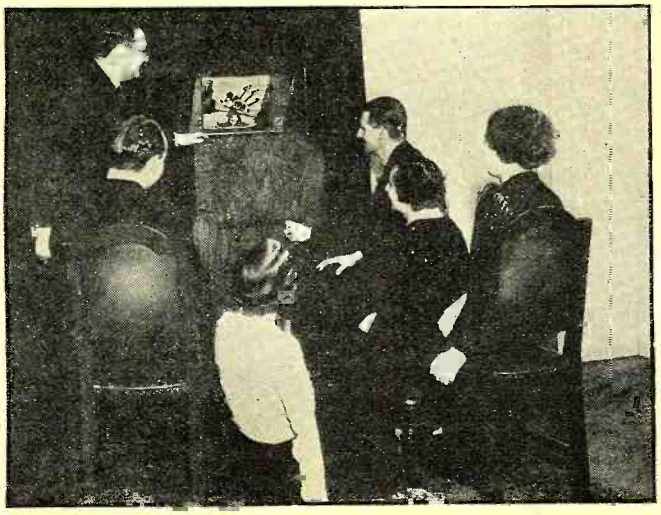
R.C.A. will use the A. T. and T. coaxial cable from Philadelphia to New York to relay television to the Empire State Building for field tests in early 1936 or before. A report that they have in process of construction several hundred television receiving sets has been "going the rounds". It is confirmed that the R.C.A. has formed an inter-company committee for direction of the company's television activities. This committee, named by David Sarnoff, President of the Corporation, is headed by Dr. W. R. G. Baker, Vice-President of the R.C.A. Victor Division. Five other leading

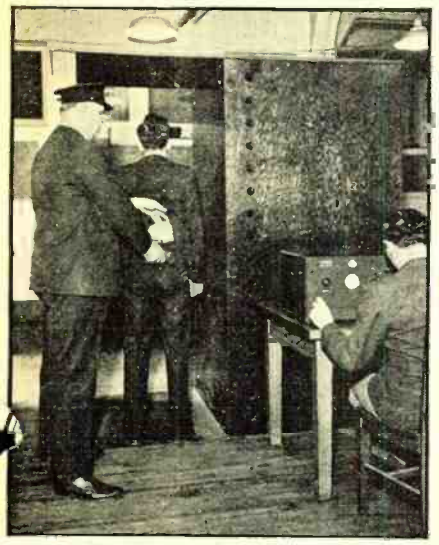
DIRECTS FIELD TESTS IN AMERICA

Dr. W. R. G. Baker, vice-president and general manager of R.C.A., heads a committee for directing the company's television research and field tests. Dr. Baker is shown examining one of the huge Iconoscope tubes that will be used in these tests. Above: the inter-company television committee; left to right: C. W. Horn, research director of the N.B.C.; J. C. Warner, vice-president, Radiotron Division of R.C.A.; E. W. Engstrom, assistant manager in charge of the television development of R.C.A.; Dr. C. H. Taylor, chief engineer, R.C.A. Communications; R. R. Beal, research director, R.C.A.; O. B. Hanson, chief Engineer N.B.C.; Dr. Baker, and H. K. Norton, assistant to the president of R.C.A.

TELEVISION MOVES AHEAD

At left: Demonstrating the Baird home receiver with an actual picture of Mickey Mouse being received and viewed plainly in the mirror. At right: The latest Farnsworth equipment for taking television "shots" being demonstrated by George Sleeper of the Farnsworth Television Company.





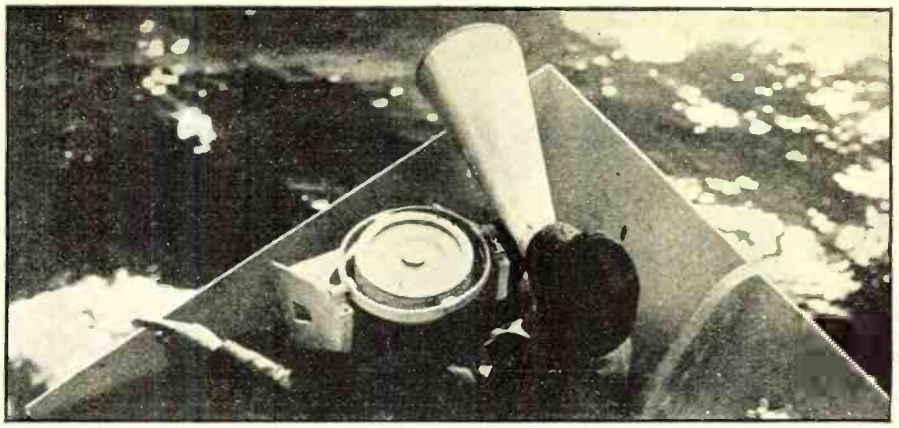
AN ELECTRONIC "FRISKER"

A guard removes a concealed weapon, the presence of which was made known by a new "gun detector" developed by Dr. David Luck, research engineer, of Camden, New Jersey. Anyone passing through a protected doorway of this kind carrying sizeable metal objects, sets off an alarm and isolates the room by automatically closing steel doors. The device might be used at the entrances and exits of banks.

men who will also serve on the committee are R. B. Beal, RCA Research Supervisor; C. W. Horn, Director of Research and Development of the N.B.C.; O. B. Hanson, Chief Engineer of the N.B.C.; C. H. Taylor, Vice-President in charge of engineering for RCA Communications, Inc., and J. C. Warner, Manager of the Radiotron Division. Dr. Baker said the committee was confident of ultimate television results, although it would take some time to iron out some of the wrinkles for commercial television broadcasting.

William Peck, who is now broadcasting television in Canada, may soon start operations in the United States, according to a reliable report. A similar statement has been made regarding the activities of Harold Donle, well-known for a long line of television experiments. The First National Television of Kansas City has already completed their new ultra-high frequency transmitter for use between 42,000 and 56,000 kc. They have been demonstrating television in their New York studio for some time now.

Another rumor regarding RCA is that their largest "test" receiver for television uses a cathode-ray tube and gives a picture 8 inches square. It will really contain three receivers, one for sight and another for sound (both ultra-short waves) and the third receiver will be for ordinary sound broadcasts. A complete set will have as many as fifty tubes, if this rumor is correct. Still another report (that was vehemently denied by officials) was that this company had ordered many thousands of television cabinets for fall delivery. (*Editor's note—We are printing these rumors and reports simply with a view to clearing the air, but it is also our feeling that television is fast looming up as a force in radio that may start a trade revival as far-reaching in its effects as that of regular radio broadcasting, in 1919, 1920, 1921, and 1922.*)



NO MORE SHOUTING AT SEA

The use of the old-fashioned megaphone and the bellowing human voice faces extinction in communicating between nearby boats or vessels at sea. A new device which accomplishes this result, electrically, may soon be used on all ships. *(Story on page 140.)*

AID TO THE DEAF AND DUMB

This new apparatus will help teaching of speech to the deaf and dumb. Dr. F. V. Hunt of the Cruft Laboratory, of Harvard, is shown pointing to the frequency meter which will indicate when a deaf-and dumb person, speaking into the microphone, makes the correct sounds for a word, spoken previously, by a normal person.

Exchange Television Rights

PHILADELPHIA, PA. — The Farnsworth Television Corporation, which only recently arranged a tie-in with the Fernseh Television interests of Germany, is now reported to have concluded similar arrangements with Baird Television, of England, whereby patents and technical data will be exchanged. The move is interpreted to mean that both Baird and Farnsworth will manufacture television apparatus incorporating the best features

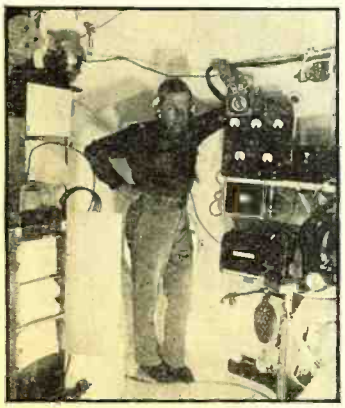
(*Turn to page* 181)

RADIO IN TASHKENT

Radio now entertains guests, shown below, instead of native singers and dancers in a tea house in far-off Uzbekistan, U.S.S.R.

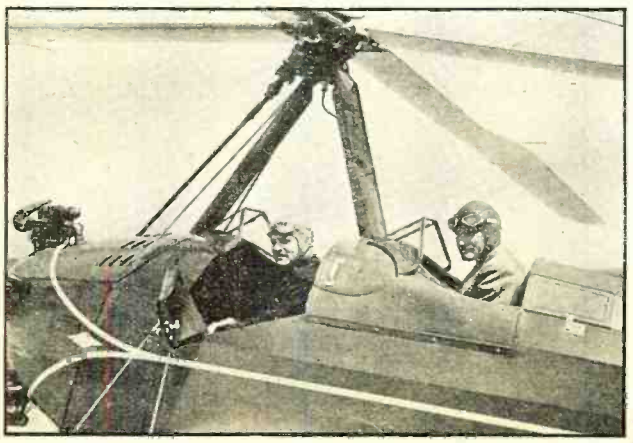
DISAPPOINTED PILOT

Capt. Orvil A. Anderson, who was to have piloted the National Geographic-Army Air Corps stratosphere flight, inspecting the gondola of the Explorer II, which, unfortunately, burst its gas bag just before taking off.

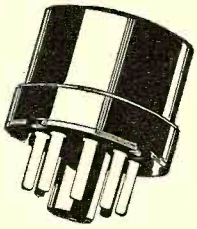


REAL "AIR COP" DIRECTS TRAFFIC

To test traffic direction from the air, Harold Fowler, Deputy Police Commissioner of New York, recently flew over highways leading to the city and gave rerouting directions to police stations via radio.



Metal ? re: Tubes



OF COURSE! Everyone will eventually use metal tubes. They do offer an improvement in design and in manufacturing methods for receivers. As early as 1933 RADIO NEWS predicted that metal tubes would simplify and improve set construction. And again in 1934 RADIO NEWS said, "Eliminating the glass bulb is a radical step that may improve radio importantly. Tubes such as these may make possible much smaller but much more powerful receivers in the future." After all, metal tubes are and have been standard for broadcast and commercial transmitters for many years so that the use of this principle, "in miniature," for receivers cannot be very far wrong. But some manufacturers may hold back for a time like the auto makers who said, "No four-wheel brakes on our cars;" and *then put them on anyway in less than a year!*

ARE METAL TUBES BETTER or worse than the older type? Lots of people ask this. The answer is: Metal tubes use the same filament, the same grid electrodes and plates as the older type. So the functions of these integral parts should be exactly similar. But the new tubes have a metal cylinder rather than a glass tube and the cylinder is smaller. It can be used as a ground. This eliminates the use of extra shielding and simplifies set construction. Then, again, the base of the tube is smaller and capacity and leakage can therefore be reduced. So there is no inherent reason why metal tubes should be worse than their predecessors and a number of reasons why they can be better.

WHAT ABOUT THE FUTURE of metal tubes? The future, we again predict *will be radio's future!* Metal tubes will be found in future radio receivers as they are now in transmitters. There may be more metal-tube types added to present types and actually there is no reason why metal tubes should not be made even smaller and still more efficient! The radio vacuum tube is really a thermionic relay and, in our humble opinion, it does not have to be manufactured in the old way, "just like a lamp." It may be considered as a "part" just as a condenser or a resistor is a component part of a radio set. The ordinary home owner would never consider taking out a resistor or a condenser if his set failed. Why? He wouldn't know what part of the set it was and he would not be able to get it out easily. Condensers do not have sockets and plugs to connect them into a set. They are not *readily* replaceable. Even coils are now being made as regular components of a receiver and plugs and sockets for coils are not used in most of today's sets. Sockets and plugs have insulation and insulation has some loss of radio frequencies. So why not also make future tubes as units that can be built right into the set to stay! No sockets—no plugs—and lower capacities and lower losses! If such a set went wrong the serviceman would repair it and handle tubes just as he now does replacement condensers and resistors. At once, this would be better service to the set owner, more opportunity for the serviceman and *all sets would be kept in better shape!* Tube manufacturers could make an honest profit, for their products would no longer be the victims of price-cutting and unfair competition by sales to set-owners who cannot tell a good tube from a bad one, and every set sold would need to have a complete set of new tubes to power it. Set manufacturers would also profit because servicemen would be on hand to tell set owners when their set became obsolete and could sell them a new one rather than have the owner blindly remove a few tubes—take them to a dealer, get new ones and *put them back into the old set which won't work half well—even with the new ones!* After all, metal tube sets of this type, for both radio and television, could sell as complete replacements, today, if the public were educated to expect a saving in radio, by yearly replacement, just as they do in the purchase of automobiles.

At any rate, no matter how you look at it, *there's a great future for metal tubes and metal tube developments!*

Radio News
September, 1935

RADIO in the C. C. C.

How short-wave radio is playing a big part among those scattered "Robin Hoods" of the Civilian Conservation Corps, not only from the standpoint of communication between camps, but also as a means of communication back home. It is just another case of how short-wave radio is pouring world news into those out-of-the-way places.

Stephen C. Manning

ENCAMPED in a forest in Idaho were 200 boys of a Civilian Conservation Corps company, uprooted from metropolitan New York. The tall trees were not the towers of Manhattan and the lads were homesick. One of the Army lieutenants, an old time radio amateur, tossed together a transmitter and receiver, and under a portable call, immediately opened the floodgates to a steady stream of messages between nostalgic "bush marines" and their families back in the Big City.

A Vast Project

This is but one phase of the Nation's newest wholesale experiment in short-wave communication which is now taking place among the 1651 camps spotted throughout the National Forests, National Parks, on private farms, at the bottom of canyons and atop high peaks—in fact, under every climatic and geographic condition in the United States.

The U. S. Signal Corps, the Forest Service and the National Park Service are sponsoring a more official brand of experimentation, while hundreds of individual amateurs ranging from the lowliest "civie" (the Army would call him a buck private) to the camps' commanding officers and work superintendents have gotten equipment into action and are "on the air."

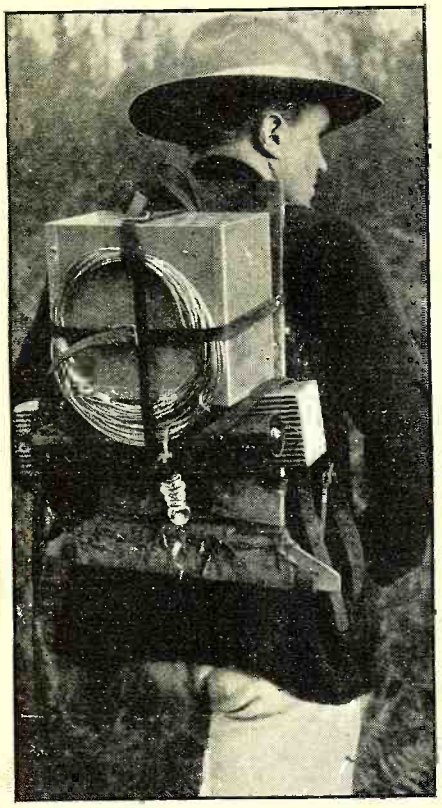
Today (a different picture than that when, nearly two years ago, the first contingents of the C. C. C. penetrated the forests) hundreds of camps are hooked together by short-wave radio and are in communication with Army headquarters and amateur stations in every part of the country.

REPORTING BACK TO CAMP

A C. C. C. radioman operating one of the Forest Service's semi-portable transceivers. The mule carries the equipment, which can be unloaded and set in operation, in a jiffy.

Short Waves

The Army was quick to see the value of short-wave communication in its administration of the C. C. C. camps. In April, 1932, the Ninth Corps Area found its problem to be this: its bailiwick stretched from the Canadian to the Mexican borders, and from the Pacific to the Rockies. How could San Francisco headquarters keep in close touch with 459 camps (the Ninth Corps Area's alloted number) dotted over this vast area? Radio was the solution, of course; but with the increased traffic over the regular Army networks, the necessary men to do the job could not be spared. So Maj. Gen. Malin Craig, then commanding the Corps Area, upon the recommendation of



A REAL PORTABLE

This portable transceiver, being toted by a forester, is used for penetration into extremely rugged country.

his Signal Officer, authorized the enrollment of unemployed members of the Army Amateur Radio system—a chain of amateurs which forms an auxilliary, volunteer short-wave network to the Signal Corps' own hook-up. The amateurs agreed to the proposition that 12 A.A.R.S. members would be signed up; their equipment would be transported and installed in the various district headquarters at the Army's expense. This net—operating on 3497 and 6990 kilocycles, under four-letter calls beginning with "WUB"—is still in efficient operation. In the other Corps Areas, throughout the summer and winter of 1933, most of the pioneering work in C. C. C. short-wave communication was done by individual amateurs in the camps. But the beginning of the second six-month's enlistment period beginning October, 1933, saw an influx of 32 more companies into the Third Corps Area (Maryland, Virginia, Pennsylvania and the District of Columbia), bring the total number of camps to 185. Many of these were isolated; roads were practically impassable in the winter.

The S. W. Network

The need for radio communication was apparent. It was felt that the Ninth Corps Areas' idea was a step in the right direction, but that the Government should provide the short-wave equipment. So the Third Corps Area was inaugurated. It was divided into two district nets—one for Pennsylvania and another Virginia-Maryland, each with its district net control station, and a main net control station at Corps Area Headquarters in Baltimore. Operation throughout the complete net—35 stations—was begun April 10, 1934. These 25-watt camp stations, using typical amateur apparatus, in the daytime operate on Army frequencies (4305 kilocycles for the Virginia-Maryland net and 4445 kilocycles for the Pennsylvania loop. Official traffic is handled under four-letter calls beginning with WVH.

At night, these stations turn to the amateur frequency bands, and use amateur call letters. While in that state, they handle private messages from enrollees to and from their home towns, and indulge in all varieties of amateur short-wave work. (Each camp is supplied with its own copy of RADIO NEWS for its leadership in the short-wave field so that each camp will have at its fingertips the latest technical and operating short-wave information.)

Practical Training

"This," said 1st Lieut. Harold O. Bixby, A.A.R.S. Liaison Agent, "was highly desirable . . . because the operation of an amateur station would build up considerable interest among the enrollees and work up worthwhile educational and recreational activities around the radio station. Radio classes have been formed, with the operators as instructors, and reports show that some of these embryonic operators may be able to operate the stations before their enrollment expires."

All of the stations in the Third Corps Area are also members of the Army Amateur Radio System, and hold regular drills in that organization, according to Capt. Rex W. Minckler, Liaison Officer in charge of the A.A.R.S. in Washington.

The A.A.R.S. again steps into the picture in the Mid-West, where in the Seventh, and to a lesser extent, the Sixth Corps areas state C. C. C. networks have been formed. These operate under amateur and special Army calls, with A.A.R.S. supervision, handling both official C. C. C. business and private messages from and to enrollees. In the Seventh Corps Area, the Minnesota and South Dakota networks are perhaps the most active, with other states rapidly establishing new stations for efficient state-wide coverage.

Less formal is the small set-up reported in Arizona, in the Eighth Corps Area. Reports come of a small loop of three short-wave stations, located at Tucson, Ashdale and Globe. In the Tucson camp, two operators are regularly on duty operating a Signal Corps field transmitter; one handles the key while the other turns the crank on the hand-driven generator. Justice is seen in the ruling that these two operators reverse their respective jobs on each of their hourly contacts with the other stations.

C. C. C. radiomen have been active in two other official fields—the Forest Service and the National Park Service. Last summer, while the Forest Service was devoting much research to the development of lightweight, portable equipment for fire-fighting duty in the vast northwestern forests, came the fierce fire season of 1934. Maj. Evan Kelley, Forester of the Service's "Hottest Region," threw picked companies of C. C. C. men into the front line of attack against the walls of fire sweeping over terrain impassible except by mule back. The new Forest Service radio sets were given their baptism of fire—and many of them were operated by C. C. C. amateurs fortunately familiar with short-wave radio.

In National Parks

The National Park Service, also is going in heavily for radio in administration and fire-fighting communication. Each National Park is alloted a frequency in which its fixed and portable stations operate. C. C. C. members have aided greatly in the development of equipment. Two enrollees, graduates of technical school and working on their Master's degrees in radio engineering, helped perform many valuable experiments in Rainier National Park. Another amateur-enrollee was a valuable assistant in (*Turn to page* 164)

A C. C. C.—ARMY NETWORK STATION

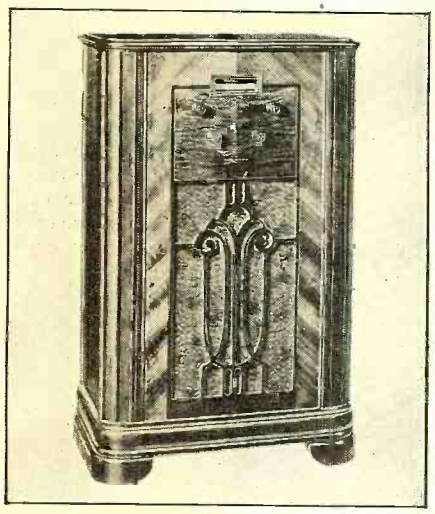
This is Station WVHN-W8LYK, a station of the Third Corps Area, located at Camp Milray, Pennsylvania. C. C. C. men built the table and chair, which are in the radio corner of the administration building. This is standard equipment for all the 35 stations in this loop.

WHAT'S NEW in RADIO

By William C. Dorf

Attractive Battery Operated Console

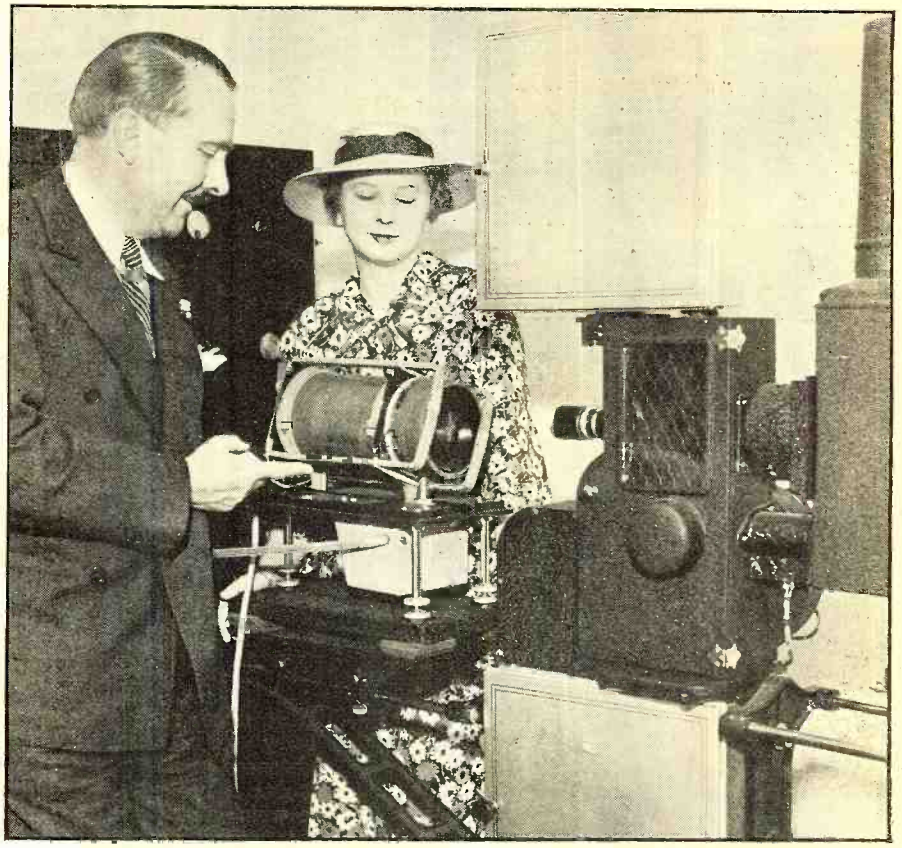
The photograph below illustrates the new American-Bosch model 376N five-tube superheterodyne receiver for use in unelectrified homes. The set can be em-



ployed with either the air-cell, standard dry-cells or a 2-volt storage battery.

A New Universal Tube Checker

Dealers and servicemen will be interested in the new Weston tube tester which represents a striking departure from former types both in appearance and electrical design. It has socket mountings to take care of all pin combinations for all glass or metal tubes now on the market, also has provisions for various combinations for any new tubes which may be introduced in the future. The meter itself is of modern rectangular shape with an easily read scale.



EXPLAINS FARNSWORTH'S LATEST TELEVISOR

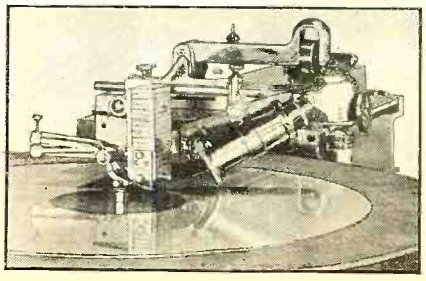
George Everson is shown demonstrating to Mrs. Gordon Coyell the new Farnsworth cathode-ray television instrument to be used for British Sight broadcasting.

New Line of Glass Tubes Interchangeable With Metal Tubes

An announcement was recently received from the Arcturus Radio Tube Company that they are bringing out a line of tubes identical in electrical characteristics and pin connections to the metal tubes, but having a glass envelope. These tubes carry the same type numbers as the metal tubes except the letter "G" is suffixed. The new "G" line will enable set manufacturers to proceed with the design of metal tube sets without waiting upon the present limited production of metal type tubes.

Precision Recorder

The Universal Microphone Company announces a professional recording machine featuring rim drive and countershaft which makes it possible to make recordings at 78 or 33⅓ r.p.m. on 50- or 60-cycle current. The machine is set for 108 lines per inch, but it can be changed to any number of lines desired. The special power cutter has screw adjustments for damping. Additional Universal recording equipment includes a recording amplifier, aluminum blanks and silveroid discs, together with sapphire, bamboo and trailing shoe needles.



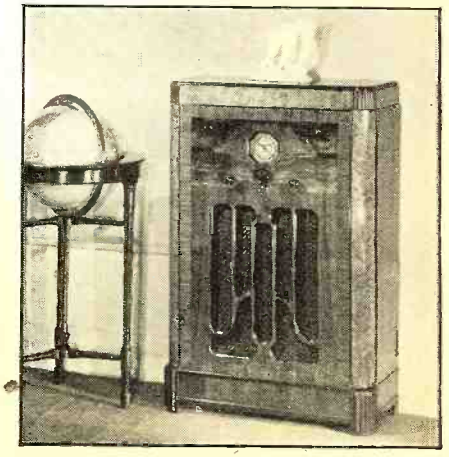
Something New in Loudspeakers

A magnetic type reproducer with no solder connections in the mechanical linkages, fewer parts and extremely rugged construction has just been announced by Wright-De Coster, Inc. This Hyflux magnetic speaker is designed to have an unusually fine frequency range and to provide tone quality comparable to the electrodynamic type reproducer.

Receiver Features Expert Workmanship

The Stromberg-Carlson model 58W lowboy receiver covers from 540 to 18,000 kc. in three bands. Six tubes are employed, and a 10¼-inch dynamic type speaker. Several new and unusual features are incorporated in the design of this set, out-

(*Turn to page* 174)



PROJECTS SOUNDS LIKE HAMMER BLOWS

Here is the world's most powerful loudspeaker, that is capable of throwing the human voice in intelligible speech to a distant point miles away. The sound leaves the speaker with the force of a 50-pound sledge-hammer blow, making a sound at the mouth of the speaker 1,000 times as strong as the roar of Niagara Falls.

The U.S.Navy's VOICE SEARCHLIGHT

By The Editor

A NEW loudspeaker or what may be termed a giant "voice searchlight" has recently been made available for the U. S. Navy and the Coast Guard. It is so powerful that it can reproduce the human voice 1,000,000 times above normal strength and can project the sound in a "beam" over a distance of several miles. Compared with an ordinary loudspeaker this new device gives the Navy the most powerful "voice" in the world, as it is at least 500 times more powerful than the standard loudspeakers ordinarily used for this purpose. The new device was developed by engineers of the Western Electric Company and is capable of reproducing intelligible speech with more volume than a clap of thunder. When measured directly in front of the horn, the maximum sounds are 1,000 times louder than the roar at the foot of Niagara Falls. This gives some idea of its tremendous power.

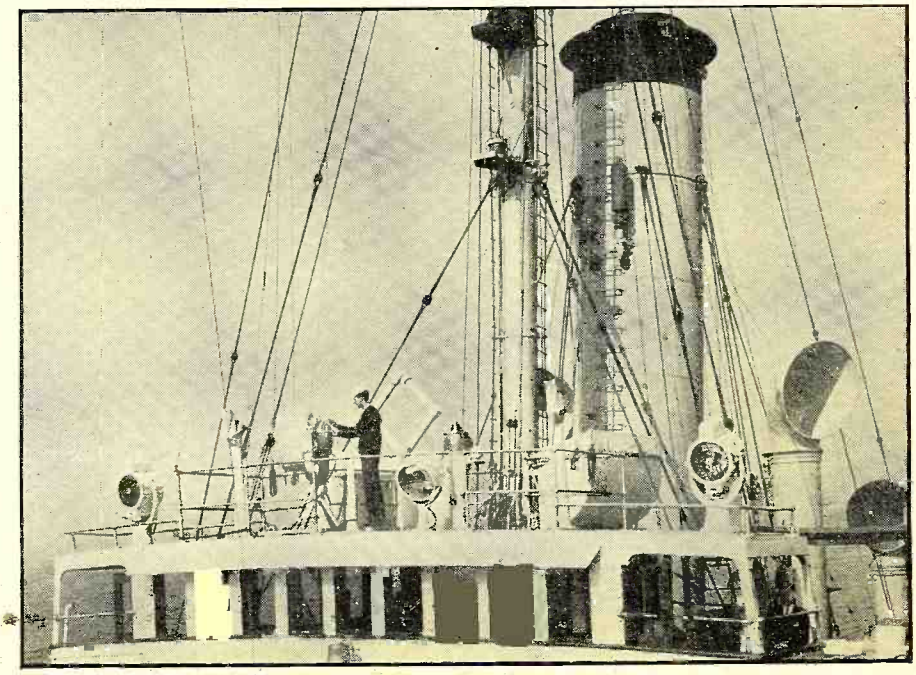
Wide Usage Predicted

Enormous crowds of people extending way beyond the range of existing loudspeakers could be handled easily by means of the new speaker. Such groups of people would include outdoor mass meetings; soldiers moving en masse: fire fighters within burning buildings; rescuers at sea, from the rescue ship to the distressed crew or to those in lifeboats; searching parties and expeditions; at yacht races and other outdoor groups or sports.

The unit not only will carry over great distances but it will carry speech over these distances *intelligibly*. This is due to the special design in which clarity is obtained by arbitrarily and deliberately sacrificing straight-line frequency reproduction and by focusing on those frequencies which tend to make speech more readily understandable. This enables the output of the device to pierce through a tumult of other noise and reach ears already carrying deafening burdens of sound with an overpowering amount of crisp, understandable speech. The loudspeaker, itself, is of a special "moving coil" type. A coil of wire attached to the diaphragm is suspended in a powerful, steady magnetic field. The coil is 8 inches in diameter and is made of fine duralumin ribbon .01 inches thick. When driven at maximum power the diaphragm generates an actual sound pressure of *better than 1 pound per square inch* and the magnetic force to set up this pressure is equal to about 50 pounds. Another way of saying this would be that the sounds leave the diaphragm with the force of a 50-pound sledge hammer blow. The speaker and its reflector, combined, are 30 inches in diameter and 30 inches deep. The reflector is made of cast aluminum and weighs 125 pounds. The speaker unit itself weighs 375 pounds. Both the speaker and the reflector are mounted on a swivel tripod and the speaker can be pointed easily in any direction.

Used for Speech

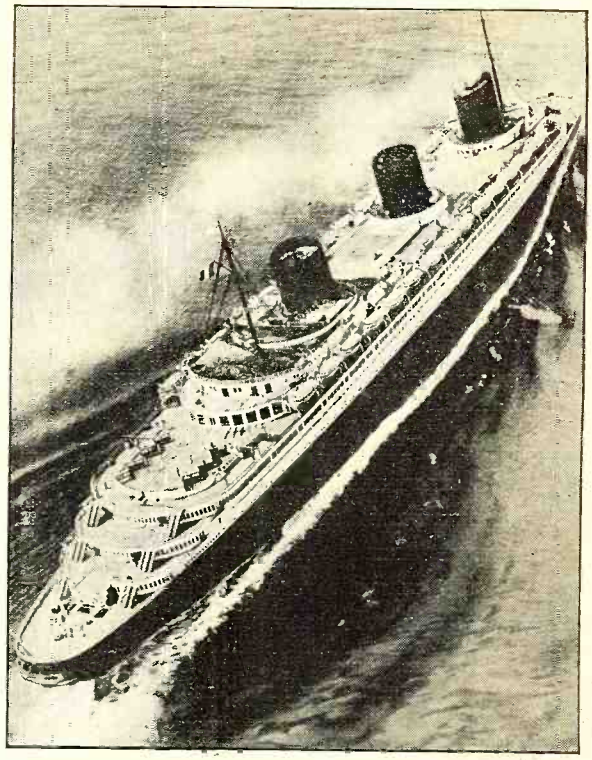
It is reported that this is the type of device that the Navy Department intends to make avail- (*Turn to page* 188)



The New Queen of the Seas Broadcasts to Two Continents

The Radio Equipment of the "NORMANDIE"

By Jean Ledoux



THE S.S. Normandie, world's largest liner and winner of the blue ribbon of the Atlantic for the speedy maiden voyage from Le Havre to New York and back, is equipped with one of the most elaborate marine radio layouts in the world with the call letters FNSK. In all of the newspaper and newsreel fanfare and ballyhoo, accompanying the liner's debut in New York Harbor, little was noted regarding the ship's radio apparatus. And yet it was the Normandie's huge radio installation that kept the enthused populace informed of the festivities aboard the liner long before she steamed into Quarantine.

Broadcasts Widely Heard

From a crowded New York roof-top, the writer watched the Normandie's gallant and proud arrival. All neighboring roofs were also jammed with throngs anxious to glimpse the newest addition to the French Line fleet. This intense interest in the liner's debut was caused, to a large extent, by the radio broadcasts over the CBS and NBC chains direct from the liner and the columns of wirelessed news dispatches from correspondents on board. But not much has been written about the ship's radio installation.

Much emphasis has been laid on the luxurious interior of the liner. The elaborate staterooms, the palatial lounge, the roomy theatre, the imposing chapel —and many other features of the Normandie's design—have been described frequently. And in line with all the grandeur of the ship's decorations and equipment, the ship's radio layout stands out prominently as one of the most interesting in any nation's merchant marine.

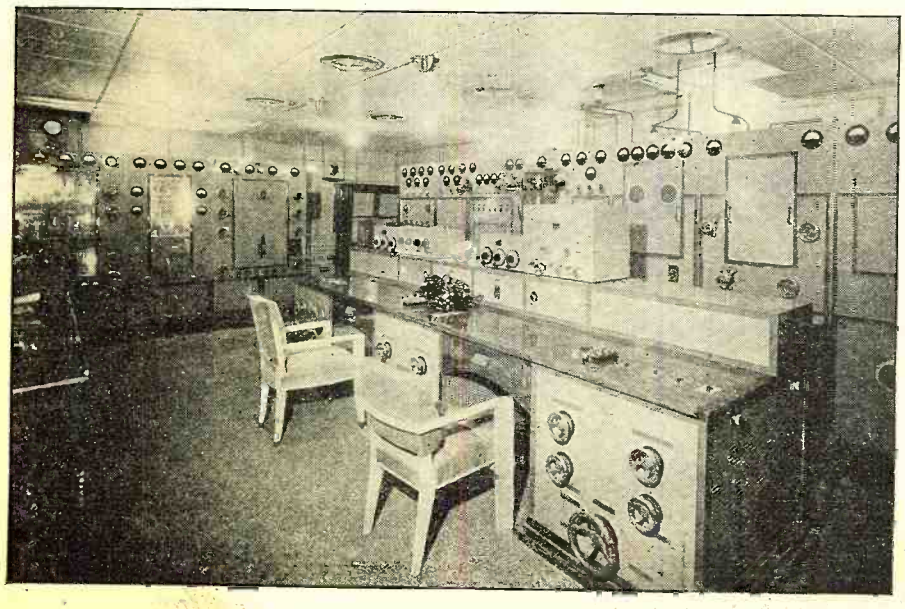
Radio-telegraph, radio-telephone and radio navigation devices of many types are included in the intricate Normandie layout. Visiting the liner at its New York pier, the writer was impressed with compactness of the equipment. The radio room, large express-liner size, is far from the passenger hustle. A page boy guided the writer through narrow passageways and stairways to reach the radio room designated on the Normandie as the "commercial cabin," the term being used to distinguish it from a special radio cabin reserved for the bridge to accommodate radio equipment used in direct relation to navigation.

Famed Radio Room

The commercial radio cabin contains an assortment of short-wave and long-wave telegraph transmitters and receivers designed for various marine frequencies. In addition radio-telephone transmission appa- (*Turn to page* 180)

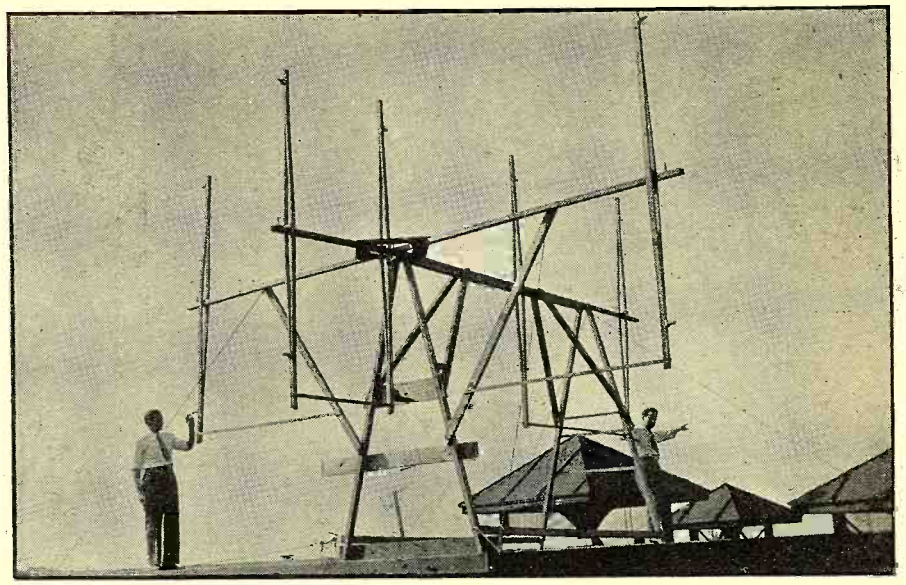
SCENES BELOW DECKS

The shielded radio equipment of the monster vessel contains a wealth of the latest developments for simultaneous radio transmission and reception services. Lower right: photograph shows Gaston Magrin, famous chef, answering questions of Announcer George Hicks, during a broadcast from mid-ocean to America while Alfred H. Morton, NBC program manager, right, looks on.



A LIFE-SIZE PICTURE

On the opposite page is shown a home scene where Peck's television receiver, operating in an illuminated room, pictures a television subject's head in full size with a sound accompaniment. The top photograph on this page shows the 6-meter special television beam antenna which projected the pictures over a distance of over 70 miles.



Reporting Progress . . . .

TELEVISION

TELEVISION has arrived in Canada. It is not "still in the laboratory"; it is not "just around the corner" or the familiar "two or three years off." It is actually on the air daily over the Peck Television Corporation station, VE9AK, located in the Dominion Square Building, Montreal. And Canadian radio manufacturers are preparing to put a low-cost radio-and-television receiver on the market.

Nor is it the "flickering" television such as has been broadcast formerly in America; both transmitter and receiver differ greatly from apparatus which has heretofore been shown. The transmitter uses an *entirely gearless* scanner and with a 300-watt antenna input is sending a strong signal *more than seventy miles* on the 5 to 6 meter channel. Twenty miles had previously been considered the practical limit for this 5-6 meter television prior to Peck's experiments.

The receiver, too, is different. It projects a 14 inch by 16 inch picture on a screen with enough brilliance to be readily visible in a normally-lighted room. It uses no costly cathode-ray tubes; its only elements which need replacement are a $1.50 light-valve tube and a 10-cent automobile headlight bulb (the light source). Both of these elements give 5000 hours service.

VE9AK was erected in the middle of May, 1935, as a 20-watt station. It then had a service radius of about ten miles. As the engineers under the personal direction of William Hoyt Peck, president and chief engineer of the corporation, furthered their experiments, the power was gradually increased to 300 watts and the range for an R9 signal was increased to 75 miles easily.

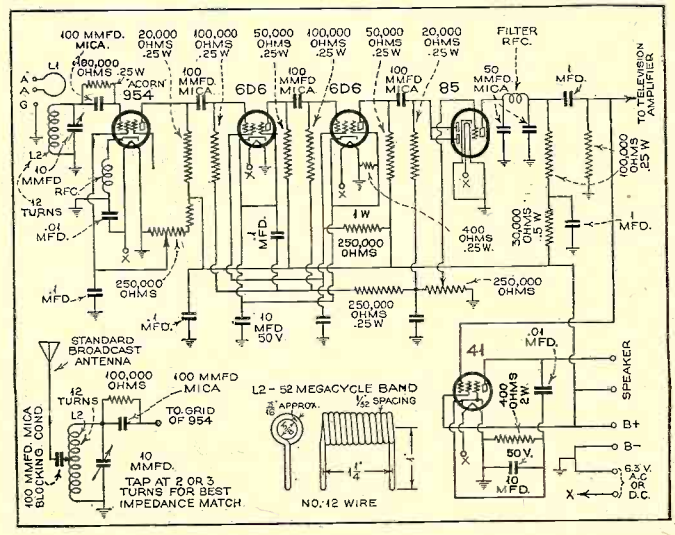
To understand how Peck has more than trebled the range formerly believed possible for ultra-short waves, it is necessary to know something of his background. Briefly, he is one of America's foremost experts in the field of optics, and sprang into international prominence during the World War, when he devised a means of making sextant mirrors that had hitherto been obtainable only from Germany.

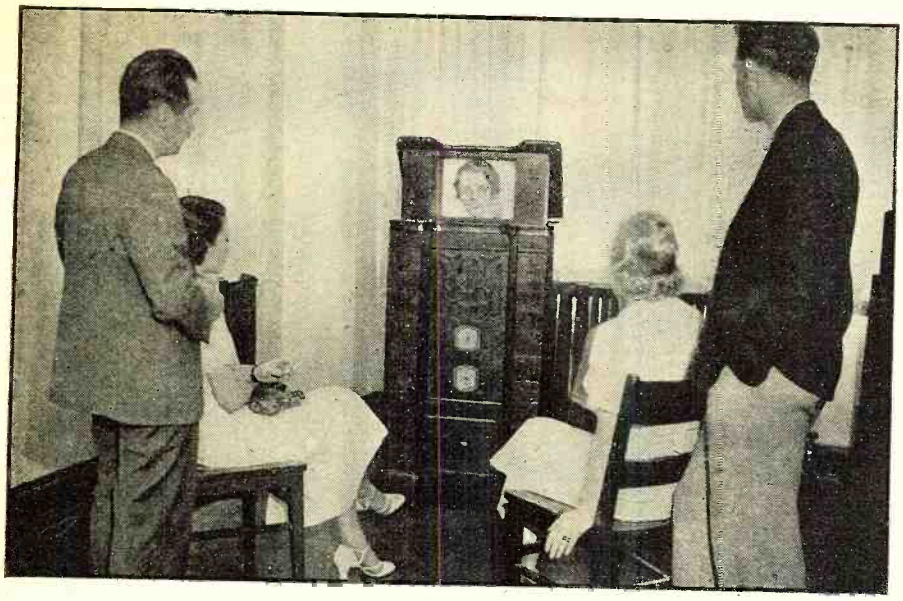
Phenomena Studied

Knowing the familiar fact that ultra-short waves are in many of their characteristics similar to light waves, Mr. Peck brought his years of optical training to bear upon the problems which they presented. He understood the refraction of light by the earth's atmosphere, which enables us to see the sunset some twenty-eight minutes after the sun has sunk below the horizon and decided that the same phenomenon might hold for similar radio waves.

DURING A FIELD TEST

An engineer and his assistants checking the strength of the new Canadian television transmitter, atop the Dominion Square Building in Montreal, from a distant field. At right, the schematic diagram of Peck's television receiver.





71 MILES on 6 Meters in CANADA

By Rupert Oakille

Peck likewise, from long study of light reflectors, developed a theory for directional antennas, which has worked out in practise. "If you set up an automobile headlight bulb with no reflector behind it," says he, in explaining his theory, "it will illuminate only a small area. But if you add a *correctly designed* reflector, the beam may be projected a mile or more in a single direction. We are now applying this principle to the propagation of ultra-short radio waves."

The Reflector Antenna

The output of the Peck Television Corporation's transmitter is fed into a single upright antenna—a small copper rod atop the Dominion Square Building. On three sides of this antenna are similar rods, tuned to the requisite frequency and placed ½-wavelength away. These are the reflectors, each collecting the energy radiated into its quadrant and reflecting it back to the antenna proper. By adjusting the length of the reflector rods, their resonance and therefore their efficiency may be controlled, so that it is possible to tune them in such a way that signals can still be heard on the "dead" sides of the antenna as well as along the path of the beam. In this manner, it is possible for the one transmitter to serve two areas; i.e., the area immediately surrounding the transmitter (in this case the city of Montreal), and the area traversed by the beam, which at present lies between Montreal and the outskirts of Trois Rivieres, Quebec.

At the side of the antenna from which the beam emanates, two upright metal rods are arranged. These, however, are placed in line at correct distances from the antenna and consequently act, not as reflectors, but as "electrical lenses," for their effect is to *concentrate* the beam along the predetermined course, and to keep it from spreading.

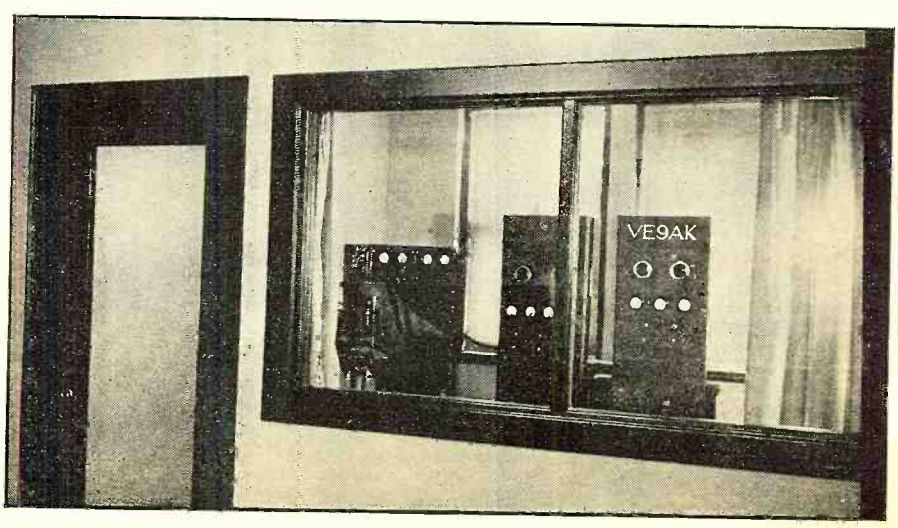
The receiving antenna for these waves is also an upright rod and Peck has discovered that as little as five feet difference in the placement of a receiving aerial which is seventy-five miles from the transmitter may mean the difference between an adequate signal and total lack of reception. He explains this by pointing out that it is possible for a reflected wave, out of phase with the direct wave, to cancel out, but that by moving the receiving antenna a quarter wavelength, the phase shift problem is overcome.

Approximately 1,000,000 persons are within the area in which J. L. Cassell, Joseph Dusek and other Peck engineers have conducted tests during the past three months. Their figures show that signals of sufficient strength to override local interference are heard throughout this entire territory. The engineers have established field headquarters at the Hotel Lafleur, Louisville, Quebec, where Roland Lefleur, manager of the hotel, had been acting as an unofficial observer, making nightly checks on the signal strength of VE9AK. Later a complete receiving installation was made here as a permanent test station. The hotel, one of the largest in that part of Quebec, was thus the scene of Canada's first major television demonstration.

Nor is the Peck optical antenna system the only new development of this organization, which has steadfastly adhered to mechanical scanning in preference to the much-publicised cathode—ray equipment. "There is no need to use more than 180 lines unless you want to watch television (*Turn to page* 186)

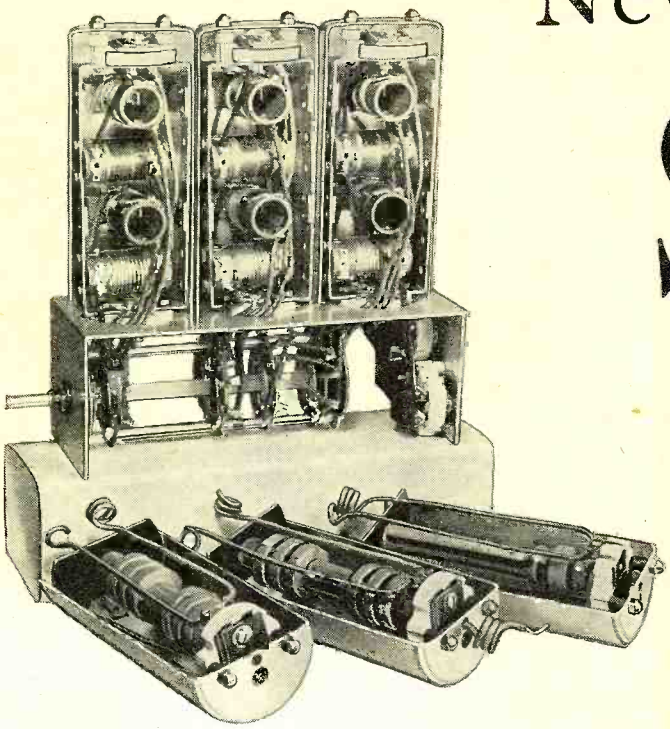
TELEVISION STATION VE9AK

Looking into the control room of the Canadian television station VE9AK, showing the short-wave transmitter, the control panel, and at the extreme left, the pick-up apparatus.



New Features *for* SUPER

John M.



THE COILS

The r.f. and i.f. coils are shown here with shields cut away. R.f. coils with switch, trimmers, and padders are assembled and wired by the manufacturer.

THE receiver described in this article is an unusually suitable one for the home constructor. With few exceptions, it has heretofore been difficult for the home constructor to build up a modern and highly satisfactory short-wave receiver for the reason that it has been difficult to purchase matched short-wave coils adaptable to band switching. Even where such coils are available there has been further difficulty in obtaining a separate ganged condenser suitable to operate with these particular coils.

MANY difficulties have been eliminated for the constructor in the "Super DX-8" because all r.f. coils are carefully matched to work together and in turn the entire coil set is matched to the special band-spread ganged tuning condenser. More than that, the r.f. coils are provided with the coil switch and the necessary trimmers and padding condensers completely assembled and wired on a small subpanel. Thus, not only is accurate matching and alignment provided, but in addition, variations in wiring which might seriously affect alignment of the tuned circuits are avoided. In other words, all of the complications normally found in assemblying an all-range short-wave receiver are avoided due to the cooperative effort of the General Manufacturing Company and the Reliance Die and Stamping Company, two manufacturers who worked together in the production of the tuning circuits.

The former company manufactures the r.f., i.f. and beat oscillator coil assemblies, and the latter produces the band-spread ganged condenser. These items, together with a drilled chassis and a wiring harness constitute the foundation kit from which this set may be constructed. All other parts may be purchased independently—a distinct advantage from the standpoint of the experimenter who may already have many of the miscellaneous parts on hand.

Continuous Band-Spread

The receiver is a 4-band, 8-tube short-wave superheterodyne which has a continuous frequency range from 1.6 to 18 megacycles and is applicable to any type of short-wave reception, especially short-wave broadcasting and "ham" activities. Continuous band spreading is provided on all ranges by the ingenious tuning condenser, each section of which consists of a 140 mmfd. tuning condenser and a 33 mmfd. trimmer, these trimmers being ganged as shown in one of the accompanying illustrations. Rough tuning by means of a large gang is accomplished in the usual way, then the fine tuning or band spread is obtained by pulling out on the main knob. When in the "out" position, this knob operates the small condenser gang. Dials are available for use with this condenser and have two indicating needles and two scales as shown in the photograph.

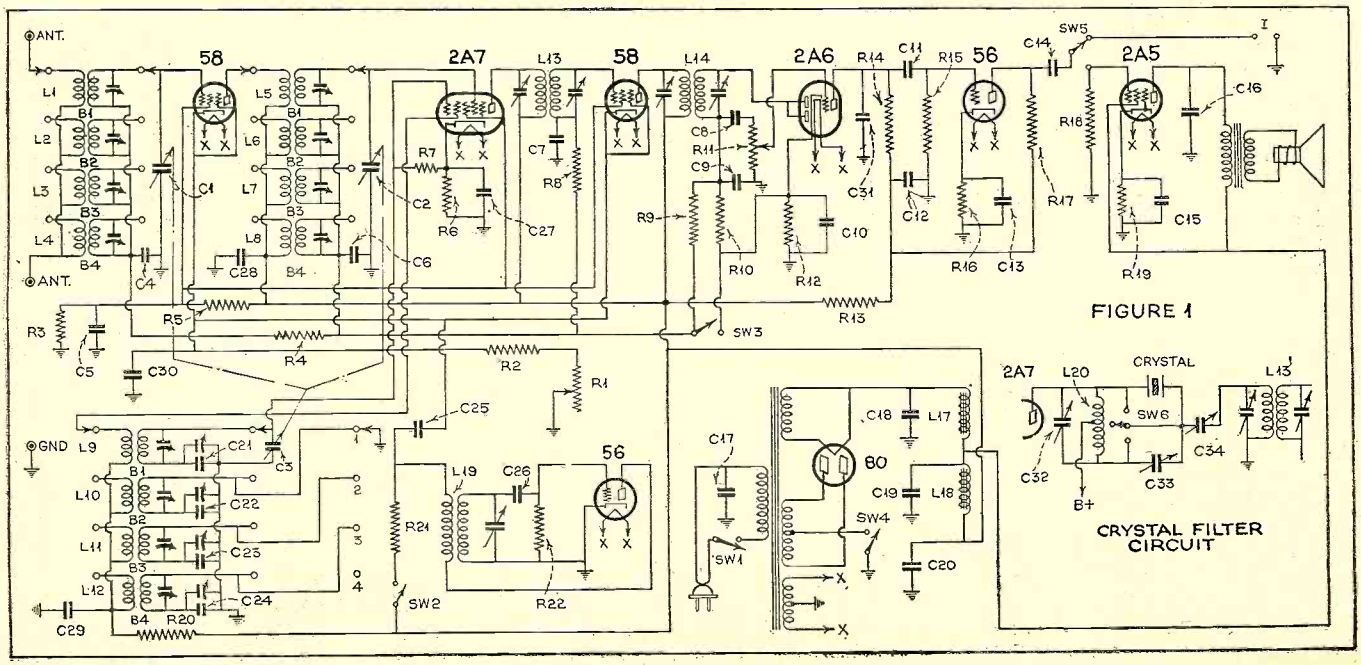


FIGURE 1

the Home Constructor *in the* DX-8

Borst

This band spread feature is a decided asset for all types of short-wave reception. In addition, the circuit included a beat frequency oscillator as an aid in picking up weak stations or in c.w. reception. For the use of the amateur, there is a "stand-by" switch, by means of which the plate supply is cut off but the filaments left lighted so that the receiver is made dead while he is transmitting. A quartz-crystal filter is provided for in the circuit and in the drilled chassis for constructors who desire this feature. Both manual and automatic volume control are included; also a headphone-speaker switch. Finally, complete drawings including the schematic circuit and picture wiring diagram and a complete set of instructions for building the set are available with the coils kit.

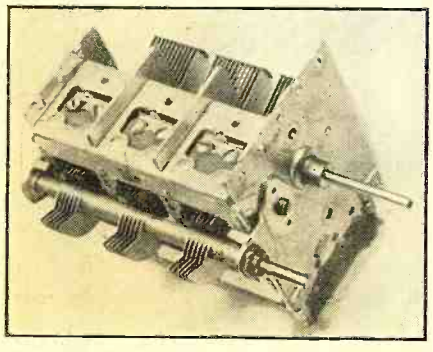
The Circuit Used

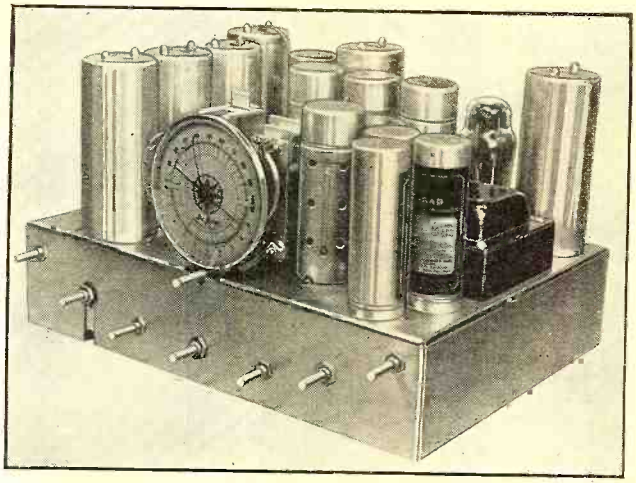
The receiver includes one tuned r.f. stage on all bands, a detector-oscillator, one i.f. stage, a second-detector a.v.c. and audio tube, one straight audio stage and a pentode output tube.

Figure 1 shows the circuit diagram of the receiver. The antenna terminals are arranged so as to accommodate either a doublet or an ordinary L-type antenna. The 58 r.f. tube is controlled by the a.v.c. along with the 2A7 detector-oscillator and the 58 i.f. stage. The maximum sensitivity of the receiver can be adjusted so as to limit the interstation noise. When the a.v.c. is cut out, the same sensitivity control is used for manual adjustment.

THE TUNING CONDENSER

This unique condenser has dual sets of rotor plates operated by separate shafts. The band spread rotors are clearly shown. The main rotor plates are visible on the opposite side.





THE COMPLETED ASSEMBLY

The single tuning knob controls regular tuning when in the "in" position. To obtain band-spread tuning, this same knob is pulled forward, in which position it controls the band-spread section of the main condenser.

The intermediate-frequency amplifier works on a frequency of 507 kc. The Gen-Ral transformers are of a new, highly efficient type; the coils being wound in several "pies" connected in series. This method of winding has been found to give the least resistance for a given inductance. A duo-diode triode, the 2A6 serves as second detector, a.v.c. tube and resistance coupled audio. A high-mu triode is used, so as to obtain the most from this hard-working tube. There follows an audio stage, employing a 56 tube. When listening on phones this is the last stage but when speaker operation is desired a turn of the switch will connect up the coupling to the last tube, the 2A5. It is not necessary to pull the phone plug out when switching from phone to speaker.

The heterodyne oscillator, employing a 56 tube is coupled to the cathode of the i.f. amplifier tube by means of a condenser.

The optional crystal filter circuit is shown in Figure 1 for the benefit of constructors who desire this feature.

The special chassis and panel combination is suitable for rack mounting or for a metal cabinet. Holes, cutouts and slots have been provided for the mounting of the necessary parts.

Looking at the front of the set and moving from left to (*Turn to page* 185)

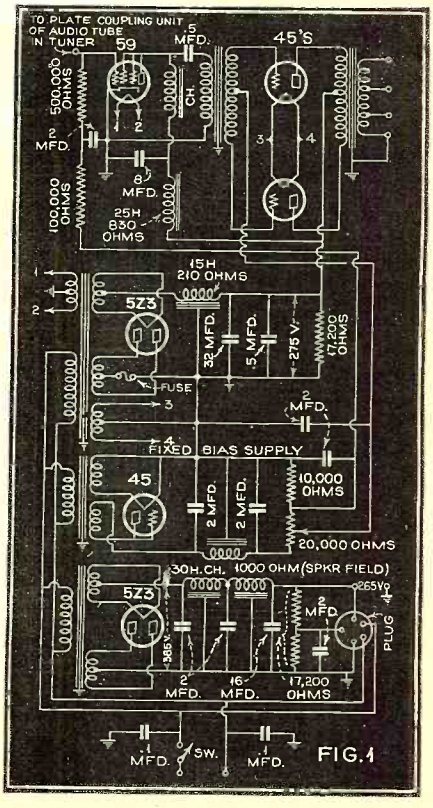
MORE IDEAS *and a*

Power Pack *for the* VALENTINE "SUPERHET"

LAST month the discussion covered the "Valentine" circuit up to the second detector. The present and concluding article covers the circuit briefly from this point on.—*The Editor.*

THE 56 second detector is used as a diode; plate and cathode being tied together. Connection of the high end of the 3rd i.f. transformer secondary is made to the plate of the tube, and the return connected through a "pi" filter, consisting of an 85 mh. choke and two .00002 condensers, to one end of a 250,000 ohm potentiometer the other end of which goes to the grounded plate and cathode of the 56 diode. Between slider and cath-

(*Turn to page* 179)

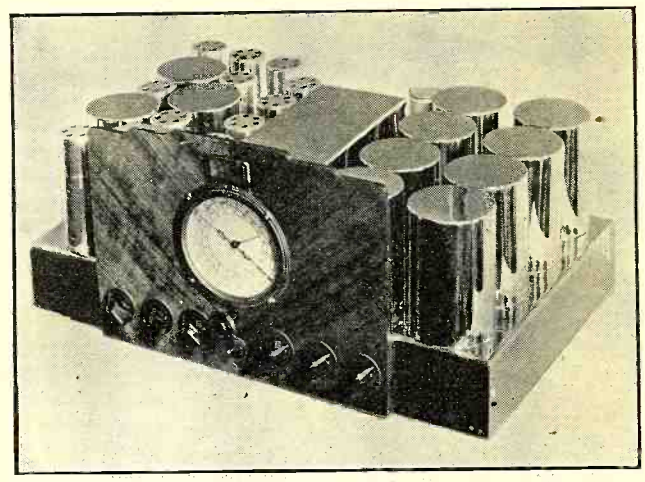


New 19 Tube RECEIVER

for

High-Fidelity Reproduction
Quiet Long-Distance Reception
Sharp Tuning
9.4 to 2150-Meter Range

McMurdo Silver



EVERYTHING UNDER FULL CONTROL!

Figure 1. Wide flexibility of operation is provided by the 7 calibrated panel controls which are, left to right: High-fidelity, high-selectivity switch, audio volume, bass-note regulator, tuning (center), beat-frequency oscillator switch (lower center), treble regulator, band switch, and sensitivity. The dial is accurately calibrated for all 5 ranges; with a "second hand" to facilitate logging short-wave stations. Above the dial is the vacuum-tube voltmeter type tuning meter.

IT is the purpose of this article to briefly describe an all-wave receiver whose designer has sought to derive maximum benefit from all available data in an effort to create a receiver fully satisfying the rigid requirements that recent experience has indicated the fine receiver must meet. Among these requirements are:

(a) Tuning range covering *all* broadcast and other interesting services.

(b) Sensitivity adequate for reception of all signals not entirely obliterated by local noise under any and all conditions.

(c) Inherent noise so low as to satisfy (b).

(d) Frequency stability of an unusually high order.

(e) Controllable selectivity permitting extremely sharp tuning or broad tuning at will for full range high-fidelity sound reproduction.

(f) Adequate audio-frequency range for high-fidelity reproduction, variable to permit compensation for individual home acoustics and reproduction at different volume levels.

(g) Adequate undistorted power output to satisfy (f) and to handle maximum amplitude range of best present and future broadcast transmissions.

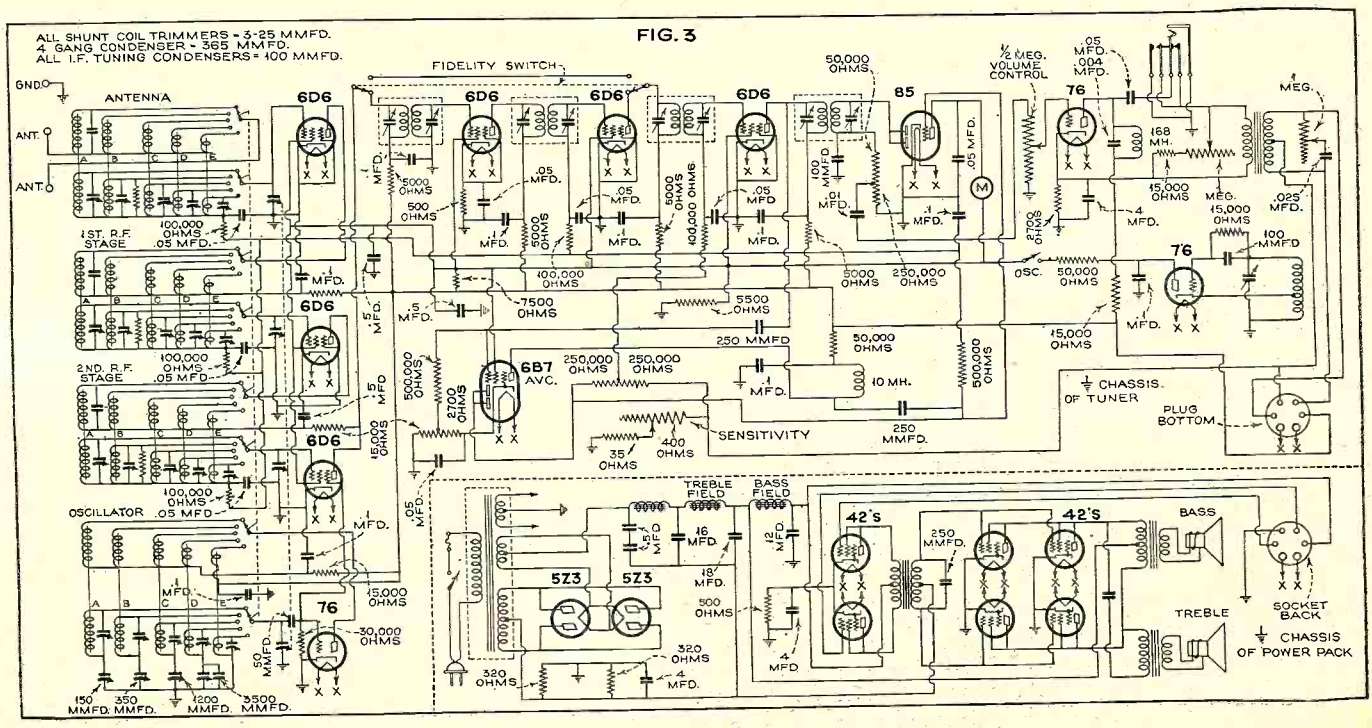
(h) Simplicity and identification of all controls to provide flexibility essential to satisfaction of all above requirements.

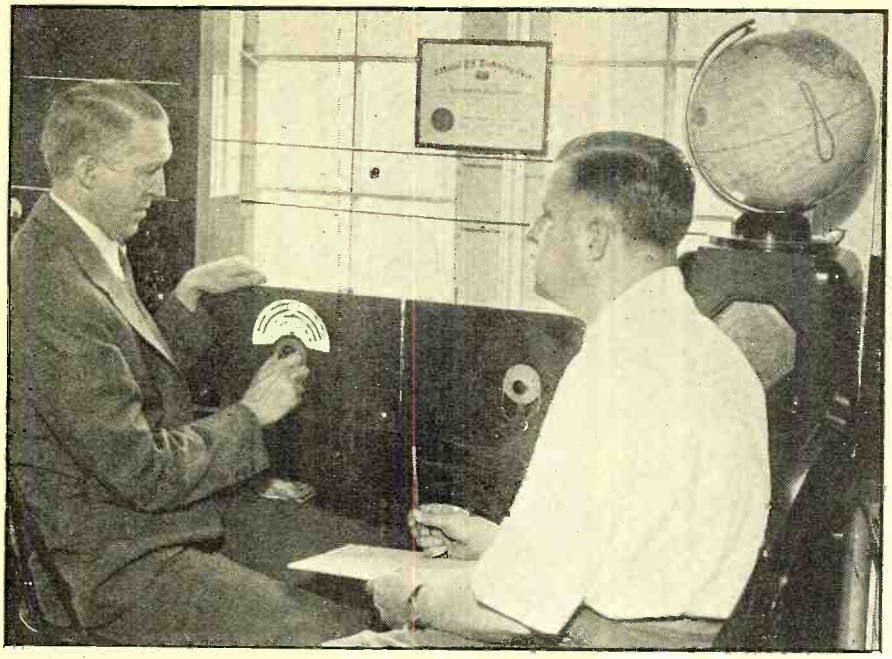
The MASTERPIECE IV receiver consists of the tuner, a 35-watt power amplifier and bass and "tweeter" dynamic speakers. It tunes from 2150 to 732 meters (140 to 410 kc.) for airport and European broadcasting, and from 568 to 9.4 meters (530 to 32,000 kc.) for all regular and short-wave broadcasting, police, airplanes and airports, amateur, commercial 'phone, and even some ultra short-wave police signals.

Its 19 tubes, all of the 6.3-volt type, are:

2—6D6's in two r.f. stages (*used on all bands*)
1—6D6 as suppressor injected first detector
1—76 oscillator
3—6D6's as air-tuned, 465 kc. i.f. amplifiers
1—6B7 as a.v.c. and tuning meter amplifier and rectifier
1—76 as audio beat oscillator
1—85 as second detector and second tuning meter amplifier
1—76 as variably (*Turn to page* 188)

FIG. 3





Glenn Browning's New "HAM" RECEIVER

John Strong

THE amateur communication receiver pictured here being tested in the Westchester Listening Post is a 7-tube superheterodyne designed by Glenn H. Browning for the sole purpose of serious amateur work. It incorporates the new Amateur Super-Tuner unit with r.f. pre-amplification on all bands. It is designed strictly for the 160-, 80-, 40- and 20-meter amateur channels and will not receive the short-wave broadcasting stations. This has eliminated the compromises which are necessary in the usual all-wave job and allows true *electrical band-spread*, with high-inductance circuits used throughout.

What this means in actual operation can be appreciated from the fact that the 40-meter band, for instance (only 300 kc. wide), is spread out over 150 degrees on the main 6-inch dial and *requires 17 complete revolutions of the vernier tuning knob!*

Selectivity is attained by a sharply-tuned antenna circuit plus r.f. pre-selection and two triple-tuned, band-pass i.f. transformers, giving a total of eight tuned circuits.

Separate audio volume and i.f. sensitivity controls are provided and delayed a.v.c. may be used, when desired. A phone-jack cuts the phones in on the first stage of audio but also includes the variable tone control (which is particularly useful as an audio filter on c.w. reception).

A stand-by toggle switch turns "off" the high-frequency oscillator, but leaves the final diode detector and the audio amplifier in operation so that it can be used for monitoring if desired.

The audio beat oscillator is coupled to one of the diode plates of the final detector instead of to the i.f. tube. This circuit arrangement gives exceedingly smooth c.w. signals and is very stable.

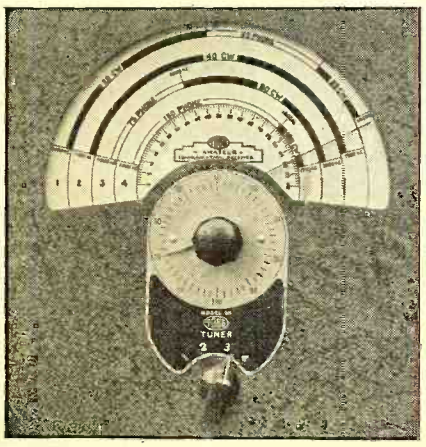
The overall sensitivity of the set is better than one microvolt (absolute) on all bands, and this is usable sensitivity, the inherent noise level of the set itself being so low that very weak c.w. signals may be copied even on the loudspeaker.

In order to maintain a high usable sensitivity and keep the noise level at an absolute minimum, the loudspeaker has not been built into the receiver, but is furnished as a separate unit so that it can be placed where it will not introduce reaction noises under any conditions.

The tuning dial is of unique design and should make a strong appeal to the experienced amateur. Extra dials are furnished which can be quickly interchanged. The electrical band-spread is so extreme that one dial can be logged (directly in kilocycles), if desired, and used as a frequency meter.

CLOSE-UP OF THE DIAL

Here is pictured the new band-spread tuning dial for the 7-tube amateur communications superheterodyne. The top calibration is for the 20-meter band, including both c.w. and phone. The next calibration covers the 40-meter c.w. band. The third calibration covers the 75-meter phone and 80-meter c.w. ranges and the fourth calibration covers the 160-meter phone and c.w.

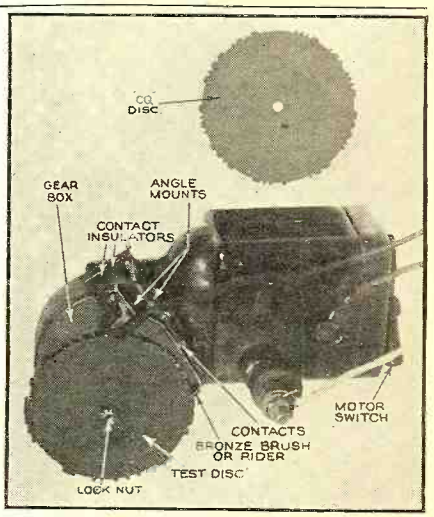


Making CQ KEY *from an old* Windshield Wiper

Ed. Glaser

AN automatic key was born! A 6-volt windshield wiper motor was procured for $1.00 from an automobile wrecking company. A pair of contacts was "lifted" from an old-time A.B. relay. A thin piece of phosphor bronze and a bakelite disc cut-out (for a meter) were found in the junk box. This key has been a great help, saving a lot of time and labor for amateur operation. Two discs were made, one for "TEST" and the other for "CQ." During early 5-meter work in Brooklyn and, lately, for 75-centimeter work at Bellmore, the key has run for hours at a time.

In the type of motor used the shaft turns a worm which drives a worm gear. It is possible to put a disc right on this worm gear and this was done at first. However, it was necessary to reduce the speed of the motor so much (using a series rheostat) that there was not sufficient power to insure a stable arrangement. The motor ran unevenly over the cycle and occasionally stopped. So it was thought advisable to add a pair of gears. A small pinion of 12 teeth and a 1-inch gear of 48 teeth gave a reduction of 4:1 which turned out to be very satisfactory. The desirable speed of the motor, of course, depends upon the size of the disc and *what characters are on the disc.* For instance, "TEST W5EE" on a disc would not require the extra gearing, as it could be run almost *three times as fast as the writer's* "CQ CQ DE W2BRB" disc! This, of course, with the same words-per-minute speed which is all that matters in a key. So in all cases the gearing isn't needed. The condition of the motor is also an important factor. The bearings on this particular motor were not in the best of shape.



The discs are of $\frac{3}{16}$ bakelite and 2½

(*Turn to page* 183)

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

A WELL-KNOWN BRITISHER

Here is the transmitting apparatus of G5ZT, with its operator who has been heard in many countries outside of the British Isles.

A MOVEMENT to gain the Federal Communication Commission's sanction of more frequencies for Class A telephone operation is well under way. The proposal is to obtain an additional fifty kilocycles in each of the two bands allocated to Class A 'phone—75 and 20 meters. The plan seems to have attained the overwhelming support of the 'phone men in this category. There have been only murmurs of objections.

THE plan to gain additional band widths for amateur 'phone is for each amateur favoring the proposal to write the Commission, making the request. What is asked for does not involve the allocation of any new frequencies. It merely requests an additional 50 kilocycles for 'phone in each of the two bands where Class A operation is permitted. The request for frequencies would follow the Dominion of Canada's recent sanction of an additional group of frequencies for telephone in the 20- and 75-meter bands. The Canadian allocation, which went into effect on April 1, provides that frequencies between 3500 and 3550 kilocycles and 3850 and 4000 kilocycles on the 75-meter band may be used for both c.w. and 'phone. In the 20-meter band the Canadian amateurs are permitted to use 'phone in their entire band, which is 14,100 to 14,300 kilocycles.

American amateurs are requesting the additional 50 kilocycles in the 75-meter band 3850 to 3900 to supplement the present allocation of 3900 to 4000 kilocycles, and in the 20-meter band, 14,100 to 14,150 kilocycles to supplement the 14,150 to 14,250 kilocycles allocated for Class A operation.

Anyone who has listened in on the 75-meter 'phone band during the last two months should not have failed to hear some mention of the proposal. General criticism seems to be directed toward the amateur organizations for not carrying the fight to Washington, it being logically argued that the American amateurs should have the same privileges as the Canadian operators, particularly so in view of the interference problem, which is certainly more acute in the United States than in Canada. Furthermore, the Canadian amateurs would be favorable to the United States opening up the additional channels for 'phone operation. It is successfully argued that the amateur channels should be uniformly allocated throughout the North American continent.

The need for additional frequencies for telephone operation is indeed apparent. Interference is extremely severe on these two bands and it is seldom that contacts are completed 100 per cent. While an additional 50 kilocycles would not solve the interference problem, it would go a long way toward helping the situation.

It has been pointed out in these columns on a previous occasion that the number of amateurs is steadily increasing, and the popularity of telephone communication is gaining at a tremendous pace. On January 1, 1929, when the present bands became effective, the total number of licensed stations in the United States was less than 18,000. Since then there has been only one change in allocation, with no increase in frequencies. In 1932 the 85-meter 'phone band, which then was 50 kilocycles wide, was moved to the high-frequency side of the 80-meter band and 100 kilocycles were assigned to telephone operation. But the astounding thing is that during this period the number of licensed amateurs has increased to about 60,000, whereof it is estimated that more than 20 percent are licensed for Class A operation and an additional 25 percent are interested in 'phone operation of some kind.

There seems to be no logical reason why the additional 'phone frequencies should not be allocated. Few of the "dyed-in-the-wool" c.w. men have voiced an objection to the proposal. In the 75-meter band particularly, the portion of the band in which the additional 50 kilocycles are requested is not used extensively by c.w. men. They congregate mostly around the low-frequency end of the band. True, their interference problems would be helped to some degree if there was more of a tendency to spread out, but their reason for operating on the low-frequency side is a logical one. Most amateurs, by habit, start tuning their receivers from the low frequencies to the high, with the result stations on the low frequencies are the ones that are heard first and, therefore, seem to have more QSO's.

On the two Class A bands in which additional frequencies are sought, the 'phone men have 200 kilocycles at present against 700 kilocycles allocated to c.w. That is a ratio of 22 percent to 78 percent favoring c.w. Another thing that might be pointed out in favor of the need for additional 'phone frequencies is the width of the channel required for a modulated signal against a continuous wave signal. One hundred percent modulation produces peak side-bands of at least 5 kilocycles on either side of the operating frequency. A properly operated c.w. station uses only one frequency and is inherently sharp. When a modern receiving set is used with a crystal filter, it is possible to obtain 200-cycle selectivity. That means that more than ten c.w. stations could operate simultaneously within a 10-kilocycle range without causing an appreciable amount of interference to each other and a good operator probably would not have any difficulty picking out and copying any one of the ten. From a technical viewpoint there certainly seems to be need for a more equitable distribution of frequencies between 'phone and c.w.

Television Threatens the Amateur

The amateur has a threatening competitor in television. The art of visual broadcasting is an accomplished laboratory fact, and one of the largest research companies in the United States is spending more than $1,000,000 in making a comprehensive survey of the field from all angles (technical, commercial, etc.) and will be prepared within at least five years to offer a visual service and receiving equipment to the public.

The threat to the amateur is in the possible loss of his valuable ultra-short-wave frequencies. The writer recently was discussing the possibilities of television with an engineer who should know what the plans for the embryo industry are. During the course of conversation it was brought out that the probable band of frequencies which will be sought for television broadcasting in the United States are those between 50,000 and 100,000 kilocycles (50 and 100 megacycles). The question was brought up about "other services" that now are assigned to these frequencies: what would happen to them if and when the public and industry should be ready for visual broadcasting? It was calmly but definitely indicated that only one disposition could be made of the problem, and that was in accordance with "public interest, convenience and necessity"—the *prima facie* rule governing the decisions of the allocating authority.

The amateur, of course, should not stand in the way of the development of the television industry. But, on the other hand, there is no reason why he should lose any of his present ultra-high frequencies, particularly in view of the fact that *it has been the amateur who has developed their practicability!* Television, as it is being developed now, requires a tremendous band of frequencies for the transmission of one single sight-and-sound program. A band of 1500 kilocycles is required for the transmission of a single program. In other words *three television signals could not*

be transmitted simultaneously in a given area at the same time in the amateur's 5-meter band (56,000 to 60,000 kilocycles)!

While television is still in the future, when it comes it will come quickly. It is bound to. In its present laboratory status it is "pretty good." Highly entertaining pictures may be had right now. When it comes in commerciallly, it will be offered as a service supplementary to aural broadcasting—which its planners *hope it will not supplant!* It will be offered only two to four hours daily and, at first, only in the larger cities. But the point is that plans for its development are being made quietly "behind the scenes" and it has been decided that 50 to 100 megacycles is the logical television band. No allocation has been made nor it likely to be made within the next year and a half, but *it is being thought about!* Therefore it is time for the amateur *to think about it, too, and to prepare to keep the ultra-high frequencies he now has!*

(*Turn to page* 179)

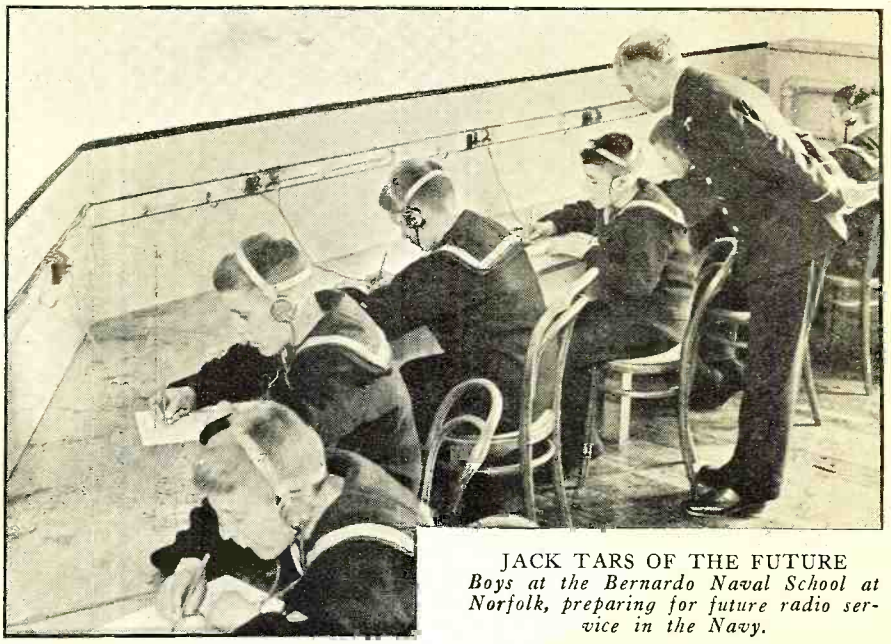
A Pioneer CSCG Member

RICHARD D. WATSON, owner and operator of W1BGL, Dover, N. H. Dick's station was one of the first CSCG practice stations. When he was at the key, before leaving with the Byrd Expedition for Little America, his "fist" was known far and wide.

"Spud" Henderson, radio operator, KFS, the Mackay radio station at Half Moon Bay, California, who handled the Byrd traffic with Dick, said Watson was one of the finest operators he ever worked with. Dick says:

"I am mighty glad to know that RADIO NEWS *is publishing CSCG schedules each month. This is a great thing for all who really want to improve their handling of code. Not only do CSCG activities tend to improve Amateur Communications, as it already has, to my knowledge, but it will encourage serious-minded fellows to push on toward their goal by making the right kind of systematic practice available every hour of the day. I shall be back on the air with CSCG programs just as soon as I rebuild my station."*

73—RICHARD D. WATSON, W1BGL.



JACK TARS OF THE FUTURE

Boys at the Bernardo Naval School at Norfolk, preparing for future radio service in the Navy.

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 Aug. 1st and ending Sept. 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	56,100-3536½
9:00 A.	ED.	W2HZJ	3577
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	3610
6:00 P.	E.	W8EEZ	3598
6:30 P.	C.	W9LKK	3757
7:00 P.	E.	W2HCP	3753-3835.5
7:00 P.	C.	W9SFT	3585

TUESDAY

8:15 A.	E.	VE3UU	3865
9:00 A.	ED.	W2HZJ	3577
3:30 P.	C.	W9TE	7012
4:00 P.	E.	N1FNM	3510
6:00 P.	E.	W8MHE	3610
6:00 P.	E.	W8EEZ	3598
6:30 P.	C.	W9LKK	3757
7:00 P.	M.	W9HHW	7276
8:00 P.	C.	W5CPV	7149
8:00 P.	M.	W7DBP	3607
8:30 P.	E.	W8FQS	3582

WEDNESDAY

6.00 A.	C.	W5DDC	7200
9:00 A.	E.	W2HZJ	3577
3:30 P.	C.	W9TE	7012
4:00 P.	E.	N1FNM	3510
5:00 P.	P.	W7WE	3637-7274
6:00 P.	E.	W8MHE	3610
6:00 P.	E.	W8EEZ	3598
6:30 P.	C.	W9LKK	3757
8:00 P.	M.	W7DBP	3722
8:30 P.	E.	W8FQS	3582

THURSDAY

8:15 A.	E.	VE3UU	3865
9:00 A.	E.	W2HZJ	3577
3:30 P.	C.	W9TE	7012
6:00 P.	E.	W8MHE	3610
6:00 P.	E.	W8EEZ	3598
6:30 P.	C.	W9LKK	3757
8:00 P.	M.	W7DBP	3607
9:00 P.	E.	W8FQS	3582

FRIDAY

9:00 A.	E.	W3AEJ	3785
9:00 A.	ED.	W2HZJ	3577
3:30 P.	C.	W9TE	7012
5:00 P.	P.	W7WE	3637-7274
6:00 P.	E.	W8MHE	3610
6:00 P.	E.	W8EEZ	3598
6:00 P.	E.	N1DUZ	3638
6:30 P.	C.	W9LKK	3757
7:00 P.	E.	W2HCP	3753-3835.5
9:30 P.	E.	W4BHR	3867

SATURDAY

8:15 A.	E.	VE3UU	3865
8:30 A.	E.	W1AMH	56,100-3536½
9:00 A.	ED.	W2HZJ	3577
6:00 P.	E.	W8MHE	3610
11:50P.	P.	W7WE	3637-7274

SUNDAY

8:15 A.	E.	VE3UU	3865
9:00 A.	ED.	W2HZJ	3577
10:30 A.	E.	W3EEV	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	3610
7:00 P.	C.	W9LUS	3631
8:00 P.	M.	W7DBP	3722

Active Members Candler System Code Guild

W1AMH—Harold J. Morse, 48 Hebron St., Hartford, Conn.

N1DUZ—J. E. Vermeiren, 137 Middlesex St., Springfield, Mass.

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.

W7WE—Loren C. Maybee, 3516 Hudson St., Seattle, Washington.

W7DBP—F. W. Stuart, R. F. D. 2—Boise, Idaho.

(*Turn to page* 179)

More Than 1,000,000 Miles in Less Than a Week

Crossing Continents *and* Oceans *with the* HRO

(National Amateur Communication Receiver)

L. M. Cockaday

AT THE WESTCHESTER LISTENING POST

The author, with his assistant, Wm. C. Dorf, putting the receiver through its paces on the high-frequency bands.

IF one listens in on the amateur telephone bands for any length of time, there is heard quite a lot of talk of interference breaking up QSO's. After using an HRO receiver for a week at the Westchester Listening Post, it is our opinion that many of the amateurs really have quite excellent transmitters, but that some of the receiving apparatus *may be quite mediocre or even "haywire"* regarding selectivity, frequency stability and freedom from image frequency troubles or cross modulation.

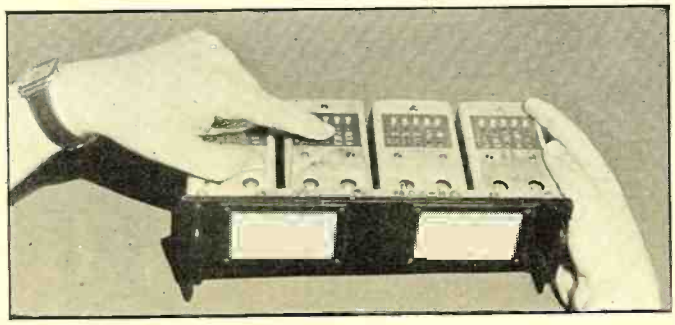
THE term "HRO" in connection with an amateur communication receiver has been rolling off the tongues of amateurs, now, for some months. It's become somewhat of a mystery. The receivers in question have been very scarce and hard to-get and most of the dope on what this receiver actually can do has been hearsay and rumor. Your editor decided that he would make an effort to get one of the receivers, test it out in his DX Corner at the Westchester DX Listening Post and then write a story of the results, whatever they might be, for the growing list of amateur radio enthusiasts and short-wave listeners reading RADIO NEWS.

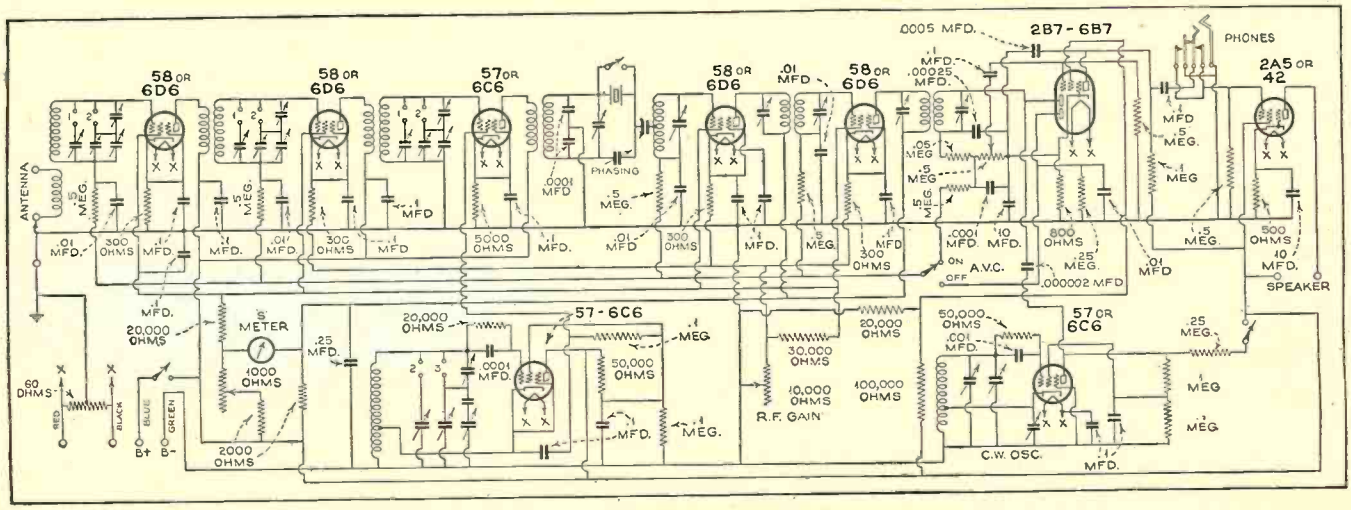
Accordingly, one of the rack-and-panel mounted jobs was obtained and was set up as shown in the photograph at the Listening Post and immediately there started (for me) one of the most enjoyable DX tours of the world that it has been my pleasure to make—via short waves. During a week of reception running from 10 meters up to the standard broadcast band, signals from the most difficult stations to tune in were received with a minimum of background noise and with a freedom from interference and "swinging" that we believe to be at the very peak, *par excellence*, that radio engineering and fine workmanship would permit.

But first let us describe shortly what the receiver is. It is a single-signal type receiver with a really usable (*Turn to page* 186)

FOR "REAL" BAND-SPREADING

Pictured here is the plug-in coil arrangement, with the finger pointing at the screw which is shifted to the next hole, to make the unit "band-spread." There is a screw for each one of the four coils that should be shifted. On the 20-meter band this gave a running dial-length of inches to each phone station.





Theory and Practice for Correct

IMPEDANCE MATCH

C. A. Johnson

Part Two

THAT the impedance of a circuit element consists of some equivalent resistance in ohms plus a phase angle, we learned in the preceding article. We showed that the net impedance of two or more circuit elements in series could be determined either graphically or by means of a formula. In either case, the final result was a value for Z in the following general form:

Z = [some value in ohms]; [some phase angle]

In general, this value was different for different frequencies.

These facts are of fundamental importance and the reader should master them if he is seriously interested in understanding problems of impedance. In this installment we want to show how the impedance of more complicated branched networks is determined. It may not be necessary for you to become skilled in the details of impedance calculations, but you will be handicapped in any work with electrical circuits if you do not have a general idea of how it is done. The process may appear to be a little involved; but bear in mind that we are dealing with a very involved problem in electrical and radio engineering.

Let us return, for the moment, to our problem of the choke coil having a resistance of 3000 ohms and an inductance of 1 henry. We found that its impedance was

$$Z = 7000 \text{ ohms } \angle 64°.5$$

This means that when a 1000-cycle e.m.f. is applied to the coil, there are two factors influencing the phase of the resultant current. The resistance part of the coil tends to keep the current in phase with the e.m.f., or along the horizontal axis on the vector diagram. The reactive part of the coil tends to cause the current to lag 90° behind the e.m.f., or to make it coincide with the vertical axis. The result, of course, is that the current vector takes an intermediate position 64°.5 from the horizontal axis.

Now let us insert a .05 mfd. condenser in series with the coil. This introduces a third force which tends to make the current lead the e.m.f. by 90°. As a result the current vector will rotate in this direction, but will come to rest at a point about 45°.5 above the vertical axis. The impedance is also reduced to 4250 ohms. Thus we see that each of the different kinds of elements in a circuit produces one of three effects on the current. (1) Resistance tends to keep the current in phase with the e.m.f. (2) Inductance tends to make the current lag behind the e.m.f. by 90°. (3) Capacity tends to make the current lead the e.m.f. by 90°.

Simplifying the Mathematics

Impedance calculations for parallel and divided circuits are simplified if we have some way of designating this phase-changing property when writing the equations for the circuit. The small letter "j" is usually used for this purpose. If the impedance under consideration is purely inductive, we set a +j in front of it. If it is purely capacitative, we set —j in front of it. If the impedance is purely resistive it has no prefix. Any impedance can be completely expressed by dividing it into its resistive and reactive parts. Therefore, the general expression for an impedance may be written

$$Z = R \pm jX \qquad (1)$$

When

R = resistive part in ohms
X = reactive part in ohms
±j = an indicator telling us (1) that X is reactive, and (2) whether the net value of X is inductive or capacitative, depending upon the sign.

This type of formula is called the "complex" expression for an impedance. To illustrate the use of this notation we will write the impedance of the elements discussed above in complex form.

For the 1-henry choke coil at 100 cycles:

$$Z = 3000 + j\,6280 \text{ ohms}$$

For the 1-henry choke coil in series with .05 mfd. at 1000 cycles:

$$Z = 3000 + j\,3080 \text{ ohms}$$

For a 1 mfd. condenser in series with 500 ohms at 1000 cycles:

$$Z = 500 - j\,159 \text{ ohms}$$

Now if we keep in mind the meaning of j and —j, it is easy to evaluate these or any other expressions in terms of ohms and phase angles. The final value of the impedance, Z, in ohms, is the vector sum of these two parts. The tangent of the phase angle, ϕ, is always given by the reactive part of the expression divided by the resistive part. The sign of the phase angle is given by the sign of j. This information may be condensed into the following formulas, where the terms have the same meaning as in formula (1):

$$Z = \sqrt{R^2 + X^2} \text{ ohms} \qquad (2)$$

$$\tan \phi = \frac{X}{R} \qquad (3)$$

In solving for the impedance of parallel circuits and complex networks we proceed as follows:

1. Draw the part of the circuit under consideration.
2. Write the expression for the impedance of each of the elements in terms of formula (1).
3. Combine these expressions as much as possible, using the ordinary rules for adding series and parallel resistances.
4. Using the ordinary rules of algebra, separate the reactive parts from the resistive parts. Remember that anything preceded by a j is reactive.
5. From step 4, you will obtain an expression of the same form as formula (1). Substitute the numerical values of the problem into this expression. Using formulas (2) and (3), you can solve for the value of the impedance in ohms, and for the phase angle.

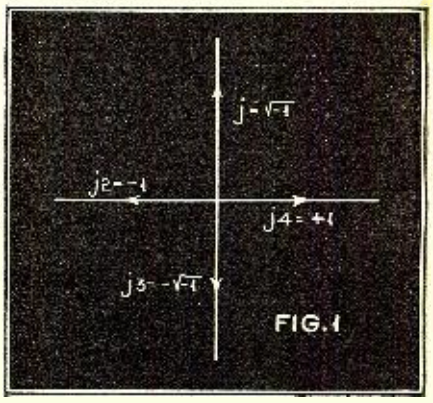


FIG. 1

Before illustrating this process we need to explain a little more about the mathematical nature of our phase indicator j. Textbooks frequently refer to it as the "operator j." This merely means that it doesn't have quite the same function as the ordinary letter symbols used in algebra. However, we can multiply and divide j into itself. For this purpose it may be considered to have the value of $\sqrt{-1}$.

Thus we may tabulate the following values of the power of j.

$j = \sqrt{-1}$; $j^3 = -\sqrt{-1}$;
$j^2 = -1$; $j^4 = +1$; etc.

What "j" Means

The meaning of these successive powers of j becomes clear if we look at the four quadrants of the vector diagram in Figure 1. Successive operations of j upon a vector quantity (such as current), rotates the vector in a counter-clockwise direction in steps of 90°. Note that when j is on the horizontal axis it (*Turn to page* 155)

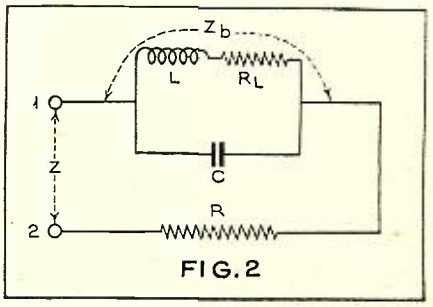


FIG. 2

A Little BRAINWORK make Profits for

Barron

IT may be said with very little fear of contradiction that the opportunities for money-making in the radio industry today are just about double what they were four or five years ago. This may sound very much like an overstatement to the more cynical members of the profession. It is nevertheless an incontrovertible fact that will bear the closest examination.

IT is my opinion that many radio men have suffered unduly from the depression (like many other folk) merely because they do not look for business—*in the right places!* In the right places—that is the secret to the whole problem. They are too bound to the old channels of trade, repairing, selling new sets, with sporadic business in tube replacements. This is admittedly pretty dull stuff these days, and if a fellow can make a living at it he must hump and hump fast.

Much has been written about the possibilities of the P. A. field and some nice business has been had from this source by the more alert and business-like members of the clan. They have, however, held their sales efforts to too limited an application of the P. A. field. They canvass the local Masonic lodge, the Elks and let it go at that. What about the music teachers? But what in the world can a music teacher do with a public-address system? Nothing, to be sure. But they can do a great deal with a P. A. system provided with a recording head. Imagine, if you will, a music teacher set up with a small but good recording outfit. The business advantages that they enjoy over their competitors *is simply tremendous!*

Little Willie is taking violin lessons. The teacher records his playing, advises him to take the record (which may cost a dime) home and play it on his phonograph. He listens to his own mistakes. But what about mother and father? They naturally get all puffed up over little Willie's phonographic début. The same holds true of any instrument, but it is in voice-culture that this system has greatest advantages and proves its real worth. Foreign language schools can, and do, use the same kind of equipment for precisely the same purpose.

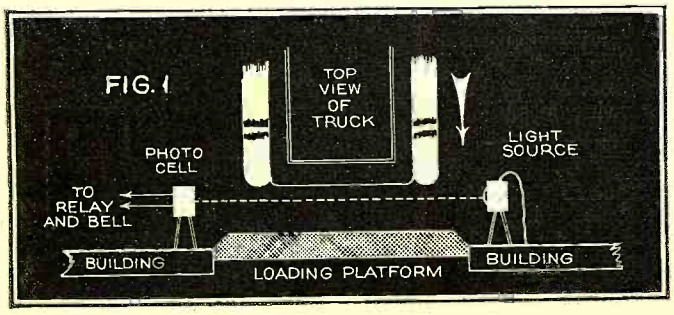
This Idea Brought Profits

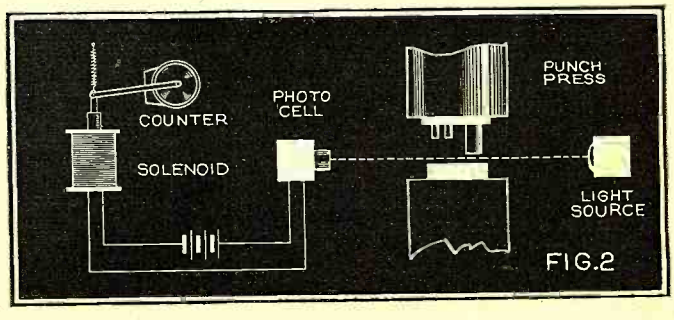
I know of a radio serviceman in a city of 500,000 who made six such installations within three months at a very tidy profit. After he had placed the equipment in two music studios, business began coming to those places at such a rapid pace that competitors of these studios simply had to fall in line and have the same sort of equipment. It is not difficult to get three hundred dollars for such equipment.

In the small town where I live, the local moving-picture house used to send a truck with a 5-piece band running about town, advertising its new bills. They could not afford it any more, so the local radio doctor got on the job and sold the management the idea of a radio-equipped truck, playing phonograph records. He used a standard P. A. outfit with a turn-table slung from springs so that road bumps would not affect reproduction. This fellow netted $200 on the job. Now $200 in these days, divided by four, leaves a weekly income for a period of one month of $50. Not bad for such times from one sideline.

Group Hearing Aids

Some moving picture theaters have installed head 'phones on a group of seats so that hard-of-hearing people may listen to the talkies. Since such jobs may now be handled by servicemen, they offer a profitable field in small communities. Then take the case of the large church. The first ten rows of pews are usually rented. Many people who are hard of hearing do not go to church because they cannot hear the sermon or take part in the service. Any minister knows this, and if the church is wealthy he is convinced that such equipment is needed. In a case that recently came to my attention, the minister was partial to the idea, but he did not have the funds to spend. The radioman was a live wire. He knew that the people who subscribed to the pews were "the" people of the town and he immediately set out to get their help. He simply wanted to tell them that there were many people who could





and lots of PUSH Servicemen

R. Mace

not hear because they had to sit too far back and he wanted help so that everybody could hear. He did not have to go far. The first man he told about it agreed to bear the cost of the whole thing himself! And we still solicit two-dollar repair jobs!!!

Most cities in the United States have brokerage offices. And brokers are not entirely "broke." The job that I am about to mention came unsolicited, but it gave a radioman an idea that has since netted him a fine profit. Indeed it has kept him busy for the last three months. In every broker's office there is a Dow, Jones news ticker over which comes all sorts of financial news of real importance to traders. However, if a trader is watching the ticker, he often misses many important things that come over the Dow, Jones system. This is every broker's problem and this particular broker got the brilliant idea of installing a P. A. system and having a clerk read the news off to the traders. This would not interrupt trading and the traders would appreciate the service. It worked like a charm. Other brokers in the same town were approached and sold. Some came and wanted the system installed merely because they suddenly realized that they needed it and they wanted to meet competition. The fellow in question, after he had sold all of the brokers in this town that could be sold, hopped in his car, drove sixty miles to another city of 300,000 and sold seven more systems. And they still sell vacuum tubes!!!

Photo-Electric Opportunities

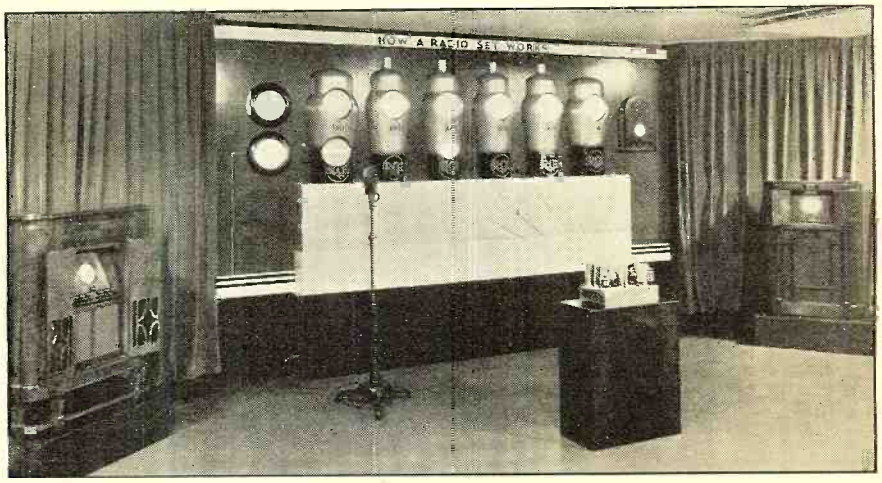
Much has been said about photo-electric installations and some radiomen have entered this phase of the electronic field. Many of those who have tried it have not had the proper business slant.

Jump in your car some morning when business is slow and run around to see the smaller manufacturers, who may want to cut down expenses. Of course, 90 per cent of these factory men never heard of a photo-electric cell and some talking will have to be done, but the talking can in many cases be made profitable.

One radioman did this trick and the first fellow he ran into knew nothing about photo-cells, never heard of them as a matter of fact. He said the only problem that he had at that time was "those 'blankety-blank' truck drivers that delivered materials to the storehouse." He had finished paying a six-hundred-dollar repair bill caused by careless drivers who backed into his building with such force that they did a great deal of damage. This was told in fun, but the radioman was a grade-A salesman; on his toes every minute. An idea flashed through his mind. He told his to-be-customer that he could stop that damage for (*Turn to page* 186)

A RECORD BY LITTLE WILLIE

Such records made by a music teacher of his students' progress helped his business—and the sale and installation of the recording equipment brought profits to one progressive serviceman.



"Seeing" RADIO SIGNALS

Samuel Kaufman

A HUGE model of a radio receiver was erected recently by NBC and RCA-Victor engineers in the network's Radio City studios to demonstrate the operation of a home receiving set to thousands of studio visitors each day.

Built on a scale of 20 to 1, the set has mammoth tubes. When the guide speaks into a microphone or plays a phonograph record, the sound is converted into radio energy, then conducted to the array of tubes along a line which indicates the antenna lead. Another line denotes the electric current.

Cathode-oscillograph tubes, arranged in cut-out portions of the model, show the course of the sound energy through the various stages of conversion and amplification, and by wavy lines indicate what the currents of electricity (carrying this energy) look like.

Servicemen's PRIZE CONTEST

Announcement of Awards

Zeh Bouck
Service Editor

FIRST PRIZE

A Kit of Spare Electrical Parts

"I thought of a little scheme a few months ago, which, with a modest investment, has put quite a few extra dollars in the service till. I invested about $15.00 in an assortment of plug fuses, 2-way sockets, rubber and bakelite handle caps, parallel lamp-cord wire, asbestos-covered heater cord, duplex outlet boxes and plates, key and chain sockets, flat-iron heater plugs, etc. I carry this collection in an otherwise discarded analyzer case. Either when I have finished a radio job, or during the process (if repairs are made on the spot) I bring up the subject of radio noises. It is usually possible to demonstrate what defective equipment will do. and I tactfully suggest replacement at a nominal cost. There are few homes in which *some piece of electrical equipment has not gone haywire*, and odd jobs almost invariably result. I make no labor charges for this work, but get a fair price for the parts. This makes the selling job that much easier, using the argument that calling in an electrician would cost considerably more. For the average serviceman, I believe this scheme will be well-worth the slight extra time involved—both in profit and good will."

SECOND PRIZE

A Newcomer Gets Ahead

"I am a new-comer in the radio service business, having started January of this year. I have made what I consider a success in the face of considerable competition. My nearest competitor is only a few blocks away, and has been in business over four years. I attribute my success to the 6-inch by 9-inch cards (Figure 1) which I had printed. I distributed about fifty of these among nearby stores, garages and filling stations, the proprietors of which were almost invariably happy to cooperate. The garages and filling stations receive a 15 per cent commission on all work they direct to me. The other stores I endeavor to repay with my patronage." Mr. Yeouze looks at us from Figure 2.

THIRD PRIZE

A Card That Brings in Business

"Recently we spent about three months in a countrywide, radio-set inspection. We called on every home and (where permitted) checked the radio installation free of charge. In many instances this resulted in immediate service jobs. In all cases the card shown in Figure 3 was distributed. This card is self-addressed—of the 'business reply' type—and requires no stamp. The wording is self-explanatory. We have received many cards back—with more coming in every day. The same card is given to any customer bringing his set into the shop."

FOURTH PRIZE

Using a Mike to Clinch Sales

"I thought I knew all the tricks in the retail radio game, but I learned something new from a friend of mine who is also in the service business. I noticed that he had quite a few microphones around the shop, and I jokingly asked him if he was building a broadcasting station. 'Not on your life,' was his reply. 'These microphones are my sale clinchers. Haven't you ever seen a man grab up a mike when a public-address system was being set up? Folks are just crazy to talk into a microphone. Here's how I work it. When I'm demonstrating a new set, I first put it through its paces; then I hook up the mike and let the customer talk into it. The effectiveness of this little bit of sales psychology is surprising to say the least. There isn't anyone who is immune to the thrill of handling and speaking into a microphone for the first time. I've sold several sets that would still be in the shop if I hadn't used the mike as a sales clincher. Some of you fellows might try it on those hard-boiled customers you have been trying to sell for so long!' "

WHEN YOU REQUIRE
RADIO SERVICE
CALL
VI. 7 - 7891

KC.	STATION	DX STATIONS Station	Dial No.	Location
570	WMCA			
660	WEAF			
710	WOR			
760	WJZ			
810	WNYC			
860	WABC			
940	WAAT			
1010	WHN			
1100	WLWL			
1180	WINS			
1250	WNEW			
1300	WEVD			
1350	WBNX			
1400	WBBC			
1450	WHOM			
1500	WWRL			

To Convert Meters To Kilocycles
300,000 ÷ 1500 KC = 200 Meters
300,000 ÷ 200 M. = 1500 KC.
1 Megacycle = 1,000,000 Cycle = 1000 Kilocycles
10 MC. = 10,000 KC. = 30 Meters

RADIO SERVICE
HARRY SCHMIDT
117-03 Hillside Ave. Richmond Hill, L.I., N.Y.

FIGURE 4

FIGURE 1

Prompt Guaranteed Service On All Makes
YEOUZE RADIO SERVICE
Phone Cleveland 6216
32 Mulberry St. Buffalo, N. Y.
Public Address Sound Systems Rented For All Occasions

This Month's Prize Winners!

FIRST PRIZE—To C. F. Henry, Henry's Radio Service, 104 Melrose Drive, Syracuse, N. Y.—$10.00 for practicability. An idea that every serviceman can put into immediate operation, with the probability of realizing quick and consistent profits, the building up of customer good will, with added respect for his servicing ability and versatility!

SECOND PRIZE—To Anthony S. Yeouze, 32 Mulberry Street, Buffalo, N. Y.—$5.00 for an encouraging word to beginners in the service business!

THIRD PRIZE—To Roger H. Hertel, Hertel's Radio Store, Clay Center, Nebr.—$5.00 for an idea that recognizes the psychological fact that some folks are too lazy to stamp an envelope, write a letter or telephone!

FOURTH PRIZE—To Harry D. Hooton, Radio Service Co., Beech Hill, West Va.—$5.00 for novelty!

FIFTH PRIZE—To Harry Schmidt, Radio Service, 117-03 Hillside Avenue, Richmond Hill, L. I., N. Y.—$5.00 for the time tested and always reliable blotter reminder, with a genuinely useful imprint!

Congratulations and thanks—from RADIO NEWS and its servicemen readers!

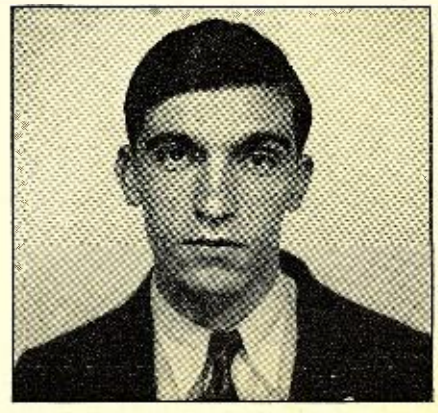
FIFTH PRIZE

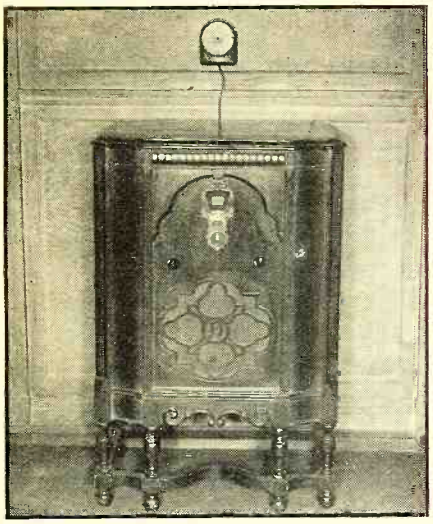
A Blotter Reminder That Is Useful

"I find the blotter shown in Figure 4 of real utility in building up and maintaining my radio service business. It is a first class blotter that survives this particular usefulness in that the back contains a station log—for locals and DX—and a kc.—meter conversion table."

OUR RADIO NEEDS ATTENTION. Please call and service this radio as soon as possible. We have a
_____ (Make of Radio) Model No. _____
It is a battery set ☐. All electric set ☐
Brief description of trouble _____
_____
_____
Other electrical appliances needing service
_____
Mr. or Mrs. _____
Address _____

FIGURE 3 ABOVE
FIGURE 2 BELOW





INSTALLED ON A RECEIVER

Here is the time switch connected to a receiver and set to turn it "on" for a specified program and to turn the receiver "off" when the program is ended.

Let This Automatic TIME SWITCH *Increase Your Revenue*

John H. Potts

FINANCIAL success in radio servicing is largely a matter of technical ability plus salesmanship. Increased profits and excellent advertising result from the sale of good side-lines.

AUTOMATIC control devices have appeal, fascination and utility in the home, just as they do in other locations. The simple, self-timing switch pictured here fills a great number of needs. Prowlers are tempted by darkened homes. When away, the automatic switch can turn on lights during the evening, so that the family's absence is not advertised. The switch will shut off the lights when not needed, thus giving economical protection when visiting or away on vacation.

The device consists essentially of an a.c. operated electric clock with independent circuit-opening and closing switches. It may be adjusted to give automatic switching "on-and-off" of any light or appliance within its capacity at any interval from 45 minutes to over 23 hours—and to repeat the operation—day-in and day-out—for an indefinite period.

Oil burners may be turned on before arising, warming the room after a freezing night. In homes using other heating systems, a small electric heater may be turned on to accomplish the same result. In hot weather, the bedroom fan may be kept in service until one falls asleep, and may be shut off at a pre-determined time. With the switch, the radio may play until midnight and then shut itself off or awaken us to music at the required time in the morning. If we desire not to miss a special feature, the clock may be set to turn on the radio at the specified time and turn it off when the program has ended—of particular advantage when extension speakers are used. Defrosting the refrigerator may also be taken care of.

Merchants will welcome the economy which the device makes possible in the operation of small signs and window displays. These may be automatically shut off late in the evening when their advertising value is a minimum. Schools may use the switch to operate time bells at specified intervals, without individual attention.

Many additional applications will suggest themselves. The automatic switch will bring the serviceman who specializes in its installation extra profits and increased prestige.

Selling SERVICE *in the* SMALL TOWN

Fred E. Kunkel

HOW to get business for ten miles around—how to get business in your own home town? These and other questions are happily solved by Craig Woodward of Flash Radio Service in Gaithersburg, Md., who devotes his entire time and a small store to radio exclusively—sales and service.

WITH very low rent and a low electric light bill, the telephone is the only expensive item of overhead he has, and his advertising which is very effective is also inexpensive.

Among the many ideas used to keep in contact with radio users is a little card which he persuaded the local newsboys to deliver with their daily papers from door to door for a small consideration. Card is reproduced herewith.

This proved very successful. People whose radios did not seem to be working as well as formerly took advantage of it, and, of course, Mr. Woodward made the inspection when they called up. Almost without exception a free inspection sold new tubes or brought in a repair job so that his trip was not wasted. "Anyhow I have plenty of time at my disposal," he explained, "and this was one good way of getting business or leads to jobs, and of getting acquainted with set owners.

Classified Ads Pull

He also uses the classified columns of a county newspaper, advertising his radio repairing. "I thought I'd try it," he explained, "and I got a call the first day the 'ad' appeared. It is very profitable advertising, since country people read everything that appears in a newspaper, including the classified 'ads.'

"Being run at a low cost and always producing results, I keep it in every week. We get a lot of road work out in the country, ten and fifteen miles away. A radio expert in a small town is something like a doctor. He gets his business everywhere, out on the farms and in the small towns."

Another thing about Woodward is his systematic way of doing things and keeping his store in first class shape. While working on a set he takes out the parts such as knobs, bolts, washers, etc., and puts them all in a drawer at one place so he has everything together when the set is put back together again. Throwing the parts all over the bench and then spending an hour looking for some missing part, cured him early in his experience, so now he has everything right at his finger tips where he wants them.

He also carries a small modern set with him on all calls, and when through with a job gives a demonstration. Many people are so impressed that they buy immediately, while others drop in to the store and buy later.

Impedance Match

(*Continued from page* 151)

becomes an ordinary number. From this it follows that any coefficients of *even* powers of j represent a resistive part of the impedance. It may be positive or negative, and the sign must be taken into account in its addition. When j is on the vertical axis, it contains $\sqrt{-1}$ and belongs to the reactive part of the impedance. In mathematics, the quantities along the horizontal axis are sometimes called "real" quantities to distinguish them from the coefficients of $\sqrt{-1}$, which mathematically speaking, are "imaginary" quantities.

Now, to illustrate the use of the operator j, we will derive a general formula for the impedance between the terminals 1 and 2 of the circuit in Figure 2. The purpose of this calculation is to illustrate a general application of this method, so that it will mean something to you when you encounter it in other literature.

Following the procedure outlined above, we will first write the impedances for each element using complex notation where required.

1. For $L + R_L$:
$$Z = R_L + j\,\omega L$$

2. For C:
$$Z = -j\frac{1}{\omega C} = \frac{-j}{\omega C}$$

(*Turn to page* 181)

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.

United States of America

Alabama, J. E. Brooks, L. T. Lee, Jr., William D. Owens; Arizona, Geo. Pasquale; Arkansas, James G. Moore, Don Pryor; California, Eugene S. Allen, A. E. Berger, C. H. Canning, Earl G. DeHaven, G. C. Gallagher, Werner Howald, 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; 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. Winfree; Idaho, Bernard Starr, Lawrence Swenson; Illinois, E. Bergeman, Larry Eisler, Robert Irving, Charles A. Morrison, Phillip Simmons, Samuel Tolpin, Ray A. Walters, Floyd Waters, Robert L. Weber, J. Ira Young, Evert Anderson; Indiana, Freeman C. Balph, Arthur B. Coover, J. R. Flannigan, Henry Spearing, B. L. Cummins; Iowa, J. Harold Lindblom; Kansas, C. W. Bourne, Wm. Schumacher; Kentucky, Geo. Krebs, Charles Miller, Wm. A. McAlister, James T. Spalding, W. W. Gaunt, Jr.; Louisiana, Roy W. Peyton; Maine, Danford L. Adams, M. Keith Libby, Vincent M. Wood, R. C. Messer; Maryland, Howard Adams, Jr., J. F. Fritsch, James W. Smith, August J. Walker, Forrest W. Dodge; Massachusetts, Armand A. Boussey, J. Walter Bunnell, Walter L. Chambers, Arthur Hamilton, Sydney G. Millen, Harold K. Miller, Elmer F. Orne, Roy Sanders, Donald Smith, Robert Loring Young; Michigan, Ralph B. Baldwin, Stewart R. Ruple, Jerry M. Hynek; Minnesota, M. Mickelson, E. M. Norris, Dr. G. W. Twomey; Mississippi, Mrs. L. R. Ledbetter, Dr. J. P. Watson; Missouri, C. H. Long; Montana, Henry Dobravalny; Nebraska, Hans Andersen, P. H. Clute, Harold Hansen, G. W. Renish, Jr.; Nevada, Don H. Townsend, Jr.; New Hampshire, Paul C. Atwood, Alfred J. Mannix; New Jersey, Wm. F. Buhl, Wm. Dixon, Morgan Foshay, George Munz, R. H. Schiller, Paul B. Silver, Earl R. Wickham; New Mexico, G. K. Harrison; New York, Donald E. Bame, John M. Borst, H. S. Bradley, Wm. C. Dorf, Capt. Horace L. Hall, Robert F. Kaiser, John C. Kalmbach, Jr.; I. H. Kattell, W. B. Kinzel, Wm. Koehnlein, T. J. Knapp, A. J. Leonhardt, Joseph M. Malast, S. Gordon Taylor, Edmore Melanson, Joseph H. Miller, R. Wright, Harry E. Kentzel, Howard T. Neupert, A. C. Doty, Jr.; North Carolina, W. C. Couch, E. Payson Mallard, H. O. Murdoch, Jr.; Ohio, Paul Byrns, 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. Remster, Ned Smith, Virgil C. Tramp; Pennsylvania, Oliver Amlie, Harold W. Bower, Roy L. Christoph, R. O. Lamb, John Leininger, Geo. Lilley, Edward C. Lips, Chas. Nick, Hen. F. Polm, C. T. Sheaks, K. A. Staats, F. L. Stitzinger, Walter W. Winand, J. B. Canfield, Charles B. Marshall, Jr.; 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; 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; Virginia, G. Hampton Allison, L. P. Morgan, D. W. Parsons, Gordon L. Rich, Gaines Hughes, Jr., E. L. Myers; Washington, Glenn E. Dubbe, A. D. Golden, Charles G. Payne; West Virginia, Kenneth R. Boord, R. E. Sumner, Fred C. Lowe, Jr.; Wisconsin, Willard Hardell, Walter A. Jasiorkowski; Wyoming, L. M. Jensen, Dr. F. C. Naegeli, Eric Butcher.

S. W. TIME SCHEDULE

LAURENCE M. COCKADAY

THE thirtieth installment of the DX Corner for Short Waves contains the World Short-Wave Time-Table for 24-hour use all over the world. The list starts at 01 G.M.T. and runs 24 hours through 00 G.M.T., right around the clock! This Time-Table contains a List of Short-Wave Stations, logged during the last month in the RADIO NEWS Westchester Listening Post (in our Editor's home), as well as at our official RADIO NEWS Short-Wave Listening Posts throughout the world. It provides an hour-to-hour guide to short-wave fans, whether experienced or inexperienced. The Time-Table shows the Call Letters, Station Locations, Wavelength and Frequency in the middle column. The column at the left gives the Times of Transmission in G.M.T. a.m., and the column at the right gives the Times of Transmission in G.M.T. p.m. The corresponding time in E.S.T. is also given and space has been left for filling in your own Local Time. The time, E.S.T., in the U. S. would be 8 p.m., E.S.T., for 01 G.M.T., as there is a five-hour difference. The time, E.S.T., for 13 G.M.T. would, therefore, be 8 a.m., E.S.T. These two features can be seen at the beginning of each outside column in the Time-Table. The times, C.S.T., for these two corresponding hours would be 7 p.m., C.S.T., and 7 a.m., C.S.T. The times, M.S.T., for the corresponding hours would be 6 p.m., M.S.T., and 6 a.m., M.S.T. The times, P.S.T., for corresponding hours would be 5 p.m. and 5 a.m., P.S.T. In this way American listeners can easily fill in their own Local Times at the top of the columns. Foreign listeners would probably prefer to use G.M.T., anyway, or, if not, can compute the time difference from G.M.T. and fill in their Local Time in each column head. At the end of the Time-Table is given a List of Symbols covering the various irregularities of transmission, etc.

L.P.O. AT BANDOENG

Introducing our faithful observer for Java, E. M. O. Godée

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, Irving R. Potts, President, A. W. Oppel, Executive Secretary; Society of Wireless Pioneers, M. Mickelson, Vice-President; U. S. Radio DX Club, Geo. E. Deering, Jr., President; the Radio Club Venezolano of Caracas, Venezuela, President, Alberto Lopez; The World-wide Dial Club of Chicago, Illinois, President; Howard A. Olson; International 6000- to 12,500-Mile Short-Wave Club, Oliver Amlie, President, Joseph H. Miller, Vice-President.

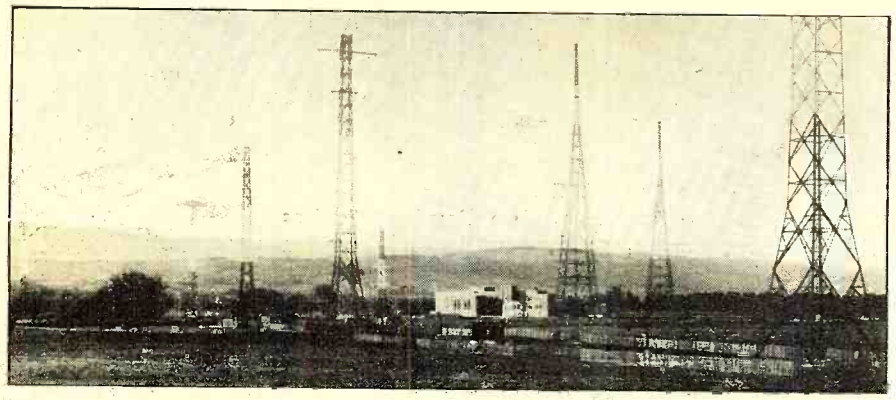
Any DX fan wishing to join any one of these Clubs or Associations may write for information to the Short-Wave DX Editor, and his letter will be sent to the organization in question. Other Clubs who wish to become affiliated should make their application to the Short-Wave DX Editor. Clubs associated with 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 "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. Our Editors are doing the same thing, working with you day and night to bring you the best and most reliable short-wave information. Your logs are welcome and are sincerely invited.

Let's See Your DX Corner!

Readers are also invited to send in photographs or snapshots of themselves in their Listening Posts, for publication in the DX Corner. Let other readers see what you and your equipment look like! Write 50 words naming and describing your receiving equipment. RADIO NEWS will pay $1.00 for each photo used, to help defray expenses. If a copy of RADIO NEWS appears in the photo, this payment will be doubled.



WHERE THE GENEVA TRANSMISSIONS ORIGINATE

These are the towers and the building housing HBL-HBP, located at Prangins, Switzerland. Directional beams are used to cover different sections of the world.

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 given. If any of our readers can supply actual Time Schedules, actual Wavelengths, 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:

PI1J, Dordrecht, Holland, 42 meters, reported on the air, Saturdays, 11:10 a.m., 12:10 p.m., E.S.T. (Stevens.)

HBJ, Geneva, Switzerland, 20 meters, 4610 kc., reported heard 2:30-3:05 p.m., E.S.T. (Hamilton, Harris, Stevens, and J. H. Miller.)

HBO, Geneva, Switzerland, 26 meters, same time as HBJ. (Hamilton, Harris, Stevens, and J. H. Miller.)

A new station at Prague, Czechoslovakia, will soon work on 13 and 100 meters, 24-34 kw. at 7 a.m. to 12 noon, E.S.T. (Stevens.)

SP1SA, Poland, reported heard on 33 meters, Sundays, at 3:35 p.m., E.S.T. (Slapkowski.)

I2RO, Rome, Italy, now on the air from 8:15-9 a.m., from 9:15-10:15 a.m., from 2:30-5:00 p.m., and from 6-7:30 p.m., E.S.T. on Mons., Weds., and Fris., on the 25.4 meter wavelength. They are on the air, on 31.3 meters, from 7:45-9:15 p.m. on Mons., Weds., and Fris. (Kenney, Jr., Jensen, Libby, Olson, Webb, and Baadsgaard.)

PCJ, Eindhoven, Holland, 19 meters, now transmitting Tuesdays 8-11 a.m., G.M.T.; Thurs. noon to 4 p.m., G.M.T.; Suns. 1:30 p.m., G.M.T., onward, irregularly. (Donaldson.)

RW59, Moscow, U.S.S.R., reported heard, Suns. 6-9 a.m., 10-11 a.m., 1-6 p.m., and on Mons., Weds., and Fris., 4-6 p.m. On Weds. 5-6 a.m., E.S.T. (Reilly, Houghton, Letroy, Hynek, Dodge, Mallet-Veale.)

RW15, Khabarovsk, Siberia, 4273 kc., reported heard 2 a.m. to noon E.S.T. daily. (Schradieck.)

LKJ1, Jeloy, Norway, reported heard 07:30-08:30 G.M.T. (Schierman.)

RV59, RNE, RV15, are reported as the correct calls of the Soviet stations, according to a dispatch from Moscow to L.P.O. Schradieck of Rhode Island, L.P.O. Sholin of Calif., and also Listener Masuda of Japan. According to a dispatch received at RADIO NEWS, the proper calls are as shown in our Time Table. We are writing again to check this.

Who says DJD and DJB do not come in well out west, here? Listener Haws of Minden, Nebraska, gets them "F. B." and he is a reporter for Berlin and should know.

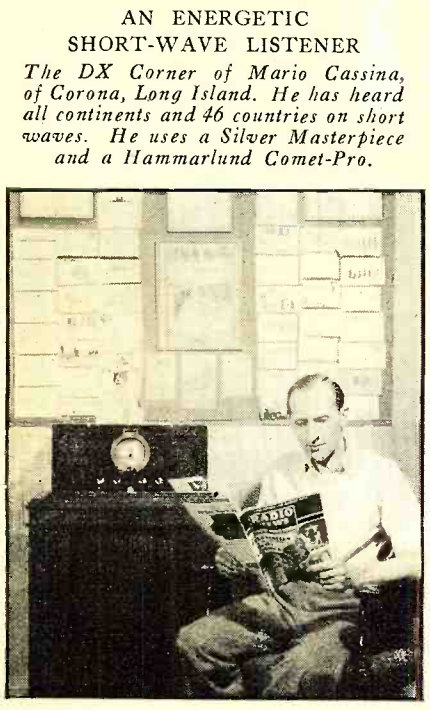
"The British stations have been coming in fine here in San Francisco even if a certain Eastern expert thinks it impossible. GSC can be understood 300 feet from the loudspeaker and GSB, GSD and GSL are all very good." (Gallagher, Sholin.)

News in English, from foreign stations, is heard as follows: I2RO,

(*Turn to page* 160)

AN ENERGETIC SHORT-WAVE LISTENER

The DX Corner of Mario Cassina, of Corona, Long Island. He has heard all continents and 46 countries on short waves. He uses a Silver Masterpiece and a Hammarlund Comet-Pro.



S.W. PIONEERS
Official RADIO NEWS Listening Post Observers

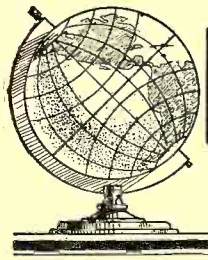
LISTED below by countries are the Official RADIO NEWS Short-Wave Listening Post Observers who are serving conscientiously in logging stations for the DX Corner.

Alaska, Thomas A. Pugh.
Argentina, J. F. Edbrooke.
Australia, Albert E. Faull, A. H. Garth, H. Arthur Matthews, C. N. H. Richardson, R. H. Tucker.
Belgium, Rene Arickx.
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.
Canada, J. 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.
Canal Zone, Bertram Baker.
Canary Islands, Manuel Davin.
Central America, R. Wilder Tatum.
Chile, Jorge Izquerdo.
China, Baron Von Huene.
Colombia, J. D. Lowe, 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. Self, 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 Quaglino.
Germany, Herbert Lennartz, Theodor B. Stark.
Hawaii, O. F. Sternemann.
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, Massall Satow.
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.
Philippine Islands, Victorino Leonen.
Portugal, Jose Fernandes Patrae, Jr.
Puerto Rico, Manuel F. Betances, A. N. Lightbourn.
Scotland, Duncan T. Donaldson.
South Africa, Mike Kruger, A. C. Lyell, H. Mallet-Veale, C. McCormick.
Spain, Jose Ma. Maranges.
Sweden, B. Scheierman.
Switzerland, Dr. Max Hausdorff, Ed. J. DeLopez.
Turkey, Herman Freiss, M. Seyfeddin.
Venezuela, Francisco Fossa Anderson.

Applications for Official Observers in the remaining countries should be sent in immediately to the DX Corner.

OBSERVER FOR CANADA

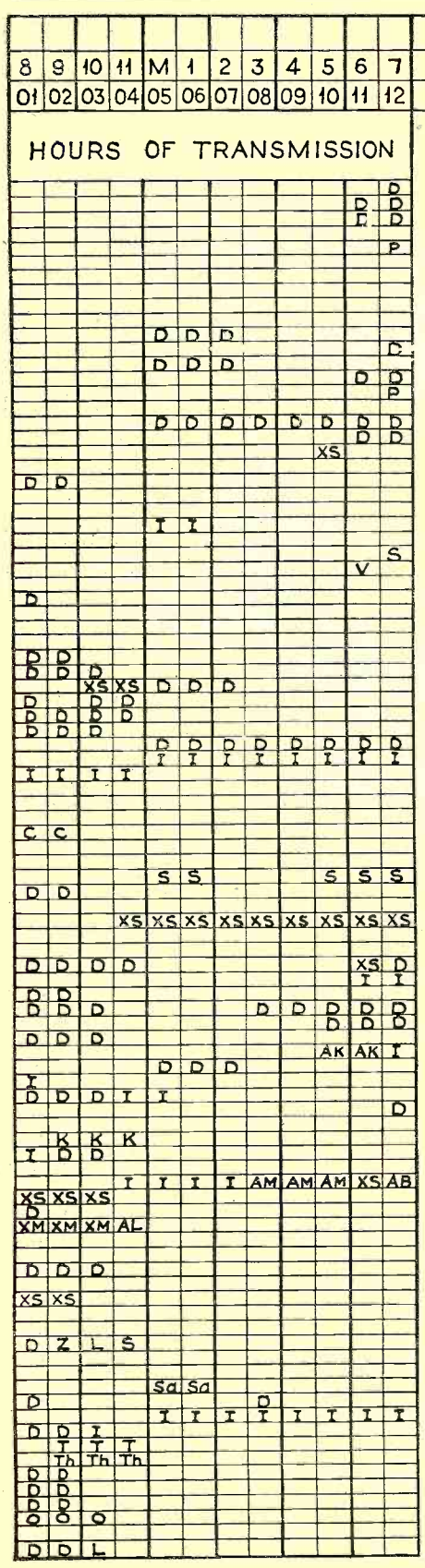
J. T. Atkinson explains that his s.w. receiver is a 3-tube regenerative set.



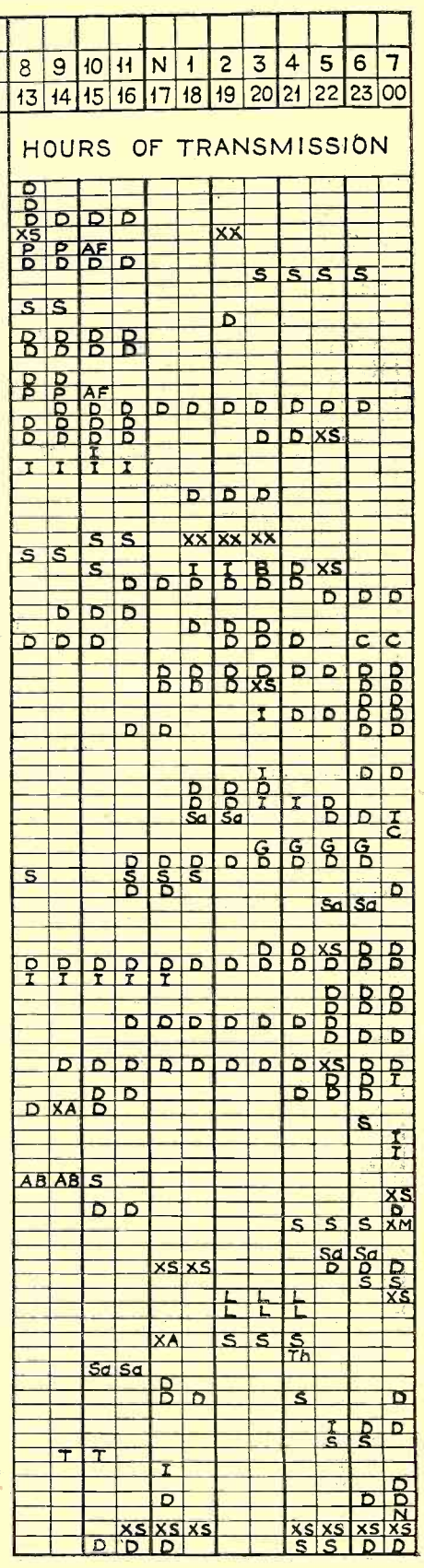
WORLD SHORT WAVE TIME-TABLE

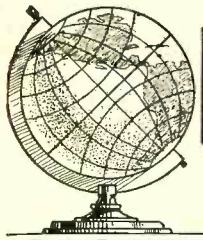
Compiled by LAURENCE M. COCKADAY

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



Wave-length Meters	Call Letters	Frequency Kc.	City Country
13.9+	W8XK	21540	Pittsburgh, Pa.
13.9+	GSH	21470	Daventry, England
16.8+	GSG	17790	Daventry, England
16.8+	W3XAL	17780	Bound Brook. N. J.
16.8+	PHI	17775	Huizen, Holland
16.8+	DJE	17760	Zeesen, Germany
19.4	PRADO	15440	Riobamba, Ecuador
19.5	HAS3 (HAS)	15370	Budapest, Hungary
19.5	W2XAD	15330	Schenectady, N. Y.
19.6+	DJQ	15280	Zeesen, Germany
19.6+	W2XE	15270	New York, N. Y.
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.
20.5+	JVH	14600	Nazaki, Japan
22.7+	ORP	13200	Ruysselede, Belg.
22.9+	VP1A (VPD)	13075	Suva, Fiji Islands
24.1+	CT1GO	12396	Parede, Portugal
24.8+	CT1CT	12082	Lisbon, Portugal
24.9+	RW59	12000	Moscow, U.S.S.R.
25.2	FYA	11890	Pontoise, France
25.2+	W8XK	11870	Pittsburgh, Pa.
25.2+	GSE	11860	Daventry, England
25.3+	W2XE	11830	New York, N. Y.
25.4	I2RO	11810	Rome, Italy
25.4+	W1XAL	11790	Boston, Mass.
25.4+	DJD	11770	Zeesen, Germany
25.5+	GSD	11750	Daventry, England
25.5+	FYA	11720	Pontoise, France
25.5+	CJRX	11720	Winnipeg, Canada
25.6+	HJ4ABA	11710	Medellin, Col.
27.9+	JVM	10740	Nazaki, Japan
28.1+	JVN	10660	Nazaki, Japan
28.9+	LSX	10350	Buenos Aires, Argen.
29.0+	ORK	10330	Ruysselede, Belgium
29.3+	CO9WR	10200	Sanctus Spiritus, Cuba
30.4+	EAQ	9860	Madrid, Spain
31.1+	I2RO	9635	Rome, Italy
31.2+	CT1AA	9600	Lisbon, Portugal
31.2+	W3XAU	9590	Philadelphia, Pa.
31.2+	VK2ME	9590	Sydney, Australia
31.2+	HP5J	9590	Panama City, Pana.
31.3	HBL	9580	Geneva, Switzerland
31.3	VK3LR	9580	Lyndhurst, Victoria, Australia
31.3	GSC	9580	Daventry, England
31.3+	W1XK	9570	Springfield, Mass.
31.3+	VUB	9565	Bombay, India
31.3+	DJA	9560	Zeesen, Germany
31.4+	DJN	9540	Zeesen, Germany
31.4+	LKJ1	9530	Jeloy, Norway
31.4+	W2XAF	9530	Schenectady, N. Y.
31.5+	VK3ME	9510	Melbourne, Australia
31.5+	GSB	9510	Daventry, England
31.5+	PRF5	9501	Rio de Janeiro, Braz.
31.8	COH	9428	Havana, Cuba
31.8+	PLV	9415	Bandoeng, Java
32.8+	HAT4	9125	Budapest, Hungary
33.0+	TFK	9060	Reykjavik, Iceland
34.0+	HKV	8795	Bogota, Col.
34.2+	ZCK (ZBW)	8750	Hong Kong, China
35.6+	HC2AT	8400	Guayaquil, Ec.
36.4+	ZP10	8220	Asuncion, Paraguay
36.5	HCJB	8214	Quito. Ecuador
38.2+	HC2JSB	7830	Guayaquil, Ecuador
38.4+	HBP	7790	Geneva, Switzerland
40.4+	HJ3ABD	7406	Bogota, Colombia
40.6+	XECR	7380	Mexico City, Mex.
41.1+	HJ1ABD	7281	Cartagena, Col.
41.7+	CR6AA	7177	Lobito, Angola, Port. West. Africa
42.0	HJ4ABB	7138	Manizales, Col.
42.1+	HB9B	7118	Basle, Switzerland
42.3+	PI1J	7082	Dordrecht, Holland
43.4+	HI3C	6900	La Romana, D. R.
44.0	HIH	6818	San Pedro, D. R.
44.4+	JVT	6750	Nazaki, Japan
44.6+	TIEP	6710	San Jose, Costa Rica
45.0+	HC2RL	6668	Guayaquil, Ecuador
45.3	PRADO	6616	Riobamba, Ecuador
45.3+	RW72	6611	Moscow, U.S.S.R.
45.7+	TIRCC	6550	San Jose, Costa Rica
45.9+	YV6RV	6520	Valencia, Ven.
46.2	HJ5ABD	6490	Cali, Colombia
46.2+	HI4D	6482	San Domingo, D. R.
46.5+	HJ1ABB	6447	Barranquilla, Col.





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											
8	9	10	11	M	1	2	3	4	5	6	7
EASTERN STANDARD TIME											
01	02	03	04	05	06	07	08	09	10	11	12

HOURS OF TRANSMISSION

Wavelength Meters	Call Letters	Frequency Kc.	City Country
46.8+	YN1GG	6400	Managua, Nicaragua
47.0	YV4RC	6375	Caracas, Venez.
47.4+	HIZ	6315	San Domingo, D. R.
47.7+	HJ3ABF	6275	Bogota, Colombia
48.1+	OAX4B	6230	Lima, Peru
48.1+	HJ4ABC	6230	Pereira, Colombia
48.1+	HJ1ABH	6225	Cienaga, Colombia
49.8+	CT1GO	6198	Parede, Portugal
48.4+	HI1A	6188	Santiago de Los Caballeros, D. R.
48.7+	CJRO	6160	Winnipeg, Manitoba
48.7+	HJ2ABA	6150	Tunja, Colombia
48.7+	YV3RC	6150	Caracas, Venezuela
48.7+	VE9CL	6150	Winnipeg, Man.
48.7+	HJ5ABC	6150	Cali, Colombia
48.7+	CO9GC	6150	Santiago, Cuba
48.8+	W8XK	6140	Pittsburgh, Pa.
48.9	ZGE	6132	Kuala Lumpur, F. M. S.
49.0+	W2XE	6120	New York, N. Y.
49.0+	YDA5	6120	Bandoeng, Java
49.0+	HRP1	6115	San Pedro Sula, Honduras
49.0+	HJ1ABE	6115	Cartagena, Col.
49.0+	VV1RC	6112	Caracas, Ven.
49.0+	VE9HX	6110	Halifax, N. S.
49.0+	VUC	6109	Calcutta, India
49.1+	W3XAL	6100	Bound Brook, N. J.
49.1+	W9XF	6100	Chicago, Ill.
49.1+	HJ4ABL	6100	Manizales, Col.
49.1+	ZTJ (JB)	6098	Johannesburg, Africa
49.1+	VE9GW	6090	Bowmanville, Can.
49.3+	CP5	6080	La Paz, Bolivia
49.3+	W9XAA	6080	Chicago, Ill.
49.3+	ZHJ	6080	Penang, Straits Settlements
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.
49.3+	HJ1ABF	6070	Barranquilla, 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.
49.6+	HJ1ABG	6042	Barranquilla, Col.
49.6+	PRA8	6040	Pernambuco, Brazil
49.7+	HP5B	6030	Panama City, Pan.
49.7+	VE9CA	6030	Calgary, Alberta, Can.
49.8	DJC	6020	Zeesen, Germany
49.8+	ZHI	6018	Singapore, Malaya
49.8+	COC	6010	Havana, Cuba
49.9+	HJ1ABJ	6006	Santa Marta, Col.
49.9+	VE9DN	6005	Montreal, Canada
49.9+	XEBT	6000	Mexico City, Mex.
49.9+	TGWA	6000	Guatemala City
49.9+	RW59	6000	Moscow, U.S.S.R.
50.1+	CT1AA	5980	Lisbon, Portugal
50.1+	HIX	5980	San Domingo, D. R.
50.1+	XECW	5975	Xantocam, Mexico
50.2+	HJ3ABH	5970	Bogota, Col.
50.2+	HVJ	5969	Vatican City
50.6+	HJ4ABE	5925	Medellin, Colombia
50.8+	HJ2ABC	5900	Cucuta, Colombia
51.1+	HI1J	5860	San Pedro de Macoris, D. R.
51.2+	YV5RMC	5850	Maracaibo, Venz.
51.4+	TIXGP3	5823	San Jose, Costa Rica
51.8+	OAX4D	5780	Lima, Peru
64.5+	HC2EP	4650	Guayaquil, Ecuador
70.2	RW15	4273	Khabarovsk, Siberia
74.9+	CT2AJ	4002	San Miguel, Azores
79.5+	HB9B	3770	Basle, Switzerland
79.9+	CT1CT	3750	Lisbon, Portugal
84.6+	CR7AA	3543	Lourenzo Marques, Mozambique
85.0+	HB9AQ	3525	Lausanne, Switzerland

EASTERN STANDARD TIME											
8	9	10	11	N	1	2	3	4	5	6	7
GREENWICH MEAN TIME											
13	14	15	16	17	18	19	20	21	22	23	00

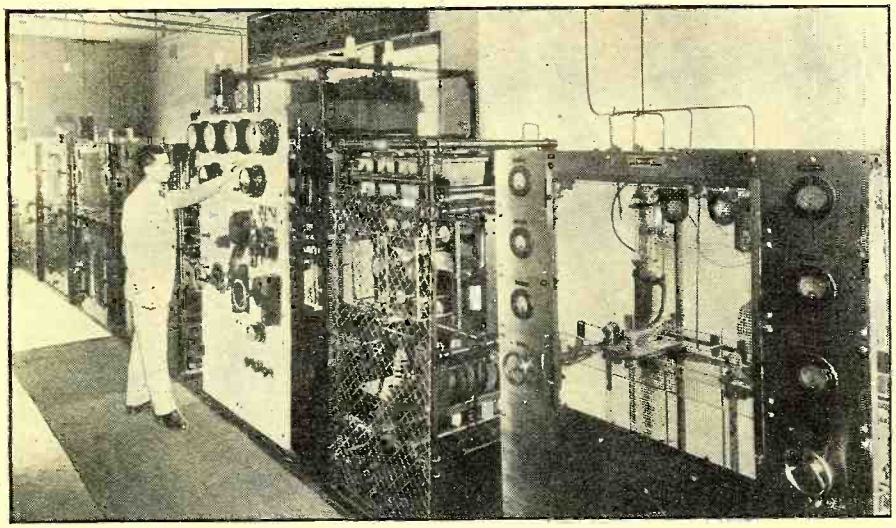
HOURS OF TRANSMISSION

KEY TO SYMBOLS

A—Sunday, Winter only
B—Sunday, Monday, Wednesday, Friday
C—Monday, Wednesday, Friday
D—Daily
E—Tuesday, Thursday
G—Tuesday, Thursday, Saturday
I—Irregularly
J—Thursday, Friday, Saturday, Sunday
K—Monday, Friday
L—Wednesday, Saturday
M—Monday
N—Monday, Wednesday, Thursday
O—Monday, Tuesday, Wednesday, Friday
P—Except Tuesday, Wednesday
R—Thursday, Friday, Saturday
S—Sunday
T—Tuesday
Th—Thursday
V—Wednesday, Sunday
Z—Tuesday, Friday

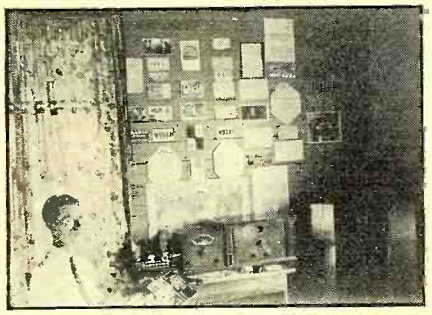
AB—Tuesday, Wednesday, Friday, Saturday
AC—Monday, Thursday, Saturday
AE—Tuesday, Friday, Sunday
AF—Saturday, Sunday
AG—Tuesday, Sunday
AK—Wednesday, Thursday, Friday, Saturday
AL—Except Monday, Sunday
AM—Monday, Thursday

AN—Tuesday, Saturday
Sa—Saturday
XA—Except Saturday, Sunday
XM—Except Monday
XR—Except Thursday, Saturday
XS—Except Sunday
XSa—Except Saturday
XX—Tuesday, Thursday, Friday
XY—Except Tuesday, Sunday



THE FAMOUS VK2ME

The photograph at the left shows the 20 kw. transmitter of the Australian station, located at Radio Center, Pennant Hills, New South Wales.



IN SOUTH CAROLINA

Meet E. W. Duncan, a short-wave listener of Arcadia, South Carolina, who "thinks RADIO NEWS *the greatest magazine ever published on account of its short-wave dope." His DX Corner is pictured.*

The DX Corner

(Short Waves)

(*Continued from page* 157)

Rome, 25.4 meters, 11810 kc., American hour, 6-7 p.m., E.S.T.; FYA, Paris, 11725 kc., 6-6:15 p.m., E.S.T.; DJD, Berlin, 25.4 meters, 11770 kc., 7:15-7:30 p.m., E.S.T.; RW59, Moscow 24.9 meters, 12000 kc., on Suns., Mons., Weds., and Fris., at 4 a.m., E.S.T.; JVH, Tokyo, on 20.5 meters, 14600 kc., 8:40-8:50 p.m., E.S.T. daily. The British Empire "G" stations broadcast news from London about 15 min. before the end of each program. (Rowlett, Gates, Kuramochi, Geiser, Bower, Baadsgaard, Akins.)

CT2AJ, San Miguel, Azores, 75 meters, 4000 kc., reported heard Mons., and Suns., 5-7 p.m., E.S.T. (Silver.)

PLV, Bandoeng, Java, 9415 kc., reported heard Tues. and Thurs., 10-10:30 a.m., E.S.T. (J. E. Moore.) How many got the R. N. special broadcast?

JVN, reported heard from 1 a.m., E.S.T., onward. (Best.)

JBK, Kagoshima, Japan, 9120 kc., reported heard 3-6 a.m., E.S.T. (Sholin.)

JIB, Chureki, Taiwan, Formosa, 10535 kc., 6 kw., heard until 6 a.m., E.S.T., daily. (Sholin.)

L.P.O. Donaldson reports the following Jap stations, testing with music irregularly: JZG, 46.36 meters; JZF, 35.27 meters; JZE, 22.5 meters; and JZD, 18.5 meters.

ZCK, Hongkong, China, is now relaying ZBW, the long-wave station at Hongkong, on a wavelength of 34.29 meters, 8750 kc., with a power of 250 watts, from 11 p.m.-1:30 a.m., E.S.T., and from 4-10 a.m., E.S.T. They also use another wavelength (65.46 meters or 5410 kc.) (Gallagher, Pilgrim, Baron von Huene, Donaldson, Matthews, Masuda, Howald, and J. H. Miller.) L.P.O. Stevens reports them on the air Mons., and Thurs., 3-7 a.m., E.S.T.; on Tues., Weds. and Fris., 6-10 a.m., E.S.T., and on Sats. 6-11 a.m., E.S.T.

ZHI, Singapore, M. F. S., 12:30-1 a.m., E.S.T. (Baadsgaard.)

VUB, Bombay, India, reported heard 11 a.m. to noon, E.S.T. Station said it would be back on the air again at 1 a.m., E.S.T. (Fabius.)

VP1A, (VPD) Radio Suva, Fiji Islands, 13075 kc., reported heard 12:30-1:30 a.m., E.S.T. except Sats. (A. E. Emerson, Howald, Atkinson, Akins, J. E. Moore, Pilgrim, Fabius, and Jensen.)

SUV, Cairo, Egypt, 10055 kc., has verified reception by Hutson.

CR7AA, Lourenco Marques, 84.67 meters, 3543 kc., with 150 watts power, is on the air Mondays, Thursdays, Saturdays, 1:30-3:30 a.m., E.S.T. (Baadsgaard.)

VK3LR, (3LR), Lyndhurst, Victoria, Australia, heard 12:30 a.m., E.S.T., and also heard testing from 2:45-3:15 a.m., P.S.T. They play records and give stock quotations at this latter period. (Bews and Belanger.)

VK2ME, Sydney, Australia, 9590 kc., has been on the air recently from midnight to 2 a.m., from 4:30-8:30 a.m., from 11:30 a.m. to 1:30 p.m., E.S.T. on Sundays. (Westchester Listening Post.)

ZLT, Wellington, N. Z., talks to VLZ, Sydney, Australia, from about 1-3 a.m., E.S.T. daily. Reports are verified. The address is Post and Telegraph Dept., Radio Wellington, Wellington, N. Z. (Capt. Hall.)

W10XFN, Rapid City, S. D. (The Stratosphere Balloon Tests), 47.2 meters, 6350 kc., heard testing 3-4 p.m., and 9:30-10 p.m., E.S.T. (Jensen, Young, Twomey, Barnes, J. H. Miller, Howald, Atkinson, Gallagher, A. E. Emerson.) J. E. Moore reports the call as W10SF10, 6/42 megacycles and time as 10:15 p.m., E.S.T.

W2XBJ reported heard testing on 8.95 megacycles with music. (Gavin.)

W10XFP, Schooner Morrissey reported heard. (Roberts.)

W3XAL, Bound Brook, N. J., reported on the air from 4-5 p.m., E.S.T., Mondays, Wednesdays, and Saturdays. (Christoph and Houghton.)

W6USA, the National Exposition at San Diego, Amateur Station, 3890 kc., and 3910 kc., with a 1 kw. transmitter, is on the air from 4 p.m. to 1 a.m. daily. A National receiver is used. (Westchester Listening Post.)

XAM, Mexico City, Mexico, 11500 kc., heard testing with music, 8:30 p.m., E.S.T. (Gallagher.)

TFK, Reykjavik, Iceland, 9060 kc., reported heard 7-8 p.m., E.S.T. (Toohey, and Schradieck.)

FNSK, the Steamship Normandie, uses these frequencies for calling New York: 8830 kc., 4412 kc., 13210 kc., 22060 kc., 17650 kc.; it talks to Paris

MERRIE OLD ENGLAND

O.R.N.S.W.L.P.O. Harold Self of Suffolk, England, sends greetings to fellow Observers. Notice the coveted certificate.

O.R.N.S.W.L.P.O. FOR MEXICO

The "Ham" and listening post of F. Saldana, whose transmitting call is X1DD. Other Observers in foreign countries, hearing his signal, will kindly report reception to RADIO NEWS.

A SMILE FROM BERLIN

Greetings from Official Observer T. B. Stark of Berlin, a regular short-wave reporter.

at the following frequencies: 13195 kc., 8815 kc., 4397 kc., 17635 kc., and 22045 kc. (Kemp, Clarkson, Libby, Reilly, Sholin and de Laet.)

HIZ, San Domingo, D.R., reported heard on 6315 kc. (Albrecht.)

CO5RY, Matanzas, Cuba, reported heard on 42 meters. (Clarkson.)

COCD, Havana, Cuba, 6140 kc., reported heard 10:30 p.m. to 12:06 a.m., E.S.T., playing chimes. It signs off with same theme song as EAQ. (Gavin.)

CO9GC, Santiago de Cuba, 48.7 meters, reported heard 1:30-4:30 p.m. and from 10 p.m. to midnight, E.S.T. (Donaldson.)

TI2PG, San Jose de Costa Rica, reported transmitting on 6550 kc., and on 7150 kc., 500 watts. (A. E. Emerson.)

TI4AC, San Jose de Costa Rica. This is the call of the new station replacing TI4NRH, and the owner plans inaugurating a new broadcast series soon on 45.5 meters with 400 watts power. TI4AC is now operating on the 20-meter Ham band. (Styles.)

TIRCT, San Jose de Costa Rica, reported heard on 13100 kc., or on 13200 kc., on Tues., 6:30-7:15 p.m., and from 9-10 p.m., E.S.T. (Messer and Kentzel.) Schradieck says this is an harmonic.

TIRCC, San Jose de Costa Rica, 300 watts, 45.8 meters, 6550 kc., reported heard 6-7 p.m., E.S.T. (Winand, Betances, Stevens, Wedel, Messer, Chambers, and Gallagher.) Schradieck says this call is TIRCT.

HCJB, Quito, Ecuador, now heard on 8214 kc., from 4-10 p.m., Sundays, and on weekdays from 7:14-11:14 p.m., E.S.T. (Sholin.)

HC2AT, Guayaquil, Ecuador, 35.7 meters, 8400 kc., reported broadcasting. (Palacio and Messer.)

HH2F, Port au Prince, Haiti, 49.41 meters, 6070 kc., reported heard 8-9 p.m. except Sundays. (Betances.)

YNGU, Managua, Nicaragua, reported heard on about 33 meters. (J. E. Moore.)

HRP1, San Pedro Sula, Honduras, reported heard on 49 meters, 2-4 a.m., Malta Standard Time. (Vassallo.)

HJ4ABA, Medellin, Col., 25.6 meters, 11710 kc., 100 watts, reported heard 11:30-1 p.m., 6:30-10:30 p.m., E.S.T. (Libby and Kentzel.)

HJ4ABL is reported as the correct call for the Colombian station on 6110

(*Turn to page* 163)

CLUB NEWS

Society of Wireless Pioneers

A hearty welcome is extended to the following new members: H. J. Dent, Bombay, India; H. H. Lasman, G2PX, London, Eng.; Albert Fabius, Paaulio, Hawaii; F. L. Carpenter, W9NVG, Minneapolis, Minn.; C. B. Sethna, VUB, Bombay, India; A. G. Cutts, Sheffield, Eng.; R. W. Stewart, West Hartlepool, Eng.; Fred Bell, West Hartlepool, Eng.; E. C. Edulgee, Nagpur, C. P., India.

Alice R. Bourk, W9DXX, has recently been confined to her bed with a severe heart attack. She manages to work her rig by remote control and if her fellow members hear her CQ, give her a word of cheer.

C. A. Morrison was a recent visitor at our test station W9QJ, and several of the local broadcast stations were also visitors as was the amateur station of S. B. Young, owner and operator of W9HCC.

News data pertaining to the Society should be sent direct to the office of the Vice-President, 2223 E. 25th St., Minneapolis, Minn., U. S. A.

Radio Club Venezolano

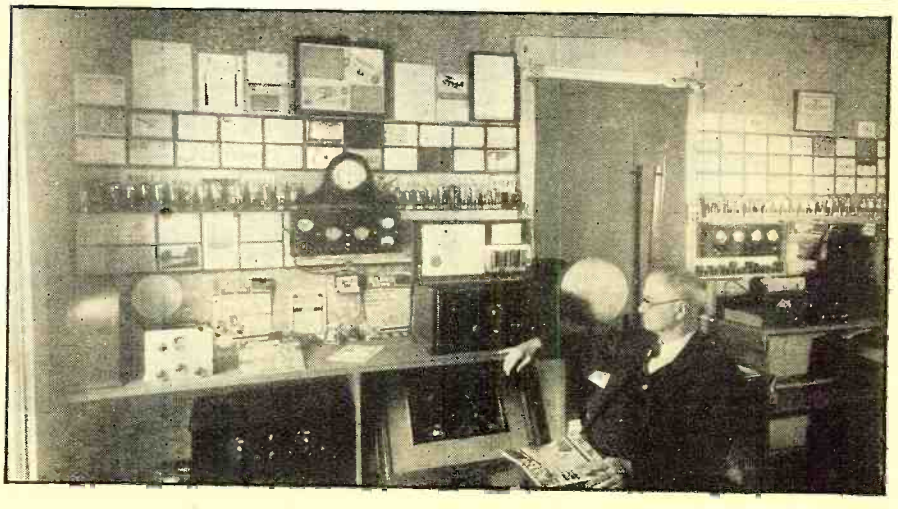
The new officers, for this year, of the Radio Club Venezolano are as follows: Pres., R. V. Ortega; Vice.-Pres., Hermann Degwitz; Sec'y, F. F. Andersen; Under-Sec'y, Nestor Pinedo; Treas., M. S. Perez; Ass't Treas., A. J. Sanchez; other executives are, Albert Lopez L., J. G. Alfaro, Dr. J. A. N. Moreno, Manuel Arraez, Gerardo Sieblitz, E. J. Maury, P. P. y E. Key T.

An Open Letter

Mr. A. Fabius, O.R.N.S.W.L.P.O. for Hawaii, and member of the Society of Wireless Pioneers, addresses the following to his countrymen: "Come on Hollanders, let's have an Official Radio News Listening Post in the Netherlands. Our country is small and not well known but we know that we have always occupied the first ranks in pioneering and certainly in radio engineering. Holland amateurs do not let the 'Jan Salie geest' get you!"

THEY DO THINGS BIG IN INDIANA

Below: Arthur B. Coover, S.W.L.P.O. for RADIO NEWS, *is shown seated at his DX station. It is so large we can hardly call it a "corner." His letter says, "Notice my Official L.P.O. Certificate on the lid of the cabinet."*



Indian Radio Amateurs' League

A few notes from the address of the League's President: "It is going to pay every radio owner in India to join our League because we want to give all the help we can to the radio novice as well as to the advanced. Foreigners will surely welcome our League as although there are many clubs giving information on European and American stations, few give information on Asiatic stations which is what they want."

South Hills Brass Pounders and Modulators

The South Hills Brass Pounders and Modulators of Pittsburgh, Pa., are holding their annual Ham Fest at Clatty's Driving Range, Bower Hill Road, Mt. Lebanon, Pittsburgh, Pa., Sunday, August 4th. Meals will be served and prizes will be distributed.

International Short Wave Club

A special DX Contest will be organized by this club during October. The judges will be Arthur E. Baer of London, Eng., J. B. Sessions of Bristol, Conn., Arthur H. Lynch, Clifford Denton, and others. Details of the contest will be available next month.

The French International Radio Show

PARIS, FRANCE—The twelfth international Paris radio show organized by the "Societe pour la Diffusion des Sciences et des Arts," will be held at Paris from the 5th to the 15th of September, 1935.

SUMMER POST AT CORNWALL

N. C. Smith, our L.P.O. for England, is shown at his summer short-wave camp at Mullion Cove, Cornwall, operating his portable on a mountaintop

TELEVISION STATIONS

IN THE UNITED STATES

Call Letters	Power Watts	Company	Location
2000-2100 Kc.			
W2XDR	1000	Radio Pictures, Inc.	Long Island City, N. Y
W8XAN	100	Sparks-Withington Co.	Jackson, Mich.
W9XK	50	University of Iowa	Iowa City, Iowa
W9XAK	125	Kansas St. Col. Agr. & Apl. Sc.	Manhattan, Kansas
W9XAO	500	Western Television Research Co.	Chicago, Ill.
W6XAH	1000	Pioneer Mercantile Co.	Bakersfield, Calif.
2750-2850 Kc.			
W3XAK	5000	National Broadcasting Co.	Portable
W9XAP	2500	National Broadcasting Co.	Chicago, Ill.
W2XBS	5000	National Broadcasting Co.	Bellmore, N. Y.
W9XAL	500	First Nat'l. Telev. Corp.	Kansas City, Mo.
W9XG	1500	Purdue University	W. Lafayette, Ind.
W2XAB	500	Atlantic Broadcasting Corp.	New York, N. Y.
42,000-56,000, 60,000-86,000 Kc.			
W2XAX	50	Atlantic Broadcasting Corp.	New York, N. Y.
W6XAO	150	Don Lee Broadcasting System	Los Angeles, Calif.
W9XD	500	The Journal Company	Milwaukee, Wis.
W2XBT	750	National Broadcasting Co.	Portable
W2XF	5000	National Broadcasting Co.	New York, N. Y.
W3XE	1500	Philadelphia Storage Battery Co.	Philadelphia, Pa.
W3XAD	2000	RCA-Victor Co., Inc.	Camden, N. J.
W1OXX	50	RCA-Victor Co., Inc.	Portable & Mobile (Vic. of Camden)
W2XDR	1000	Radio Pictures	Long Island City, N. Y.
W8XAN	100	Sparks-Withington Co.	Jackson, Mich.
W9XAT	500	Dr. Geo. W. Young	Portable
W2XD	500	R. D. Lemert	New York, N. Y.
W2XAG	100	R. D. Lemert	Portable
W1XG	500	General Television Corp.	Boston, Mass.
W9XAL	150	First Nat'l. Telev. Corp.	Kansas City, Mo. (CP)

CP—Construction Permit

SHORT-WAVE STATION LIST

Arranged by Cities and Countries

Continued from Last Month

NETHERLANDS EAST INDIES

PNI	Makassar, Celebes	34.17	8,775	P,B
——	Batavia, Java	69.24	4,330	B
PKYDA2	Bandoeng, Java	48.99	6,120	B
PLE	Bandoeng, Java	16.66	18,000	P
PLE	Bandoeng, Java	15.92	18,830	P
PLF	Bandoeng, Java	16.80	17,850	P
PLG	Bandoeng, Java	18.80	15,950	P
PLM	Bandoeng, Java	24.48	12,250	P
PLM	Bandoeng, Java	24.39	12,295	P
PLP	Bandoeng, Java	27.26	11,000	P,B
PLR	Bandoeng, Java	28.20	10,630	P
PLV	Bandoeng, Java	31.84	9,415	P,B
PLW	Bandoeng, Java	31.61	9,485	P
PLW	Bandoeng, Java	36.90	8,125	P
PMA	Bandoeng, Java	15.49	19,345	P,B
PMB	Bandoeng, Java	14.57	20.580	P
PMC	Bandoeng, Java	16.53	18,135	P,B
PMN	Bandoeng, Java	29.22	10,260	P,B
PMY	Bandoeng, Java	58.33	5,140	B
——	Bandoeng, Java	49.64	6,040	B
——	Semarang, Java	68.61	4,370	B
YDB	Soerabaja, Java	67.07	4,470	B
YDE2	Solo, Java	62.33	4,810	B
YDL2	Solo, Java	62.33	4,810	B
YDA	Tandjongpriok, Java	98.62	3,040	B
YDA	Tandjongpriok, Java	49.64	6,040	B
YBF	Medan, Sumatra	30.19	9,930	P
YBG	Medan, Sumatra	28.75	10,430	P,B
YBJ	Medan, Sumatra	24.60	12,190	P
YDU2	Medan, Sumatra	65.18	4,600	B
YDU3	Medan, Sumatra	57.00	5,260	B

SIAM

HSP	Bangkok	16.90	17,740	P
HSJ	Bangkok	37.57	7,980	P
HSP2	Bangkok	31.56	9,500	B
HSP2	Bangkok	31.10	9,640	B

SIBERIA (U. S. S. R.)

RSZ	Irkutsk	34.19	8,770	P
RW15	Khabarovsk	70.17	4,273	B
RW15	Khabarovsk	34.98	8,570	B
RAU	Tashkent	19.86	15,104	P
RIM	Tashkent	39.31	7.626	P

SOUTH AMERICA

ARGENTINA

Call	Location	Meters	kc.	Class
LQA	Buenos Aires	30.91	9,700	P
LQA	Buenos Aires	31.23	9,600	P
LSF	Buenos Aires	19.14	15,670	P
LSG	Buenos Aires	15.07	19,900	P
LSI	Buenos Aires	30.50	9,830	P
LSL	Buenos Aires	29.11	10,300	P
LSL	Buenos Aires	30.09	9,964	P
LSN	Buenos Aires	14.27	21,020	P
LSN	Buenos Aires	14.49	20,680	P
LSN	Buenos Aires	20.64	14,530	P
LSN	Buenos Aires	20.69	14,490	P
LSN2	Buenos Aires	30.32	9,890	P
LSX	Buenos Aires	14.49	20,680	P
LSX	Buenos Aires	28.97	10,350	P
LSY	Buenos Aires	14.48	20,700	P
LSY	Buenos Aires	28.80	10,410	P
LSY3	Buenos Aires	16.55	18,115	P
LU5CZ	Buenos Aires	42.35	7,080	A,B
LST	Olivos	32.93	9,104	P

BOLIVIA

CP5	La Paz	49.31	6,080	B
CP6	La Paz	32.88	9,120	B
CP7	La Paz	19.60	15,300	P

BRAZIL

PRA8	Pernambuco	49.64	6,040	B
PRA8	Pernambuco	50.00	5,996	B
PRAG	Porto Alegre	35.48	8,450	P,B
PPQ	Rio de Janeiro	25.70	11,670	E
PPU	Rio de Janeiro	15.57	19,260	P
PRF5	Rio de Janeiro	31.56	9,501	B
PSA	Rio de Janeiro	18.54	16,162	B
PSH	Rio de Janeiro	29.34	10,220	P
PSK	Rio de Janeiro	36.63	8,185	P,B

CHILE

CEC	Santiago	15.23	19,680	P
CEC	Santiago	18.91	15,855	P
CEC	Santiago	28.10	10,670	P
CE32	Los Andes	31.96	9,380	P

COLOMBIA

HJA3	Barranquilla	20.06	14,940	P
HJA3	Barranquilla	39.86	7,522	P
HJA3	Barranquilla	40.14	7,470	P
HJA3	Barranquilla	46.73	6,416	P
HJA3	Barranquilla	61.63	4,865	P
HJA3	Barranquilla	70.55	4,250	P
HJA3	Barranquilla	88.81	3,376	P
HJ1ABB	Barranquilla	46.48	6,450	B
HJ1ABF	Barranquilla	49.39	6,070	B
HJ1ABG	Barranquilla	49.62	6,042	B
HJB	Bogota	20.08	14,930	P
HJP	Bogota	40.14	7,470	P
HJV	Bogota	16.27	18.440	P
HJY	Bogota	30.19	9.930	P
HJ3ABD	Bogota	40.48	7,406	B
HJ3ABF	Bogota	47.78	6,275	B
HJ3ABH	Bogota	49.82	6,018	B
HJ3ABI	Bogota	49.56	6,050	B
HKB	Bogota	30.19	9,930	P
HKC	Bogota	47.82	6,270	P
HKE	Bogota	42.29	7,090	B
HKF	Bogota	37.01	8,100	P
HJ5ABC	Cali	48.75	6,150	B
HJ5ABD	Cali	46.20	6,490	B
HJ1ABD	Cartagena	41.18	7,281	B
HJ1ABD	Cartagena	49.15	6,100	B
HJ1ABE	Cartagena	48.99	6,120	B
HJA7	Cucuta	55.52	5,400	P
HJ2ABC	Cucuta	51.08	5,870	B
HJ4ABB	Manizales	42.00	7,138	B
HJ4ABL	Manizales	49.15	6,100	B
HJ4ABA	Medellin	16.93	17.713	B
HJ4ABA	Medellin	25.61	11,712	B
HJ4ABE	Medellin	50.56	5,930	B
HJ4ABC	Pereira	48.13	6,230	B
HJ1ABJ	Santa Marta	50.47	5,940	B
HJ2ABA	Tunja	48.75	6,150	B

ECUADOR

HC2AT	Guayaquil	35.69	8,400	B
HC2EP	Guayaquil	64.48	4,650	B
HC2JSB	Guayaquil	38.94	7,700	B
HC2RL	Guayaquil	44.97	6,668	B
PRADO	Riobamba	19.42	15,440	P,B
PRADO	Riobamba	45.32	6,616	B
HCJB	Quito	36.98	8,108	B
HCJB	Quito	52:47	5,714	B
HCJB	Quito	72.95	4,110	B

PERU

OAX4B	Lima	48.13	6,230	B
OAX4D	Lima	51.87	5,780	B
OA4C	Lima	38.34	7.820	B
OA4R	Lima	41.99	7,140	B
OCI	Lima	16.05	18,680	P
OCI	Lima	47.97	6,250	P

VENEZUELA

YV2RC	Caracas	25.64	11,695	B
YV2RC	Caracas	49.05	6,112	B
YV3RC	Caracas	31.53	9,510	B
YV3RC	Caracas	48.75	6,150	B
YV4BSG	Caracas	49.97	6,000	B
YV4RC	Caracas	47.04	6,375	B
YV4RC	Caracas	50.10	5,984	B
YV9RC	El Valle	46.85	6,400	B
YVQ	Maracay	16.38	18,295	P
YVQ	Maracay	22.47	13,340	P
YVQ	Maracay	25.64	11,695	P
YVQ	Maracay	44.94	6,672	P
YVR	Maracay	32.66	9,180	P
YV2AM	Maracaibo	41.98	7,142	A
YV5RMO	Maracaibo	51.25	5,850	B
YV6RV	Valencia	45.98	6,520	B

OCEANIA

AUSTRALIA

Call	Location	Meters	kc.	Class
VK3LR	Lyndhurst, Victoria	13.92	21,540	B
VK3LR	Lyndhurst, Victoria	31.30	9,580	B
VK3LR	Lyndhurst, Victoria	51.69	5,800	E
VIY-VK3ME	Melbourne	24.95	12,020	E
VK3ME	Melbourne	31.53	9,510	B
VK2ME	Sydney	31.26	9,590	B
VLJ	Sydney	30.72	9,760	P
VLJ	Sydney	37.57	7,980	P
VLK VLK-VK2ME	Sydney	28.48	10,525	P
VLZ	Sydney	18.36	16,330	P
		37.67	7,960	P

NEW ZEALAND

ZL3ZC	Christchurch	49.97	6,000	B
ZLT	Wellington	24.39	12,295	P
ZLT	Wellington	27.29	10,990	P
ZLT	Wellington	33.69	8,900	P
ZLT	Wellington	40.57	7,390	P
ZLW	Wellington	24.40	12,290	P
ZLW	Wellington	16.34	18,350	P
ZL2XX	Wellington	62.86	4,770	P
ZL2ZX	Wellington	49.48	6,060	B

FIJI ISLANDS

VPE	Labasa, Vanua Levu	43.77	6,850	E
VQL	Savu Savu, Vanua Levu	43.77	6,850	E
VRO	Suva, Viti Levu	43.77	6,850	E
VPD	Suva, Viti Levu	20.79	14,420	P
VPD	Suva, Viti Levu	38.00	7,890	P
VP1A	Suva, Viti Levu	28.66	10,460	B
VPF	Taveuni, Taveuni	43.77	6,850	E

HAWAIIAN ISLANDS

KEQ	Kahuku	40.68	7,370	P

KIO	Kahuku	25.67	11,680	P
KKH	Kahuku	39.87	7,520	P
KKP	Kahuku	18.70	16,030	P
KQH	Kahuku	18.77	15,985	P
KRO	Kahuku	51.29	5,845	P

PHILIPPINE ISLANDS

KAX	Manila	15.01	19,980	P
KAY	Manila	20.04	14,980	P
KAZ	Manila	30.01	9,990	P
KAZ	Manila	36.90	8,120	P
KBI	Manila	14.19	21,140	P
KBJ	Manila	22.64	13,240	P
KBK	Manila	44.64	6,716	P
KTO	Manila	18.47	16,240	P
KTP	Manila	36.92	8,120	P
KUS	Manila	16.45	18,220	P
KZRM	Manila	25.33	11,840	B
KZRM	Manila	31.33	9,570	B
KZRM	Manila	48.83	6,140	B
NPO	Manila	33.80	8,870	T

CENTRAL AMERICA

COSTA RICA

Call	*Location*	*Meters*	*kc.*	*Class*
TIN	Cartago	20.68	14,500	P
TIR	Cartago	34.11	8,790	P
TIRA	Cartago	31.26	9,590	B
TIRA	Cartago	49.31	6,080	B
TI4NRH	Heredia	19.90	15.075	B
TI4NRH	Heredia	30.97	9,680	B
TI4NRH	Heredia	51.69	5,800	B
TIEP	San Jose	22.34	13,420	B
TIEP	San Jose	44.68	6,710	B
TIXGP3	San Jose	51.90	5,777	B
TITE	San Jose	45.09	6,650	B
TITR	San Jose	25.43	11,790	B
TI2EP	San Jose	41.42	7,238	A
TPK	San Jose	46.10	6,504	B

GUATEMALA

TGF	Guatemala City	20.68	14,500	P
TGX	Guatemala City	33.48	8,955	B
TGX	Guatemala City	50.11	5,984	B

HONDURAS

HRP1	San Pedro Sula	49.93	6,115	B

NICARAGUA

YNCRD	Granada	41.82	7,170	B
YNCRG	Granada	44.99	6,664	B
YNA	Managua	20.71	14,480	P
YNLF	Managua	38.50	7,788	B
YNLF	Managua	50.22	5,970	B
YNLF	Managua	69.46	4,316	B
YN1GG	Managua	46.85	6,400	B
YN1OP	Managua	46.99	6,380	B

PANAMA

HPC	Panama City	29.14	10,290	P
HPF	Panama City	20.70	14,486	P
HP5B	Panama City	49.72	6,030	B
HP5J	Panama City	31.26	9,590	B
RXC	Panama City	38.10	7,870	P

The DX Corner (Short Waves)

(*Continued from page* 161)

kc. HJ4ABN is the long-wave station it relays, according to Observer Kemp. According to Observer Foshay, HJ4ABL has changed its wavelength to 49.48 meters. According to some listeners the proper frequency for HJ4ABL is not 6100 kc., but is 6065 kc., judging from their verifications???

HJ4ABB, Manizales, Col., is now reported heard on 49.18 meters by Kentzel, Young, and Libby. It has the same announcer as HJ4ABL. (We wish we could get this matter of these stations cleared up officially, but have not heard yet from the stations' management). ????

HJ5ABB, Manizales, Col., reported heard on 49.05 meters. (Stevens.)

HJ1ABD, Cartegena, Col., is now reported on 42.1 meters, 7281 kc., instead of 49.1 meters. (Foshay, Vassallo, and Rowson.)

HJ1ABJ, Santa Marta, Col., reported now on 5.94 megacycles, 7-9 p.m., E.S.T., and noon to 1 p.m., E.S.T. (Palacio and Rowson.) Listener Hamilton says the time is 7-11 p.m., E.S.T.

HJ4ABC, Pereira, Col., reported heard on 49.25 meters, 6089 kc. (Palacio and Betances.)

HJ5ABE, Calle, Col., announces its wavelength as 42 meters, 7058 kc., heard on the air 7-11 p.m., E.S.T. It plays 3 gongs. (Chambers.) This same station has been reported on 14116, 14150, 14120, 14155, 14220, 14110, 14100 kc., by the following observers: deLaet, Hamilton, Twomey, Christoph, Phillips, A. E. Smith, Kentzel, and Betances. (This transmission on the amateur band has been also checked at the Westchester Listening Post and it is believed to be an harmonic of the 7058 kc. transmission which is not heard well in the U. S.)

HJ4ABE, Medellin, Col., 50.6 meters, 5925 kc., reported heard 11-12 noon and 6-10:30 p.m., E.S.T. (Fletcher, Sholin, Young, Olson, and Coover.)

S.W. OBSERVER FOR OHIO

Carl P. Peters, of Troy, Ohio, keeps a sharp lookout for new short-wave "catches" and reports his findings monthly to RADIO NEWS

HJ1ABG, Barranquilla, Col., reported heard on 49.65 meters. (Coover.) Akins says it is heard Saturdays at night until 12:45 a.m., E.S.T.

How many received the special Radio News broadcasts from W3XAU, Philadelphia, last month?

HJ3ABH, Bogota, Col., 50.22 meters, 5970 kc., 1200 watts, reported on the air 11:30 a.m. to 2 p.m. and 6-11 p.m., except Sundays. On Sundays it is on the air from 12 noon to 2 p.m. and 4-9 p.m., E.S.T. (Young, Byrns, Sholin, A. E. Emerson and Foshay.)

HJ4ABD, Cartagena, Col., reported heard on 49.05 meters, 6115 kc. (Betances.)

HJ5ABD, Calle, Col., reported heard 47 meters, 6490 kc., 100 watts power. (Young.)

HJ1ABE, Cartagena, Col., will soon be on the air with 500 watts power on its present frequency of 49.05 meters, 6115 kc., where it now uses only 180 watts. Its time on the air is reported as 7:30-9 p.m., E.S.T. (Pilgrim, Wadia, Foshay, Young, and Kentzel.) On Mondays it has a special DX program from 10-11 p.m. (Sholin.)

HJU2, Buenaventura, Col., reported heard on 33.1 meters. (Palacio.)

HJA7, Cucuta, Col., reported heard on 5400 kc., 400 watts from 8-10 p.m., E.S.T. (Coover.)

HJ3Q, Bogota, Col., reported heard 8700 kc., Saturdays 9-10 p.m., E.S.T. (Clarkson.)

HKV, Bogota, Col., on 33.3 meters, 8795 kc., reported heard 7-11 p.m., E.S.T. (Gallagher, Chambers, Williamson, Belt, Reilly, Houghton, Hamilton, Davis and Kemp.) Observers Myers and Wood report this station on 8746 kc., and the call letters as HKPQ and the time from 9-10 p.m., E.S.T. ????

PRF5, Rio de Janiero, Brazil, incorporates a new news program at 8 p.m., on certain days yet to be announced during the week. (Christoph.)

YV4RC, Caracas, Venez., has increased its power to 1 kw. (Betances.)

YV5RM, Maracay, Venez., is reported heard on about 40 meters. (Young.)

LSK, Buenos Aires, reported heard on 7460 kc., around 12:30 a.m., E.S.T. (Akins.)

CEC, Santiago, Chile, 28.12 meters, reported heard from 7-8 p.m., E.S.T. (Styles.)

KIO, Kahuku, Hawaii, 11710 kc., has been reported heard broadcasting to America for the Columbia network on Thurs., 8-10:30 p.m., E.S.T. (J. E. Moore, Gallagher, and Gavin.)

Nairobi Changes Frequency

NAIROBI, KENYA, British East Africa —Due to the interference between VQ7LO and the Danish short-wave station OXY it was found advisable to change the frequency of VQ7LO. Radio Nairobi has changed its wavelength to 49.02 meters. It is hoped that this will make it possible for foreign listeners to receive the station with less interference. The station can easily be recognized by its intermission signal consisting of the roaring of a lion.

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

Roy L. Christoph, Eddie C. Zarn, Thomas Kenney, Jr., A. Belanger, George C. Akins, James E. Moore, Jr., G. L. Harris, J. F. Olson, Jr., R. S. Houghton, James Romlett, Jack Bews, J. Rowson, A. C. Lyell, G. W. Twomey, Werner Howald, Leonard A. Phillips, Thomas P. Jordan, Bob Morrison, Edgar J. Vassallo, Charles E. Gates, Alberto Palacio, Thomas L. Sego, Arthur B. Coover, Hank G. Wedel, Baron von Huene, A. B. Baadsgaard, James L. Davis, H. Arthur Matthews, Anthony Slapkowski, Jr., Charles B. Marshall, Jr., David Geiser, W. E. Frost, W. J. Woodall, Hilbert Jensen, Billy Sam Lokey, Spencer E. Lawton, Kenneth I. Albrecht, Richard O. Lamb, Richard J. Southward, Anthony J. Misunas, A. J. Webb, H. Kemp, John E. Moore, A. Fabius, Earl R. Wickham, Hen. F. Polm, Louis T. Haws, Wm. Schumacher, Arthur Leutenberg, Paul E. Byrns, Philip R. Belt, Eric Butcher, H. Mallet-Veale, Arthur Letroye, Arthur Hamilton, D. Thwaites, W. W. Gaunt, Jr., Bud Toohey, Forrest W. Dodge, F. T. Reilly, Harold W. Bower, Edward DeLaet, Lyman Chalkley, L. C. Clarkson, Morgan Foshay, M. Keith Libby, E. C. Hutson, George H. Fletcher, L. C. Styles, Walter L. Chambers, E. L. Myers, Alan E. Smith, Walter W. Winand, George C. Sholin, Carl Schradieck, Robert Loring Young, Manuel Betances, S. Kuramochi, Jerry M. Hynek, R. Stevens, Richard Best, Charles W. Krier, George Provost, Fred A. Pilgrim, Wade Chambers, H. Masuda, Frank Nasworthy, Carl P. Peters, J. T. Atkinson, Paul B. Silver, P. Ralph Dowden, Robert C. Cooney, Jose L. Lopez, E. W. Duncan, Harold J. Self, E. M. O. Godee, Theodor B. Stark, Felipe L. Saldana, N. C. Smith, Dwight Williamson, F. W. Gunn, Boris Scheierman, Sam J. Emerson, Albert E. Emerson, Ken L. Sargent, Herbert L. Pettey, R. C. Messer, David Geiser, Arthur G. Baurnfeind, B. L. Cummins, Inna Marr, F. L. Stitzinger, Fred C. Lowe, Jr., Johan P. Curiel, Duncan T. Donaldson, C. D. Hall, Antonio Fuentes L., Roberto Levi, Armand Mallebranche, J. Ford, Carols Retelsdorfjr, S. Molem, U. Hellingman, G. C. Gallagher, Malcomb L. Gavin, L. T. Lee, Jr., Harry E. Kentzel, John Wojtkiewic, Darrell Barnes, H. H. Parker, Ignacio de Villarreal, Arthur J. Green, Michael C. Michelson, H. Jackson, Charles A. Owen, Thomas S. Baker, Herman M. Valentine, E. W. Duncan, Edgar Plesser, D. R. D. Wadia, Irwin Beitman, Francisco Fossa Anderson, J. H. A. Hardeman, James T. Spalding, Hall, Thaddeus Grabek.

SHORT-WAVE PAGE

SHORT-WAVE listeners living in the East Coast of the United States consider logging stations in Asia, Australia and the Far East proof of their DX ability. While listeners located in the West Coast spend weary hours at the dials of their receivers in order to pull in the European stations.

EUROPEAN transmissions on the short waves from the "D," "G" and "F" stations that we, the New York listeners, hear with fine volume are not always so well heard by the Californian. But the Westerners do have something over us in regards to stations that are operating in Java, Japan and Indo-China. This, as one can readily see, is just the opposite to our reception. Here is our Easterners' report on the foreign locals: DJD and DJA are received here with the most remarkable volume and clarity of any of the Deutschlandsenders' transmissions. GSD and GSC are the "D" stations' only rival, but as both of these Daventry transmissions sign off at a comparatively early hour and the "D" stations continue to broadcast until 10:30 p.m., E.S.T., many listeners listen to the German stations all evening without any interference. When GSC comes back on the air at 10 p.m., they have had, of late, an R-9 signal. GSL was abandoned several weeks ago (for what reason we cannot say). It was one of the finest of the English radiations. France, whose broadcasts are and have been very temperamental, cannot be relied upon from day to day. After many months of close application to our receivers, we have never heard them with either the volume or the clarity of the German or English stations.

The "Holland twins," PHI and PCJ, have been excellent whenever heard, which is every day except Tuesday and Wednesday. We only wish this station would inaugurate an evening transmission and we know it would be a success. The station announcer, Edward Startz, is known in every corner of the world and well liked for his *friendly multi-language station announcements!*

EAQ, Madrid, Spain, is received with erratic reception results. Some days they are excellent, others they are not heard at all.

CT1AA, Lisbon, Portugal, is an excellent signal from 5:45 to 7 p.m., when it signs off.

Now we come to a station that has not been heard by all short-wave listeners, but considering the fine volume and clarity of their signals, VPD, 13,075 kc., Suva, Fiji Islands, will soon fall into the category of the Australian stations. This station's schedule is supposed to be 12:30 to 1:30 a.m., but the fan who sits up every night to hear this station is really surprised if they ever adhere to this time. But by 12:37 a.m. you will generally hear the rushing sound of the carrier and within a few minutes an announcement. Sometimes it is "VPD, Suva, calling," or "Good evening, listeners." In fact, you really cannot ever tell what they may say. VPD's program may consist of American recordings or they may test with Sydney. This is one station you must hear if you want a verification.

Logging Amateurs

Of late the short-wave fans have been concentrating a majority of their tuning to the 20-meter amateur band, and no one knows just what you may hear there. Countries can be logged that have not as yet installed short-wave broadcasting stations, but the amateurs in these countries have been heard here with fine volume. VK2EP, a 70-watt amateur station, can be heard almost nightly after midnight, and his signals are remarkably strong. He is on the very high frequency side of the American amateur band. ON4CSL, the only Belgian Congo amateur we have ever heard, was tuned in around 4 p.m. We do not know their power, but the signal was very strong. ON4AC, a Belgian "ham," can be heard talking to the States at most any time.

With all these foreign amateurs being heard here, is it any wonder that the writer should have been "bitten" by the amateur bug? We have had installed in our radio shack a 200-watt commercial-built transmitter. The amateur in charge is W2IJF and our experiments begin almost immediately on the 20-, 75- and 160-meter bands. W2IJF is a Class A operator and has a knowledge of technical radio that we regret we have not. During the past few weeks we have been laboring with the study of code. We pity John Hart, our instructor, but by fall we expect to become proficient enough to be able to pass our examination and get a much-coveted amateur ticket.

Other Data on S.W. Transmissions

The well-known master, Capt. Bartlett, has started on his yearly expedition to the Arctic, and short-wave listeners will have the pleasure of tuning in "the voice of the *Morissey*" when the schooner is miles away from us. W2KJ will ably enact the rôle of "sparks" during the voyage. The call will be W10XFP and 14,230 kc. will be the most frequently used frequency.

ZCK has a power of 250 watts, is crystal controlled and operates one 8750 kc. The Hong-Kong station is rarely heard in the East.

VK3LR, Melbourne, is now using 1 kilowatt power (formerly 600 watts).

COCD, Havana, Cuba, operating on 6130 kc., is heard irregularly. The address is: Estacion COCD, G.Y. 25, Vedado, Havana, Cuba.

VE9AS, 6423 kc., Fredericton, N. B., Canada, with 50 watts input, will not be operating except on the amateur bands until fall. This station is purely experimental and is used by the students of the University of New Brunswick in connection with their electrical engineering studies.

OAX4B operates on 6230 kc. every Wednesday from 6 to 11:30 p.m., E.S.T. This station now has a more powerful transmitter. The address is: Roberto Grellaud and Cia S en C; Avenida, Abancay 915, Lima, Peru, S. A.

Radio in the C.C.C.

(*Continued from page* 138)

the installation and operation of "the world's lowest radio station", on the floor of famous Death Valley, California.

In the non-official, experimental side of the C. C. C. radio picture, two major problems have loomed before the camp amateurs: power supply and financial supply. But these boys have, with the characteristic pertinacity of the average radio bug—and the characteristic spirit of the new Tree Army—overcome both.

"Flea-power" sets have been doing trojan work in covering the miles and keeping civies of the camps in touch with their homes through the services of the vast army of amateur stations constantly on the air. These low-power rigs use as a "B" supply anything from batteries (where no camp power is available) to camp-constructed converters delivering a.c. from the camp's d.c. generator-unit.

The financial difficulties have been tougher. The average civie draws down only his "five-per-month" to spend on his personal pleasures and needs—the other twenty-five dollars go home. This is not much, if one would dabble in radio.

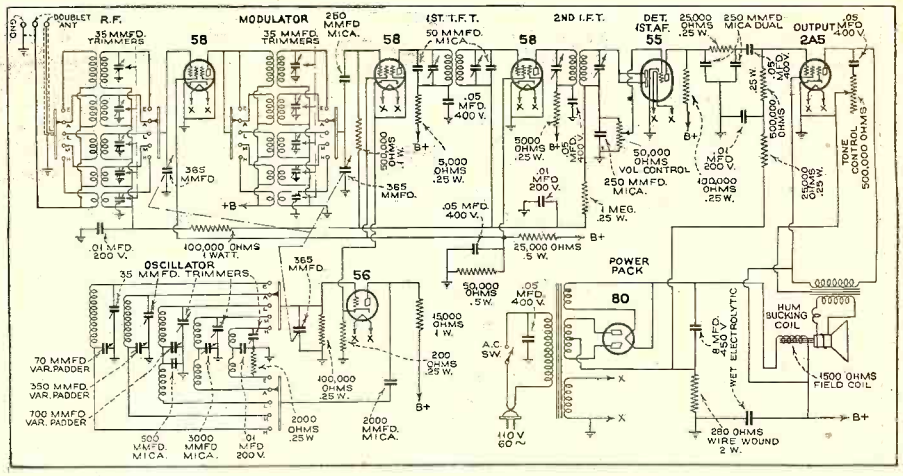
So these radio bugs of the camps have formed a vast company of clubs—each usually with an ex- or active "ham" as its instructor or guiding spirit—and have pooled their slender resources to buy new equipment or to send home for their apparatus. Others have hounded civic organizations for old sets and parts. And from these gadgets they have constructed short-wave receivers and transmitters.

Some camp men have been more elaborate in their non-official experiments. "Radio Central" was the impressive name hitched to the set-up in a Company at Custer, South Dakota. Two enrollees were radio amateurs; they constructed a main transmitter for the camp, and portable transmiter-receivers for use in the field. These were mounted in the camp's trucks. This hook-up has aided tremendously in the camp's fire-fighting activities. Both code and phone are used.

Several camps have been experimenting with 5-meter phone—a fine idea for "short-haul" field work. One company at Morristown, N. J., and another at Milroy, Pa., where the operator is attempting to form a five-meter loop connecting the several camps in the vicinity, report good results.

The C. C. C. of today is far different from that time when a strange new world opened for the latter-day pioneers who invaded the woods in the spring of 1933. Then, busy clearing ground for the camps, getting into the swing of a new type of life, enrollees and officials alike had little time for radio. But today, the average C. C. C. camp is a self-contained village of well constructed wooden buildings; recreation halls, mess halls, work shops, hospitals, comfortable barracks and even small school buildings; and a radio station is as pertinent to the unit as it is to a ship at sea. More . . . it is the magnet which draws a large group of men who want to study for their amateur and commercial licenses —or else a radio station is the goal of such a group. The Educational Adviser (each company has one) in the majority of camps has added the study of radio to his curriculum, for the

(*Turn to page* 179)



By the

Associate Editor

World-Wide Reception with this

5-Band Receiver

(Midwest Model Y-7)

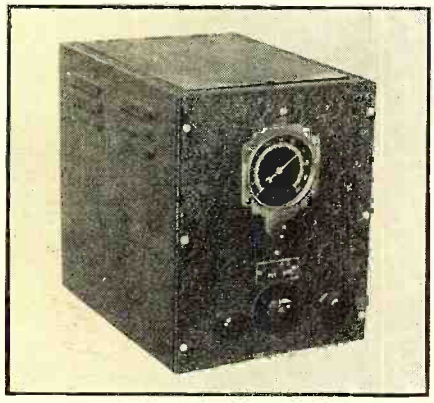
THE photograph accompanying this article shows the new Midwest 7-tube all-wave custom-built receiver being put through its operating tests at the Westchester Listening Post and it is only fair to remark here that the two operators who conducted these tests, were quite surprised at the fine results obtained, both as to sensitivity and selectivity as well as the enjoyable quality the set provides.

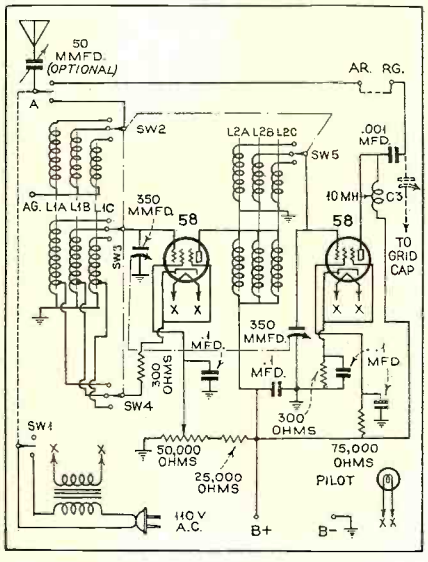
The set incorporates new 1935 developments not usually associated with a table-model receiver; for instance, a new airplane-type dial of intriguing design calibrated in kilocycles, megacycles and in meters. The dial also boasts of station group locations and an illuminated pointer indicator. Additional features include an automatic Select-o-band indicator, 19 tuned circuits 8 of which are in cascade, ceramic coil forms, a compact centralized bandswitch, doublet antenna provisions and of course, a tone control and automatic volume control. A set of this type should have wide appeal to fans in both North and South America as well as to listeners in European countries, due to the fact that it has a wavelength coverage from 9 to 2400 meters (in five different wavebands) and that the parts are specially processed to withstand unusual climatic conditions.

The set operates from 110 volt, 50-60 cycle, a.c. lighting lines. An inspection of the schematic circuit diagram given above will show that a type 58 tube is employed in the r.f. stage which, by the way, is used on all wave-bands. This same type tube is utilized for the first detector and the intermediate-frequency amplifier. A type 56 is used for the oscillator and a type 55 tube functions as a second detector, a.v.c. and an audio amplifier, this is followed by a type 2A5 tube in the output power stage. The type 80 tube is used for rectification.

The cabinet housing the receiver and the 8-inch dynamic type speaker is modernistic in design. The top and sides of the cabinet employ finished walnut veneer, while the front is of grain walnut. The dimensions are 9 inches deep by 13¾ inches wide by 20 inches high.

For the short-wave operating tests, two different type antennas were used, one a doublet aerial measuring approximately 21 feet, each side of the center insulator, and a straight L-type aerial and feeder with a total length of about 150 feet. The set gave an excellent account of itself on the amateur bands, police and aeronautical ranges and it was especially good on the 25 and 31 meter bands. Full loud-speaker volume was obtained without difficulty from DJD, Germany and GSD, England on 25 meters, and from EAQ, Spain, GSC and GSB, England and I2RO, Italy on 31 meters. Reception tests on the broadcast band brought in many Southern and Western American stations.





This Unit

BOOSTS SIGNALS

Robert Hertzberg

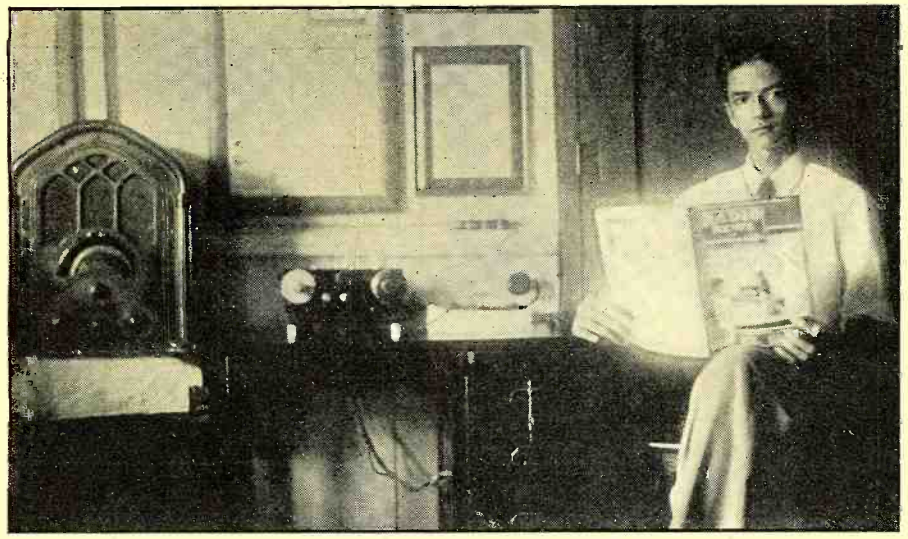
MANY owners of short-wave superheterodyne receivers are familiar with the annoying experience of repeat points due to poor image-frequency radiation, and also have had the difficulty of trying to bring in weak station announcements clear enough to be understandable. Both of these conditions can be overcome by the use of a good pre-selector, typical of which is the Peak Pre-selector herein described, a two-stage tuned r.f. short-wave booster unit with wave-band switching that can be connected ahead of any short-wave receiver in a few minutes without requiring any changes in the wiring of the set.

The circuit employs type 58 tubes in the two tuned r.f. stages. The first stage is regenerative and is controlled by the 50,000-ohm potentiometer mounted at the lower left-hand corner of the panel. The Pre-selector tunes from 15 to 200 meters in three ranges—15 to 45, 30 to 80, and 70 to 200 meters. It contains its own filament transformers but draws its plate current from the short-wave set.

The pre-selector is connected permanently to the set and may be switched in or out of service by the control mounted at the lower right-hand corner of the panel. In the "off" position this switch connects the aerial directly to the receiver and turns the pre-selector tubes off.

The tuning of the pre-selector is simplicity itself. By slowly tuning across the pre-selector dial, it will be found that at one point the signal to which the receiver is tuned will increase in volume. Then the regeneration control is advanced to provide maximum signal strength.

This pre-selector was tried with several different receivers at different locations with very evident improvement in reception. The instrument measures 7¼ inches wide by 9¼ inches high by 10 inches deep and is finished in black crackle cabinet.



PHILIPPINE LISTENING POST

Here is where Observer George Illenberger does his DX listening at Iloilo, P. I. His Pilot receiver is shown on the left and on the desk a 3-tube all-wave set of his own make.

THE DX CORNER

S. GORDON TAYLOR

(For Broadcast Waves)

THE DX season will be upon us shortly and an invitation is hereby extended to DX listeners to apply for appointment as Radio News Broadcast Band Listening Post Observers. In sending in your application, briefly describe your DX accomplishments and the equipment you are using.

IT was hoped that the RADIO NEWS Broadcast Band converter would be ready in time to be described in this issue. However, there has been a delay due to the fact that a suitable high-capacity gang condenser is not available as yet. This condenser will be available within the next few days. Then the coil design can be completed and the descriptive article will be ready for the October issue. This converter has been showing excellent results in tests. Used ahead of a T.R.F. set, it greatly increases selectivity and sensitivity. With a superheterodyne, it results in the "triple detection" receiver, comparable with those used in several of the transoceanic commercial stations. With the new condenser, the converter range will include the high fidelity channels at 1530 and 1550 kc.

The "RADIO NEWS Trap-Circuit Tenatuner" which was described in the July issue, is meeting with tremendous success, judging by comments received from readers who have constructed this unit. Typical of these is the following, quoted from a letter written by Observer P. H. Robinson, Shelburne, N. S.—"Tried out the Tenatuner last night and it sure does everything you said it would. It boosted LS2 from the noisy R5 to an R7, leaving most of the noise behind."

Radio News DX Special

Observer Kalmbach has arranged with Station KGFF to dedicate their September frequency check program to the RADIO NEWS Broadcast Band DX Corner. This station operates on a frequency of 1420 kc., 100 watts, and is located at Shawnee, Oklahoma. The broadcast will take place at 5:30 a.m., E.S.T., Thursday, September 5th.

Observer Ray Wood has arranged with WPAX, Thomasville, Ga., to dedicate their frequency check broadcast to RADIO NEWS on September 3, 2:00—2:20 a.m., E.S.T., 1210 kc., 25 kw.

DX listeners are earnestly requested to try for these DX broadcasts—and to report to the stations if you hear them.

Periodic DX Broadcasts

Tuesdays, 2 a.m., KIUL, Garden City, Kansas, 1210 kc., 100 watts. (tips.)
Wednesdays, 1:01 a.m., E.S.T., W9XBY, Kansas City, Mo., 1530 kc., 1 kw. (tips.)
Midnight (E.S.T.), WPRP, Ponce, Puerto Rico, 1420 kc., 20 watts.
Fridays, 5:30 p.m., M.S.T., CKCK, Regina, Sask., 1010 kc., 500 watts (tips.)
Fridays, 11-11:30 p.m., E.S.T., KDKA, Pittsburgh, Pa., 980 kc., 50 kw. (tips.)
Saturdays, midnight (E.S.T.), WPRP, Ponce, Puerto Rico, 1420 kc., 20 watts.
Sundays, 1:00 a.m., E.S.T.; KFI, Los Angeles, Calif., 640 kc., 50 kw. (tips.)
Monthly, 13th, 2:00—5:00 a.m., E.S.T., CMOX, Havana, Cuba, 1320 kc., 25 kw.

Simplified World Time Chart

One of the finest time conversion charts that has yet been produced is a compact little affair which was developed and patented by Lieut. Charles M. Thomas of the U. S. Coast and Geodetic Survey. This is a colored chart 9 inches by 12 inches in size. Absolutely no figuring or computation is required to use this chart. It does not, like many other systems, give only the time difference between definite points in the world but it actually gives the time for any hour day or night.

Through a special arrangement with Lieut. Thomas, RADIO NEWS can supply these to readers. If you are interested in having a copy, address a request to RADIO NEWS, Department TC, enclosing 25 cents.

DX Club Register

Below is the listing of the active DX Clubs for the benefit of DX Listeners who may be interested in joining one or more of these organizations. For further information, address the clubs direct or the editor of this department.

Executives of clubs not listed are invited to forward information to this department.

Canadian DX Relay, Goderich, Ont., Canada; Fred H. Bisset, Pres. World-wide membership. Annual membership fee, $1.75, includes weekly bulletin containing tips, club news, etc. Five months trial membership $1.00; one month trial membership 25c.

Globe Circlers' DX Club, 254 Cleveland St., Brooklyn, New York; William H. Wheatley, Pres.; Observer Raphael Geller, Secretary-Treasurer; world-wide membership, dues $1.25 per year, issues a 6-page bulletin twice monthly.

International DX'ers Alliance, Bloomington, Ill.; Charles A. Morrison, Pres. World-wide membership. Applicants for regular membership must be able to meet certain definite qualifications. Membership dues of $1.00 per year ($1.25 in foreign countries) includes subscription to the 16-page monthly bulletin, "The Globe Circler." Sample copy on request.

KDKA DX Club, 310 Grant St., Pittsburgh, Pa.; Joseph Stokes, Pres. World-wide membership. No dues. No bulletin. Tips and DX information broadcast every Friday midnight, over KDKA.

National Radio Club, 603 W. Market St., York, Pa.; Robert H. Weaver, Pres.; dues $1.25 per year, bulletins weekly throughout the winter and monthly during the summer.

Newark News Radio Club, 215 Market St., Newark, N. J.; Irving R. Potts, Pres. Over 2000 members throughout the world. Annual dues $1.00; initiation fee $1.00 (making $2.00 total for first year), includes membership button or pin. Members receive each week DX program listings, news and letters from members. Local

Official RADIO NEWS Broadcast Band Listening Post Observers

United States

Alabama: Ray Wood
California: Roy Covert, Bill Ellis, Randolph Hunt, Walter B. McMenamy, Warren E. Winkley
Connecticut: Fred Burleigh, James A. Dunigan, 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
Maryland: Louis J. McVey, William L. Bauer, William Rank, Henry Wilkinson, Jr., Frank Zelinka
Massachusetts: William W. Beal, Jr., Walter C. Birch, Russell Foss, Simon Geller, Robert A. Hallett, Evan B. Roberts
Michigan: John DeMyer, Howard W. Eck
Minnesota: F. L. Biss, Walter F. Johnson
Missouri: Dudley Atkins, III.; C. H. Long
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. Goss, Robert Hough, Robert Humphrey, John C. Kalmbach, Jr., Harry E. Kentzel, Maynard J. Lonis, Harold Mendler, R. H. Tomlinson, William Wheatley.
North Carolina: Marvin D. Dixon
North Dakota: O. Ingmar Oleson
Ohio: Stan Elcheshen, Donald W. Shields, Richard J. Southward
Oregon: David Hunter, Walter Weber
Pennsylvania: Robert W. Botzum, Robert Hoffman Cleaver, Edward Kocsan, J. Warren Routzahn, Joseph Stokes
Rhode Island: Spencer E. Lawton
South Dakota: Mrs. A. C. Johnson.
Tennessee: W. S. Jackson
Texas: F. 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
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, Viganello

members meet monthly in the Newark News Auditorium.

United States Radio DX Club, Shrewsbury, Mass.; George D. Deering, Jr. Pres. No membership dues. Issues monthly bulletin for which a charge of $1.00 per year is made. Sample copy upon request.

Universal Radio DX Club, San Francisco, Calif.; Charles Norton, Pres.

New Dominican Stations

Observer Prats of Santurce, Puerto Rico, sends in information that the Dominican Republic has two new stations on the Broadcast Band. Both are located in Santo Domingo City and operate on 1350 kc. These stations are HIZ, 20 watts and HIC, power unknown.

F.C.C. Monitor Schedules

The complete schedule of monitor transmissions was given in this department in the March issue. Following are the changes which bring that schedule up to date as of June 25, as supplied from Washington.

Add

Monday: 2:40 a.m., 1310 kc., WMFF, Plattsburgh, N. Y.; 3:40 a.m., 1420 kc., WLEU, Erie, Pa.; 4:00 a.m., 1310 kc., WHAT, Phila., Pa.; 7:30 a.m., 1370 kc., KAST, Astoria, Ore.; 7:40 a.m., KRLC, Lewiston, Idaho; 7:50 a.m., 1310 kc., KINY, Juneau, Alaska.

Tuesday: 6:40 a.m., 1310 kc., KFBK, Sacramento, Calif.

Wednesday: 3:00 a.m., 1210 kc., KIUL, Garden City, Kans.; 5:40 a.m., 1370 kc., KFRO, Longview, Texas; 5:50 a.m., 1500 kc., WTMV, E. St. Louis, Mo.; 5:50 a.m., 1420 kc., KWBG, Hutchinson, Kansas; 6:00 a.m., 1310 kc., WCMI, Ashland, Ky.

Thursday: 2:20 a.m., 1370 kc., WMFD, Wilmington, N. Car.; 3:30 a.m., 550 kc., WKRC, Cincinnati, Ohio; 4:20 a.m., 1420 kc., KABR, Aberdeen, S. Dak.; 4:40 a.m., 1310 kc., KIUJ, Santa Fe, N. Mex.; 4:40 a.m., 1210 kc., WMFN, Clarksdale, Miss.; 4:50 a.m., 1370 kc., KFGQ, Boone, Iowa; 5:10 a.m., 1370 kc., WPAY, Portsmouth, Ohio; 5:20 a.m., 1200 kc., WBBZ, Ponca City, Okla.; 5:20 a.m., 1500 kc., KPLC, Lake Charles, La.; 5:30 a.m., 1200 kc., WAIM, Anderson, N. C.; 5:40 a.m., 1420 kc., WMFJ, Daytona Beach, Fla.

Friday: 5:00 a.m., 1430 kc., KSO, Des Moines, Iowa.

Saturday: 3:10 a.m., 550 kc., WDEV, Waterbury, Vt.; 4:00 a.m., 1380 kc., WNBC, New Britain, Conn.; 5:10 a.m., 1210 kc., KGCR, Watertown, S. Dak.

Delete

Monday: 2:50 a.m., 1310 kc., WHAT, Phila., Pa.; 4:30 a.m., 1200 kc., WNBO, Silverhaven, Pa.

Tuesday: 5:00 a.m., 1420 kc., KGIX, Las Vegas, Nevada, United States of America.

Thursday: 5:10 a.m., 1370 kc., WHBD, Mt. Orab, Ohio.

Friday: 5:00 a.m., 1430 kc., KWCR, Cedar Rapids, Iowa.

Saturday: 5:10 a.m., 1210 kc., KWCN, Watertown, S. Dak.

Changes

Monday: 2:50 a.m., 1420 kc., WHDL, Olean, N. Y., changed location from Tupper Lake, N. Y.; 4:20 a.m., 1260 kc., KGVO, Missoula, Mont., frequency changed from 1200 kc.; 6:00 a.m., 900 kc., KSEI, Anchorage, Alaska, frequency changed from 890 kc.

Tuesday: 2:00 a.m., 1210 kc., WPAX, Thomasville, Ga., call changed from WQDX; 3:00 a.m., 1370 kc., WMBR, Jacksonville, Fla., location changed from Tampa, Fla.

Wednesday: 2:50 a.m., 880 kc., WPHR, Petersburg, Va., frequency changed from 1200 kc.; 3:10 a.m., 1420 kc., KGIW, Alamosa, Colo., location changed from Trinidad, Colo.; 5:30 a.m., 900 kc., WTAD, Quincy, Ill., frequency changed from 1440 kc.

Thursday: 2:10 a.m., 920 kc., WSPA, Spartanburg, S. Car., frequency changed from 1420 kc.; 4:30 a.m., 1500 kc., WKBZ, Muskegon, Mich., location changed from Ludington, Mich.; 4:40 a.m., 1420 kc., WCBS, Springfield, Ill., frequency changed from 1210 kc.

Friday: 3:30 a.m., 1200 kc., KGEK, Sterling, Colo.; location changed from Yuma, Colo.

Saturday: 3:00 a.m., 1200 kc., WJBC, Bloomington, Ill., location changed from LaSalle; 5:10 a.m., 1210 kc., KGCR, Watertown, S. Dak., call changed from KWTN.

OFFICIAL L.P.O. HUNTER

Observer Hunter, Eugene, Oregon, sends in this extremely modest photograph. Apparently he didn't quite succeed in hiding.

Observer Hammond on Antennas

"The inverted 'L' seems to be by far the best of any antennas I have tried. My favorite is 150 feet long including the lead-in, 60 feet high, and runs east and west. I have experimented with all lengths from 50 feet to 400 feet, running in all directions, but the length and direction mentioned gives me the best all-round results.

"When I first erected this antenna, it was only 30 feet high at one end. I increased this to 45 feet and then to 60 feet with decided improvement.

"With this aerial I use a grounded antenna 50 feet long and running in the opposite direction. This is grounded at the far end with the near end connected to the ground post of my set. This arrangement increased volume and enabled me to log stations which were not understandable using a regular ground.

"The 150-foot antenna is noticeably directional with the lead-in taken off the end toward the desired stations."

Courtesy Observer Watson

N. Z. CHAMP'S LISTENING POST

Radio room of N. C. Manchester, Executive Secretary of the N. Z. DX Radio Assoc. and Canterbury DX champion with close to 400 veri's. The receiver is a Majestic super, with a 300-foot aerial grounded at the distant end.

Our Readers Report—

Observer McVey (Maryland): "I have been pulling in LS2, 1190 kc., almost every p.m. from 7:30 to 8:30 E.S.T."

Observer Wood (Alabama): "Heard the special RADIO NEWS broadcasts from WCAU and W3XAU on July 2nd and have sent them a report. Following are a few schedules which may be of interest to DX'ers: KFXR, 7 a.m.-10:30

(*Turn to page* 184)

U. S. Station Changes

The following changes have been announced by the Federal Communications Commission. Abbreviations employed are: Cp—construction permit; Unltd.—unlimited; Auth.—authority or authorization; Spec.—special; Mod.—modification; Temp.—temporary; L. S.—local sunset; Lic.—license.

1210	WMFN	Clarksdale, Miss. Granted license for new station, 100 watts, Unltd. time.
1210	KIUL	Garden City, Kans. Granted license for new station, 100 watts, Unltd. time.
1200	KFXD	Nampa, Idaho. Granted license to increase day power to 250 w.; 100 w. night; Unltd. time.
1410	KGRS	Amarillo, Tex. Granted Mod. of License to change time of operation to Unlimited; to change call letters to KGNC and to consolidate with WDAG; 1 kw. night 2½ kw. day.
550	KSD	St. Louis, Mo. Granted authority ending Sept. 1, 1935, to operate with 500 watts additional night power.
1370	WOC	Davenport, Ia. Granted license to increase power to 250 w. day, 100 watts night.
1290	WEBC	Superior, Wis. Granted license to increase daytime power to 5 kw.; 1 kw. night. Unltd. time.
1230	KGBX	Springfield, Mo. Granted Auth. to operate on 500 w. Unltd. time to Dec. 1, 1935.
890	KUSD	Vermillion, S. Dak. To remain silent to Sept. 1, 1935.
550	KOAC	Corvallis, Ore. Granted auth. to operate from 9 a.m. to 2:30 p.m., and from 6:30 p.m. to 9 p.m., PST, during month of August, 1935, instead of Unltd. time.
1420	WLEU	Erie, Pa. Temporary authority granted to operate on 100 w. night, 250 w. day. Unltd. time.
920	WSPA	Spartanburg, S. C. Granted license, 1 kw., daytime hours only.
1370	KRE	Berkeley, Cal. Granted license to increase day power to 250 watts; 100 w. night, Unltd. time.
1250	WTCN	Minneapolis, Minn. Granted license to increase day power from 1 to 5 kw., 1 kw. night. Specified hours.
1210	WMFG	Hibbing, Minn. Granted Mod. of CP extending completion date to Sept. 14, 1935.
1420	KBPS	Portland, Ore. Granted auth. to remain silent for the period ending no later than Sept. 9, 1935.
1370	WSVS	Buffalo, N. Y. Granted auth. to remain silent to Sept. 11.
560	WFIL	Granted an increase in day time power to 1 kw.
1310	New	Affirmed action of February 12, 1935, in granting application for new station to operate, 100 watts, daytime only.
1200	WHBY	Green Bay, Wisconsin. Granted license to operate, 100 w. night, 250 w. day, unlimited time.
1500	WTMV	East St. Louis, Mo. Granted license to operate, 100 watts, unltd.
1420	New	Alexandria, La. Granted construction permit (amended), 100 watts, daytime only.
780	KGHL	Billings, Mont. Granted special experimental authorization to operate, 1 kw. night, 2½ kw. day, unlimited time to Sept. 18.
570	KTAT	Fort Worth, Texas. Granted regular license, 500 w. night, 1 kw. day, unlimited time.
1240	KGKO	Wichita Falls, Texas. Granted regular license, 1 kw., unlimited time.
1490	KFBK	Granted C. P. to change frequency from 1310 kc. to 1490 kc., increase power from 100 w. to 5 kw. unlimited time.
800	WTBO	Cumberland, Md. Granted modification of license to change hours of operation from daytime to 6 a.m. to local sunset at Dallas, Texas. 250 w.
1010	WHN	New York, N. Y. Granted authority to increase day power from 1 kw. to 5 kw.
1420	WAZL	Hazleton, Pa. Granted extension of special temp. auth. to operate daily a maximum of 4 hours simultaneously during daytime with station WILM, Wilmington, Del., to Sept. 30.
550	KSD	St. Louis, Mo. Granted Mod. of CP to extend completion date to Oct. 7, 1935.
920	KOMO	Seattle, Wash. Granted amended CP to increase day power from 1 to 5 kw.
710	WOR	Newark, N. J. Granted license to cover CP authorizing increase in power to 50 kw.
1310	KINY	Juneau, Alaska. Granted license for new station; 100 watts. Unltd. time.
1220	WCAD	Canton, N. Y. Granted Mod. of Lic. for increase from 9 to 12 hours a week, to operate daily except Sunday, 12:30 to 1:30 p.m., EST, 3 to 4 p.m., EST.
1220	WREN	Lawrence, Kans. Granted Mod. of CP to increase daytime power to 5 kw.
750	WJR	Detroit, Mich. Granted CP to increase power to 50 kw.
890	KFNF	Shenandoah, Ia. Granted Special Temp. auth. to use the time assigned to KUSD for the period ending August 31, 1935.

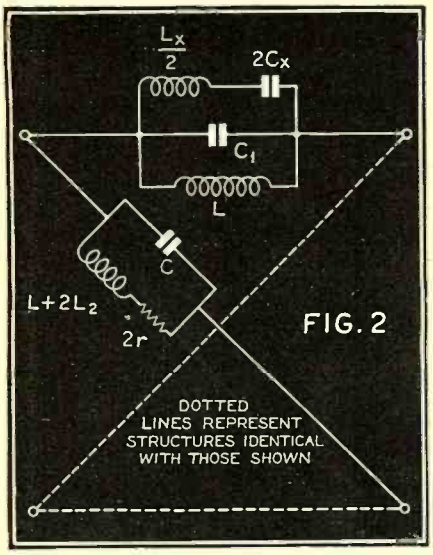


FIG. 2

$$\frac{r_1}{\omega^2 L^2} \quad (1)$$

$$\frac{r_1 + 2(r_2 + r)}{\omega^2 (L + 2L_2)^2} \quad (2)$$

$$\frac{2(r_2 + r)}{r_1} - 1 = \left(\frac{L + 2L_2}{L}\right)^2 \quad (3)$$

$$\frac{R + r}{r} = \left(\frac{L + M}{L - M}\right)^2 \quad (4)$$

FIG. 3

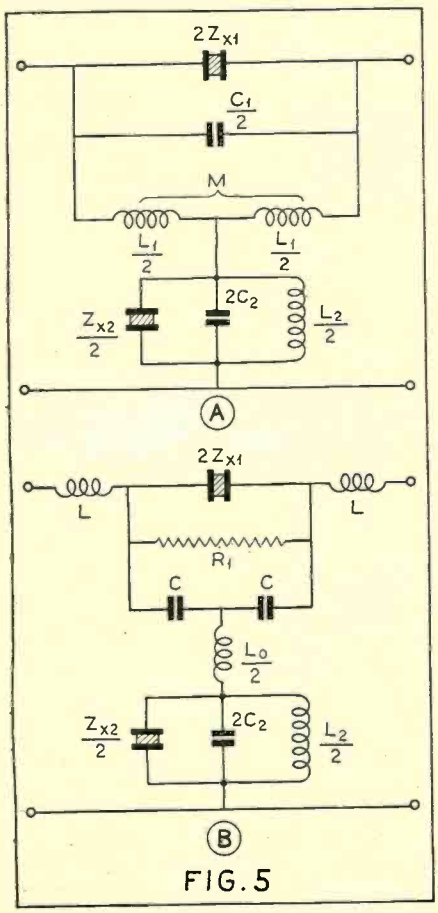


FIG. 5

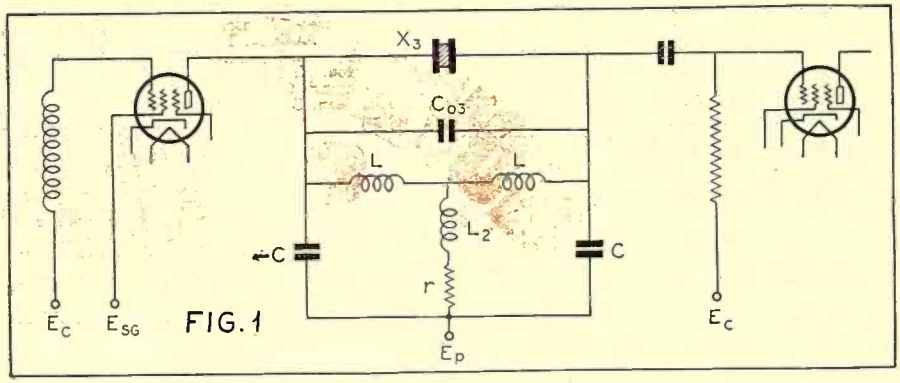


FIG. 1

The Design of Broad-Band CRYSTAL FILTERS

W. W. Waltz

Part Four

THE lattice type of crystal filter applied to i.f. amplifiers was discussed in last month's issue of RADIO NEWS. Equations were given for the required electrical characteristics of the crystals.

Of more interest to the radio experimenter is the filter of Figure 1, the equivalent circuit of which is given in Figure 2. This filter is the bridged-T type, having attenuation characteristics essentially the same as the lattice structure. X_3 in Figure 1 is the crystal whose equivalent circuit is shown by L_x, C_x and C_1 of Figure 2. The values of the elements of the equivalent circuit are derived as described above in connection with the filter in Figure 1 on page 89 of the August issue. It will be seen, however, that there is a resistance in the shunt arm which is not accounted for in any equation thus far given. This resistance is a result of an application of the bi-section theorem which was described in a previous article. In it (the resistance) is concentrated the effects of coil dissipation; that is, the resistance balances out the effect of the inherent resistance of the coils of the filter. In certain other of the bridged-T band-pass sections which can be devised, the resistance either is not necessary or is connected into the circuit in a different manner.

The value of this resistance is determined as follows: Let r_1 be the resistance of L, and r_2 the resistance of L_2. Then, from Figure 2, equivalent circuit, it can be seen that the total resistance of the inductive branches of the line and lattice arms will be respectively r_1 and $r_1 + 2(r_2 + r)$. It can be shown that at the frequencies of the transmitted band these resistances can be replaced by shunt resistances having the values (1) and (2) in Figure 3.

When these are equal, equation (3) of Figure 7 holds; from this equation we derive the value for r.

It will be seen also that the three inductances of Figure 1 form an equivalent, T; this is, in effect, a transformer and can be replaced by two coils between which there is mutual inductance. When this is done the circuit becomes that of Figure 4, the computations for which are based upon the same principles as heretofore. In this case the value of R is given by the equation (4) of Figure 3.

In which r is the resistance of the coils. Z_x is derived from the equivalent circuit. See references 3 and 8. Figure 5 shows two other possible arrangements.[8]

It will be gratifying indeed if these remarks serve to awaken in the radio profession the interest which this subject demands. Obviously enough, this discussion of crystal filters is of the most elementary nature. The subject is new, not in a sense of employing crystals, but in using them in a manner and for a purpose which some of the foremost radio engineers have considered impossible.

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8. MASON, W. P. U. S. Patent 1967250.

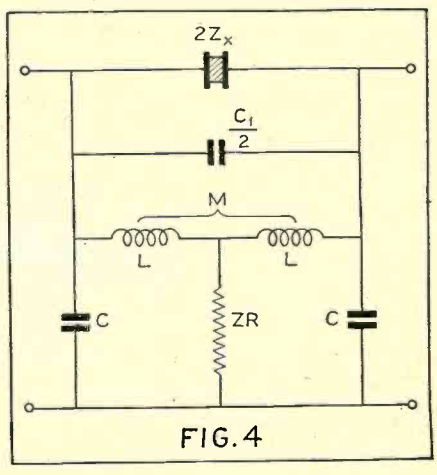
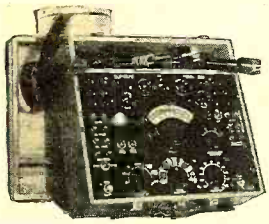


FIG. 4



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A new analyzer especially designed for servicing sound film equipment and public address systems. $69.95

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SUPREME 1936 INSTRUMENTS

"391" QUICK FACTS

1. DECIBEL RANGES
   — 10 DB to + 20 DB
   + 5 DB to + 35 DB
   referred to zero level of six milliwatts in 500 ohm line.

2 D.C. VOLTAGE RANGES
(1000 ohms per volt)

0 to 5 volts
0 to 25 volts
0 to 125 volts
0 to 250 volts
0 to 500 volts
0 to 1250 volts

3. A.C. VOLTAGE RANGES
(1000 ohms per volt)

0 to 5 volts
0 to 25 volts
0 to 125 volts
0 to 250 volts
0 to 500 volts
0 to 1250 volts

4. RESISTANCE RANGES

0 to 500 ohms
0 to 5,000 ohms
0 to 50,000 ohms
0 to 500,000 ohms
0 to 5,000,000 ohms
0 to 50,000,000 ohms

5. CAPACITY RANGES (Low)

0.0000125 to 0.00125 mfds.
0.00005 to 0.005 mfds.
0.000125 to 0.0125 mfds.
0.0005 to 0.05 mfds.
0.00125 to 0.125 mfds.

6. CAPACITY RANGES (High)

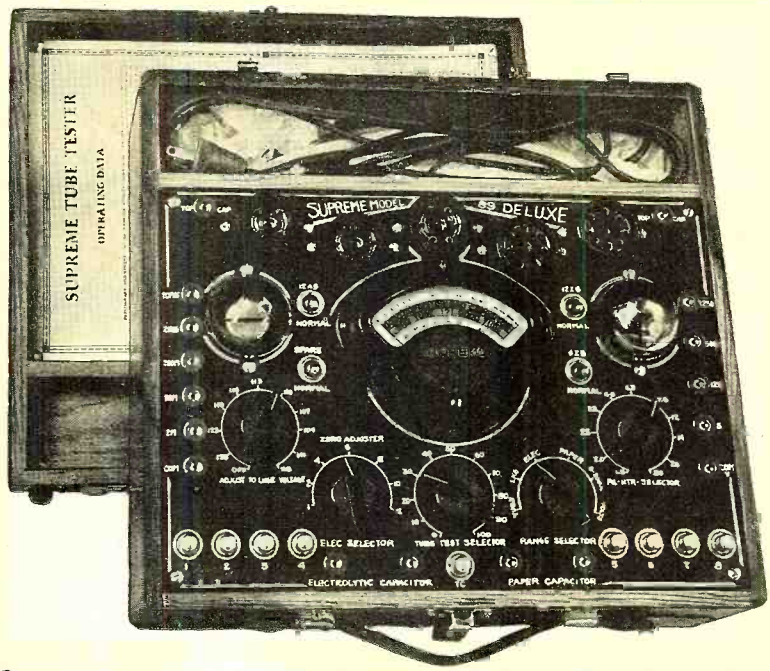
0.005 to 0.5 mfds.
0.0125 to 1.25 mfds.
0.05 to 5.0 mfds.
0.125 to 12.5 mfds.
0.5 to 50.0 mfds.

7. DIRECT CURRENTS
0—250 microamperes

0 to 1.25 ma.
0 to 5.0 ma.
0 to 25.0 ma.
0 to 125.0 ma.
0 to 250.0 ma.
0 to 500.0 ma.
0 to 1.25 amp.
0 to 5.0 amp.
0 to 12.5 amp.

The 391 Meter Dial. Note evenly divided scale for voltage, current, and capacity readings, and the convenient division of ranges, so that values occurring most often are near the center of the scale or above. The DECIBEL section is of different color than the remainder of the scale, attracting the eye when measuring power levels.

The ohmmeter scale has been so chosen that the ranges overlap considerably, hence a range can always be found which will give a good needle deflection for any resistor up to at least 10 megohms, and values up to 50 megohms can be read with but little trouble.



Supreme 89—DeLuxe Tube Tester, $45.95

Dealers Net Cash Wholesale Price

In a week or so the peak season of radio will be here. Thousands of new models will be installed, bringing new problems in radio-servicing. Supreme engineers, always in closest touch with the new in radio reception design, have produced a line of instruments abreast of these new developments. Capacity for the all-metal octal tubes is only one of the features that add to the precision and speed of the serviceman. Don't be satisfied with makeshift methods. Get the MODERN equipment which progressive servicemen by the thousands have already acquired. Prices establish a new standard of quality and value at low cost.

THE INSIDE STORY OF EACH INSTRUMENT

Now you can know exactly what your service instrument has before you buy. Send this coupon for the illustrated manual of your choice. No cost. No obligation.

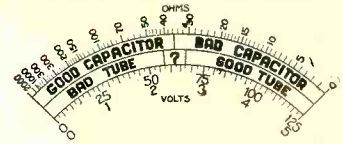
SUPREME INSTRUMENTS CORP.,
Supreme Bldg., Greenwood, Miss.
Send me the inside, diagramatic story of Supreme Instruments as follows:

- ☐ Supreme 89—DeLuxe Tube Tester
- ☐ Supreme 89— Standard Tube Tester
- ☐ Supreme 385—Automatic
- ☐ Supreme 189—Signal Generator
- ☐ Supreme 339—DeLuxe Analyzer
- ☐ Supreme 339—Standard Analyzer
- ☐ Supreme 391—P.A. Analyzer

Name .....
Address .....
Town ..... State .....
Jobber Preference .....

QUICK FACTS — 89 DeLuxe

1. Simple to operate. (1) select filament voltage, (2) set tube selector per chart, and (3) press a button.
2. Accurate. New circuit tests all tubes at RATED LOAD.
3. Rugged. Cannot be damaged by shorted tubes.
4. Fool-proof. Only 5 sockets—a tube cannot be placed in wrong socket.
5. Neon Leakage tests. Detects leakages and "shorts" between ALL tube elements and indicates faulty elements.
6. Sensitivity of neon leakage test LIMITED so as not to discard good tubes.
7. Quality test detects open circuited elements.
8. All leakage and "short" tests while tubes are heated.
9. Extra handling avoided by making leakage and short tests in same socket used for Quality test on English Reading "Good—Bad" Scale.
10. Tests all tubes without adapters.
11. Fixed ratio between tube and circuit resistance for extreme accuracy on Quality tests.
12. Easily adaptable to future tube developments.
13. Adjustable to varying power supply.
14. First English Reading condenser tester.



15. Accurately classifies all electrolytic condensers as "Good" or "Bad" on meter scale.
16. Neon test of all electrostatic condensers indicating leakages, shorts, or opens.
17. Uses full size neon lamp—easy to see instantaneous leakages.
18. Supreme 5" fan shaped meter, 1000 ohms per volt sensitivity.
19. Volt-Meter for point-to-point testing. 5 D. C. ranges of 0-5, 0-125, 0-500, and 0-1250 volts, 1000 ohms per volt.
20. Ohmmeter. Direct ranges of 0-2000, 0-20,000 and 0-200,000 ohms, powered with self-contained flash light battery. Low range to 1 ohm with 35 ohms marking at center scale.
21. Megohmmeter. Direct ranges of 0-2 and 0-20 megs. SELF-CONTAINED power pack.
22. Single selector switch converts instrument to (1) English Reading tube tester, (2) neon tube leakage tester, (3) Neon Electrostatic condenser tester, (4) English Reading Electrolytic condenser analyzer, (5) Multi-range voltmeter, (6) multi-range ohmmeter, and (7) a double range megohmmeter.

CHARLES WINNINGER

LEFT: CORNELIA OTIS SKINNER

GRAHAM McNAMEE

THE MORIN SISTERS

Backstage in Broadcasting

Samuel Kaufman

AS we are pecking out these lines on our typewriter, there are signs of a novel battle looming on the radio horizon. It seems that NBC's "Gibson Family" series, the much-ballyhooed "first original radio musical comedy," and the same network's "Show Boat" hour are suddenly pursuing almost identical lines. Just why the Gibson Family's noble experiment in "creating a new art" went haywire is hard to determine. Our guess is that radio listeners don't care much for radio serial dramas unless each episode is self-contained. Anyway, it must be conceded that Arthur Schwartz and Howard Deitz did a brilliant job with original words and music. The background of the revised Gibson Family programs is a traveling tent show—Uncle Charlie's tent show, to be exact. And a very familiar person stepped into the role of Uncle Charlie. 'Twas none other than Charles Winninger—the original Captain Henry of the Maxwell House Show Boat. Other aspects of the change in the Gibson Family theme point toward further similarity in the two air shows. The casts of each program are star-studded and it will be interesting to observe their individual progress.

THE new deal at the Metropolitan Opera House under the regime of Edward Johnson reveals America's leading exponents of classical musical drama as being materially affected by radio's influence. It seems that Lawrence Tibbett and other great operatic names are missing from next season's opera roster because of the tremendous broadcasting salaries available to such headliners at a time when the "Met" has to count pennies before doling out artists' stipends. But radio fans will be glad to know that Helen Oelheim, NBC contralto, will make her debut at the "Met" next season. Nino Martini and Helen Jepson are two radio personalities who made the "Met" requirements in previous seasons. Which reminds us to tell you that Nino's been quite busy before Hollywood talkie cameras.

CORNELIA OTIS SKINNER'S selection as star of the summer series of NBC Sunday Jergens programs was warmly welcomed by the nation's fans. Her noted character sketches were occasionally broadcast when she appeared in guest spots with Rudy Vallee, but the Jergens contract represented her initial weekly series. Her radio programs are selected chiefly from her vast repertoire of stage works. She has written about fifty stage vignettes, plus special radio material. Walter Winchell is scheduled to return to the program in September with his usual breezy banter on assorted private and public lives.

NILS T. GRANLUND, who was a renowned radio personality before the birth of the networks, has returned to the air as star of a new NBC Monday series sponsored by Bromo Seltzer. When people were still using crystal detectors and headsets, Granlund (also known as Granny and N. T. G.) presided over the microphones of WHN, New York. He deserted the radio studios for the night clubs and is world-famed for his Broadway cabaret floor shows. His purpose is to adopt chorus girl specialty acts to the microphone.

THE slogan "Telling the World" is the fitting title to Graham McNamee's Tuesday and Thursday NBC series of news comment. The series, sponsored by the Garcia Grande Cigar Company, like many programs of the season, features a slogan contest for listeners. Contest ideas have been adopted by many sponsors and we're told that resultant fan mail has been tremendous.

TWO prominent network trios—the Morin Sisters and the Ranch Boys—are featured on the NBC Sunset Dreams

HELEN OELHEIM

NTG AND HIS GIRLS

IGOR GORIN

EDDIE DUCHIN

series presented Sundays under the sponsorship of the F. W. Fitch Company. After appearing over the network on separate programs, the two trios happened to try out their combined voices in a novel sextet arrangement and a sponsor liked the idea and grabbed it.

AFTER an uneventful series of NBC sustaining programs, Igor Gorin, young baritone, suddenly leaped to the radio fore by obtaining a long-term contract on Dick Powell's Friday night CBS "Hollywood Hotel" series. Igor's addition to the cast of the Campbell Soup feature is one of many improvements the series has undergone since its inception about a year ago. The cast now includes Frances Langford, Anne Jamison, Raymond Paige's Orchestra and the newspaper columnist, Louella Parsons.

BLANCHE SWEET, veteran stage and screen star, was recently signed to conduct a Monday, Wednesday and Friday series of beauty talks over CBS. Miss Sweet, of course, is still best remembered for her screen roles of the silent era. Last season, New Yorkers saw her on the Broadway stage in "The Petrified Forest" with Leslie Howard. She was born in Chicago and represented the third consecutive generation of her family to pursue a theatrical career. She made her radio debut five years ago in Los Angeles.

WITH Ed Wynn taking a long vacation, Eddie Duchin, the young maestro of the Texaco NBC Tuesday series, has been assigned the featured rôle. As Duchin's orchestra crossed the nation on a

(*Turn to page* 183)

BLANCHE SWEET

THE SERVICE BENCH

tells YOU something about

Servicing Equipment ABROAD

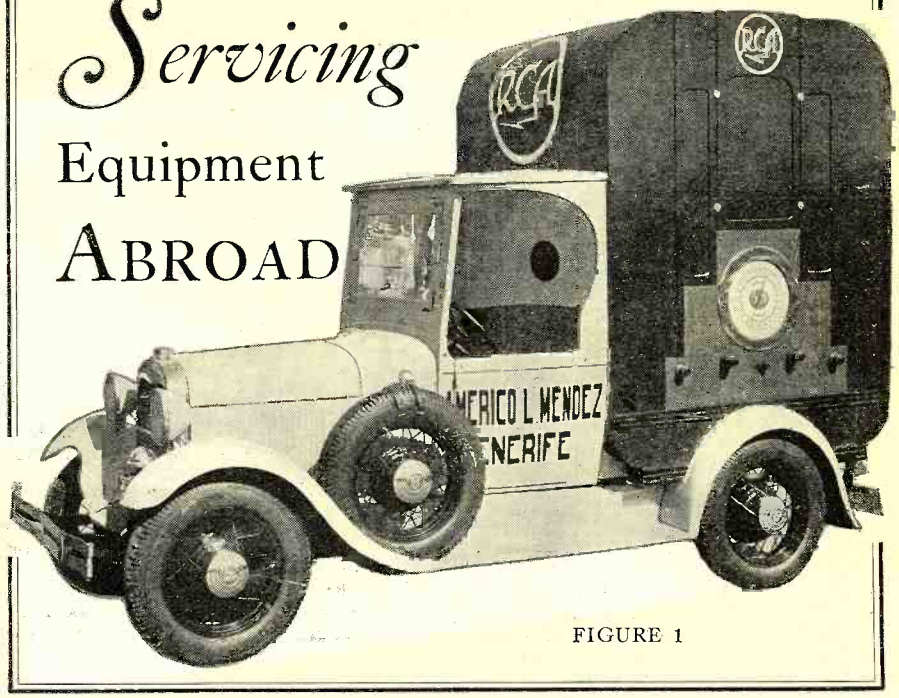


FIGURE 1

Conducted by Zeh Bouck, *Service Editor*

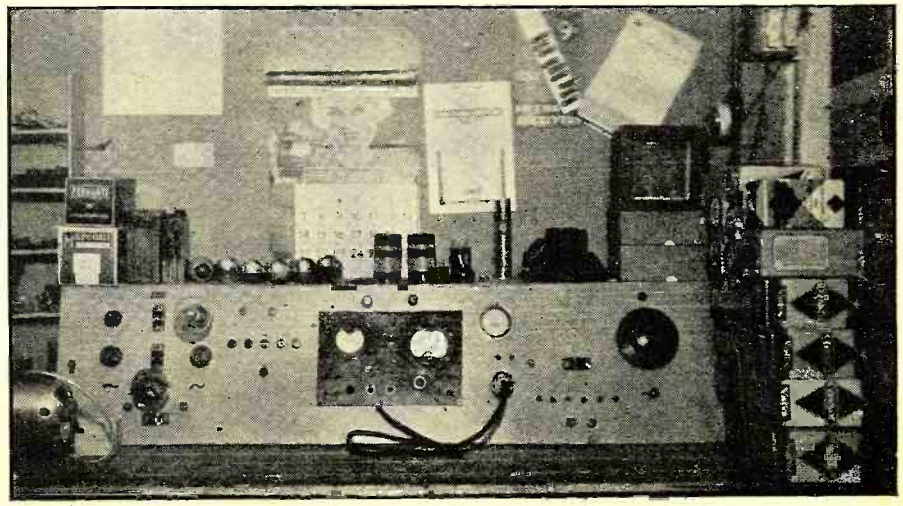
SERVICE HANDS ACROSS THE SEA

FOREIGN members of the fraternity contribute the photographs of Figures 1, 2, 3 and 4. Writing from the balmy clime of Teneriffe, in the Canary Islands, Americo L. Mendez thanks the *Service Bench* for the sales idea shown in Figure 1. "This special automobile has demonstrated impressively its value as an advertisement. The idea was brought to my attention by a photograph in your last September issue—page 172, Figure 2. Any serviceman can have confidence in the sales promotional effect of this arrangement."

The body of this radio truck should be well within the capabilities of the average serviceman to construct. There is no reason why an auto-radio could not be installed in the roomy carrier with the speaker baffled agaist the dummy screening, combining audible with visual appeal.

Whatever they may say about the Scotch, certainly expenditures have not been stinted in the exceptionally neat service bench illustrated in Figure 2, designed and built by R. Halliday, of Glasgow, Scotland. Mounted on the panel are an all-wave modulated oscillator, a tube tester which accommodates all American, British and Continental tubes, testing them either on the bench or in the receiver, voltmeter, ammeters and ohmmeter, 110 to 250 volts a.c. and d.c. outlets, a neon tube continuity tester, and power outlets for testing battery receivers. The motor at the extreme left drives a coil-winding machine, on which everything can be wound from a

FIGURE 2. WELL-EQUIPPED GLASGOW SERVICE SHOP



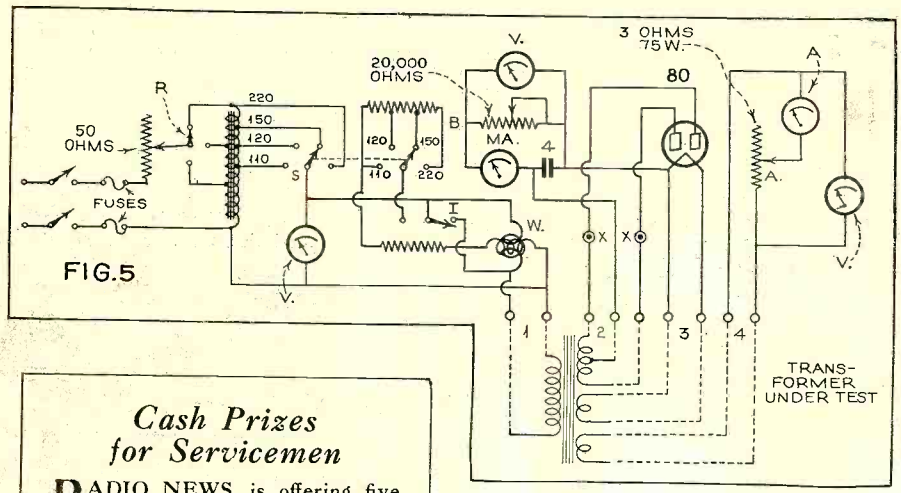


FIG. 5

Cash Prizes for Servicemen

RADIO NEWS is offering five cash prizes of $10.00, $5.00, $4.00, $3.00 and $2.00 each month for the best ideas sent in by active servicemen for promoting the service business. In addition, a one-year subscription to RADIO NEWS will be given for such ideas, other than prize-winning, that are printed. Send in as many suggestions as you wish. The more the better! What has helped you ring up the cash register may do as much for a brother servicemen and bring you in some prize cash besides! Address contributions to the Service Contest Editor.

power transformer to an r.f. choke. Mr. Halliday's letterhead describes him as a "radio electrical engineer" and the manufacturer of "high-grade electrical and radio apparatus."

Figures 3 and 4 are views of the service shop operated by Enrico Cortez, of Milan, Italy. Figure 3 shows an audio oscillator, power amplifier and loudspeaker under repair, Signor Cortez specializing in work of this nature. To the right, in Figure 4, are a tube tester and radio-frequency oscillator. On the panel to the left are mounted the various components of a tester designed for servicing power transformers, the circuit of which is shown in Figure 5. Switch "R" controls the voltages to the auto-transformers, while switch "S" varies the input to the transformer under test and automatically maintains the correct resistor values in the voltmeter section of the wattmeter. The wattmeter is switched in and out of the circuit by "I." Jacks "X" and "X" are provided for plugging in milliammeters. The load of the filament-lighting secondary can be varied by rheostat "A."

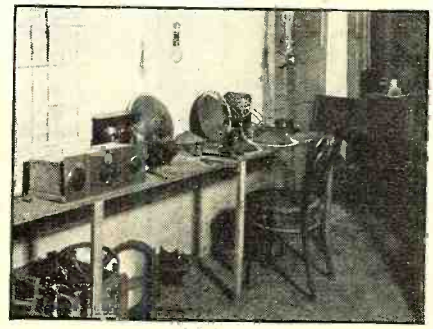


FIGURE 3

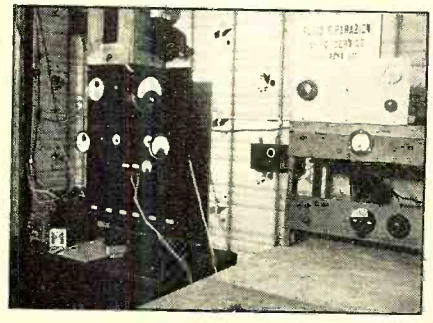


FIGURE 4

THE DAY'S WORK

As auto-radio troubles hit their peak just toward the close of the vacation season, a few relevant contributions are in order. Three *Service Bench* readers report troubles with Ford V-8 installations. L. C. Warren, proprietor of the United Radio Service, Sioux Falls, S. D., writes: "Every 1935 Ford V-8 requires a condenser on the oil gauge. The oil gauge is a set of resistor plates in series with a meter, and hooked directly to the hot "A." Vibration of the car causes these contacts to set up a disturbance which sounds like a noisy tube. In most cases, the condenser should be hooked directly to the oil gauge on the block. Mount the condenser on the firewall beside the steering column."

Frank E. Martin, of the Supreme Radio Service, Crowley, La., reports noise of rough roads—occasionally intermittent reception. Perfect operation on the good highways. A thorough check on tubes and set eliminated this section of the installation, and the trouble was finally traced to a loose connection between the lead-in and antenna. A careful soldering job effected the repair.

Dial trouble on a Ford 1935 V-8 has occasioned several service jobs for B. F. Goggan, Henderson, Texas. Jumping of calibration is the usual complaint. Remove the cogwheels from the dial assembly. With a light hammer, gently beat the cogwheel that holds the pointer until it thoroughly meshes with the intermediate driving gear. Simple and permanent.

Permanent Cure for Vibrator Rectification Troubles

"A short time ago an Emerson auto-radio set was brought in with vibrator trouble. The owner was insistent on getting the set into working order that day. The vibrator was not rectifying, and there wasn't another unit to be had in town. We decided to substitute a full-wave type 84 rectifying tube in accordance with the diagram of Figure 6.

"The five-prong socket was mounted on the receiver chassis. Room for this tube will be found in almost every receiver. The filament was connected in parallel with those of the other tubes. The vibrator was disconnected from the transformer secon-

(*Turn to page* 184)

WHAT'S NEW IN RADIO

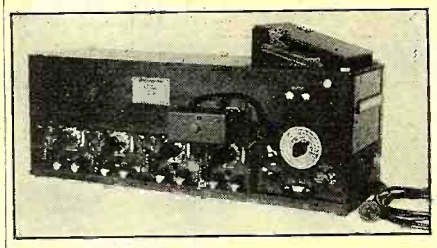
WILLIAM C. DORF

(*Continued from page* 139)

standing of which is the "clover-leaf" arrangement of coils, aligning condensers and range switch.

Universal Oscillograph

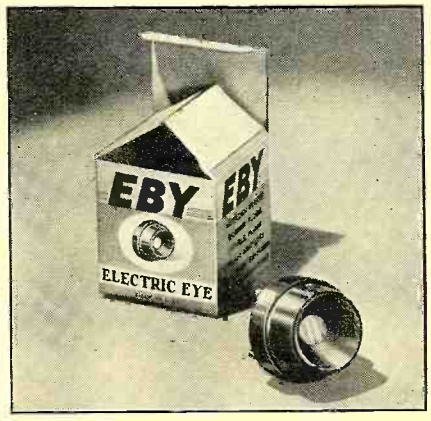
With the new Westinghouse type PA oscillograph it is possible to view the frequency pattern while it is being photographed. The instrument has a wide range of film speed, and features interchange-



able galvanometers and vibrators. The industrial and laboratory types are available for operation on either six volts d.c. or 110 volts a.c. or d.c. current.

Photo-Electric Cell

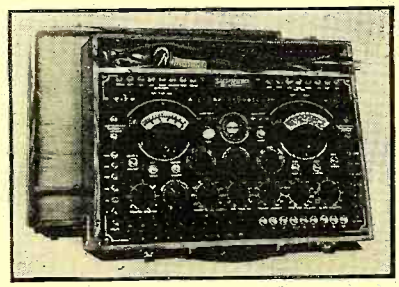
This new Eby photo-electric cell is available either singly, in assemblies containing cell, relay, tube, resistances, socket, etc. or in handy kits for home or laboratory experimentation. The manufacturer states that it is unaffected by continuous exposure to light and it reacts to both the



intensity and frequency of the incident light-rays. It has low internal capacity and is sensitive in both the generative and emissive classes.

Multi-Purpose Tester

The Supreme model 385 "Automatic" combines the features of the Supreme analyzer and tube tester, plus additional testing developments. It has three ohmmeter



ranges, point-to-point analyzing facilities, a capacity tester, and a tube checker for all tubes, including the new metal tubes.

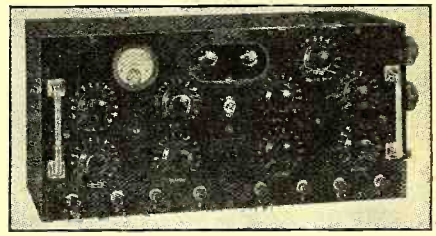
Build Your Own Condenser Tester

The Thordarson Electric Mfg. Company offers a foundation unit, or a complete kit

of parts for the construction of their new combined condenser capacity and leakage tester. The foundation unit comprises a portable Walnut instrument case, an etched and drilled metal panel and scale, mounting screws, instructions and assembly plans. A Wheatstone Bridge circuit is used for capacity measurements and leakage is indicated by a neon bulb connected in series with a high-impedance choke coil.

Mixing Panel

The Webster Company introduces the model No. 104 microphone mixing panel and pre-amplifier. With this unit it is possible to mix the output of either carbon or

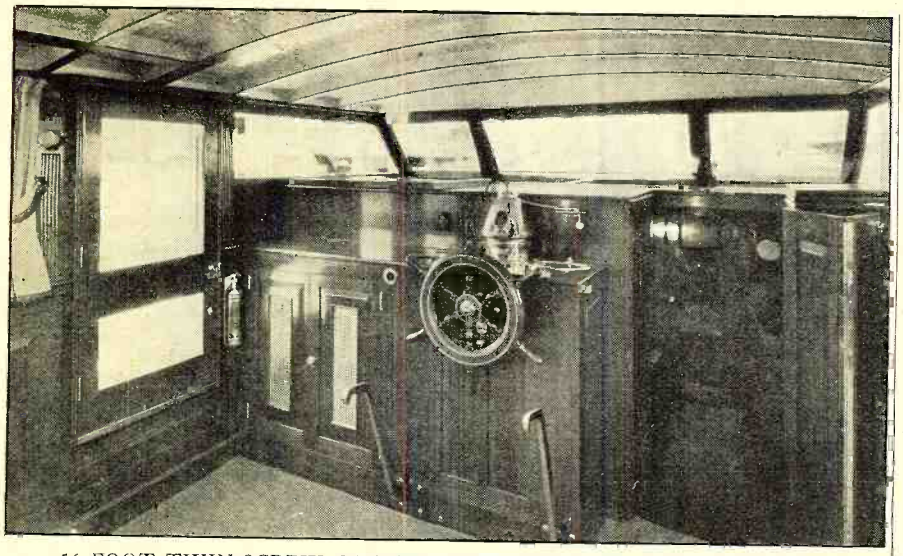


ribbon type microphones and low impedance pick-ups. The two-stage battery-operated amplifier employs the type 30 tubes.

A New Instrument for the Serviceman

The Triumph model 500 condenser bridge-analyzer has been produced for

measuring coils, resistors, power factor and continuity and for measuring and checking condensers. It operates from 110-volt, 60-cycle, a.c. power supply.



56 FOOT TWIN-SCREW CRUISER CARRIES RADIO INSTALLATION

A Philco radio receiver, the tuning dial of which can be seen in an inconspicuous position just above and to the left of the wheel, furnishes Mr. F. V. Desloge's A.C.F. express cruiser "Nimraf" with excellent radio reception in the forward and after cabins and also in the deck house.

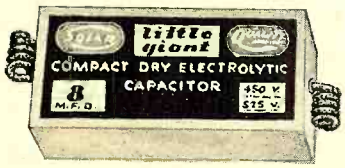
A Low-Cost Resistance Bridge

An announcement has just been received from the Muter Company of their new Wheatstone type bridge featuring accuracy, simplicity of operation and ruggedness. The resistor elements are wound in strip form, the taps being set to an extreme degree of accuracy. Thorough vacuum

impregnation insures freedom from variation due to changes in humidity and a special alloy resistance wire is employed to maintain constant resistance regardless of reasonable changes in temperature.

Small Size Electrolytic Condensers

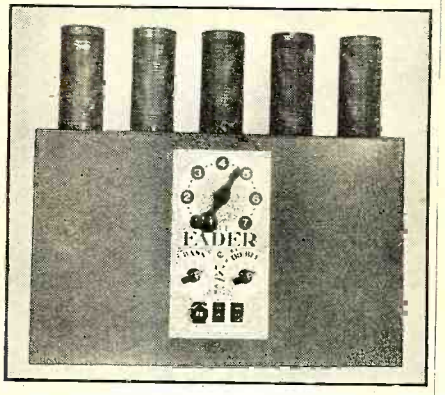
The new Solar series of small-size dry electrolytic type condensers are called "Little Giants" due to the fact that they are only one-half the size of the previous



midget type condenser, without any sacrifice in electrical quality. They are available in 200 and 450 working voltage ratings and in all standard capacities

Latest Sound System for Theatres

The new Pacent high-gain, high-fidelity 5- tube amplifier, designed primarily for use with talking moving picture equipment, is also adaptable to all manner of P. A. work. It is equipped with low- and high-frequency attenuators and a fader arrangement. Specifications are: power output 11 watts undistorted, 20 watts maximum, gain 108 db. and when operated

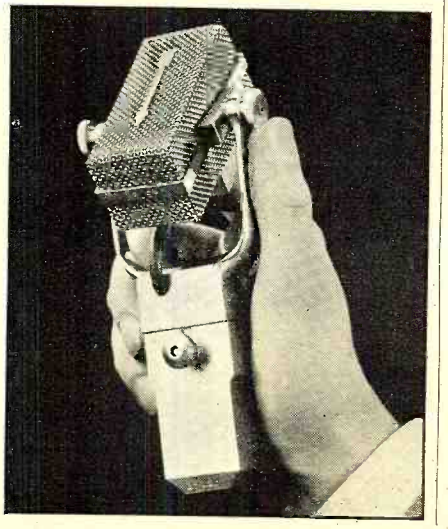


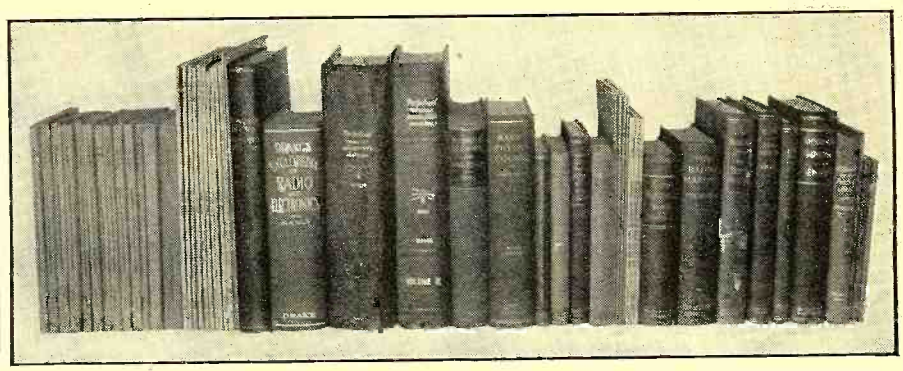
with its associated speaker system the overall response is said to be flat from 4 to 10,000 cycles.

New Uni-Directional Crystal Microphone

The Brush model UD3 microphone responds only to sounds originating on its active side, which extends over a field of 180 deg. The restricted field of sensitivity of this new microphone reduces interfer-

(*Turn to page* 183)





THE TECHNICAL REVIEW

CONDUCTED BY ROBERT HERTZBERG

Electric Circuits and Wave Filters, by A. T. Starr. Pitman Publishing Corp., 1935. Good books on filters are scarce and, in fact, the better part of the latest information is found only scattered in various technical journals. Engineers and advanced students will want to study this new orderly treatment of the subject of filters. The book begins with a brief review of mathematics, including determinants, progressions and binominal series, algebraic notation, exponential and logarithmic functions, trigonometric functions, real hyperbolic functions, complex numbers, hyperbolic and trigonometric functions, linear differential equations. This chapter is in the nature of a brief review and not a course in mathematics. The second chapter deals with the fundamentals of alternating current theory, the third with the theory of electric circuits. The design of resistances, coils, condensers is next in order. Thereafter the reader is introduced to two-terminal networks, then four-terminal networks and finally filters.

The treatment is orderly, logical and necessarily mathematical. A knowledge of hyperbolic functions, calculus and differential equations is required to obtain the greatest benefit from a study of the text.

Guida Pratica del Radio Riparatore (Practical Guide to Radio Repairing), by E. Costa, published by Ulrico Hoepli, Milan, Italy, 1935. A book on servicing equipment and servicing for those who read the Italian language. The book is divided into three parts. The first part deals entirely with measuring instruments, oscillators, tube testers, vacuum-tube voltmeters. This part alone takes 230 pages. The second part is devoted to a discussion of condensers, coils, transformers and resistors, their characteristics and how they are used in radio circuits. The third part deals with the real servicing problems. The book appears to be quite up to date and should be a welcome addition to the library of servicemen who read Italian.

How to Understand Electricity, by A. Frederick Collins, 326 pages, 5½ by 8¼ inches, cloth covers. J. B. Lippincott Company, publishers. The aim of this book is to acquaint technically untrained persons with the fundamentals of electricity, taking them in progressive stages all the way from simple magnetism to X-rays and electrical measurements. The author has kept mathematics at a minimum and where he does show a few simple formulas he works them out.

The language throughout is simple and lucid, being aimed obviously at the casual type of reader who prefers his technical education in easy steps. While the treatment of many subjects is rather sketchy, basic facts and actions are explained understandably.

Short-Wave Manual, second edition, 32 pages, 6 by 9 inches. Hammarlund Mfg. Co., publishers. Short-wave constructors will delight in this little ten-cent booklet, which is devoted to detailed descriptions of thirteen different short-wave receivers of tried and reliable design. The diagrams are clear, the values of all parts are indicated, and accurate coil-winding data are included.

Theory and Principles of the Cathode-Ray Oscillograph, by F. L. Sprayberry. 37 pages, 8½ by 11 inches, loose-leaf binder. F. L. Sprayberry, publisher. To many radio servicemen the oscillograph is a mysterious device mainly because they do not understand its operation. This book, a part of the Sprayberry Course and written in clear, specific language for the practical service technician, tears away the veil of mystery and shows how the cathode-ray oscillograph can be an extremely valuable service tool. It describes the general theory of cathode-ray devices and explains in detail how the wave patterns formed on the screen can be interpreted to indicate various circuit conditions and phenomena.

The progressive serviceman (and also the advanced amateur and experimenter) will certainly benefit from this study.

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

Image Suppression in Superheterodyne Receivers, by Harold A. Wheeler. Superheterodynes are notoriously sensitive to interference at the intermediate and image frequencies. To overcome this trouble, the author describes several types of selective circuits for coupling the antenna to the grid of the first tube.

The Design and Testing of Multirange Receivers, by Daniel E. Hartnett and Nelson O. Case. The principal difficulties in the design of "all-wave" receivers lie in the complexity of the multi-range circuits. Several circuits and a unit assembly arrangement are described which improve the frequency calibration and simplify the design. Testing is facilitated by the use of simplified signal generators having "piston" attenuators.

High-Fdelity Receivers with Expanding Selectors, by H. A. Wheeler and J. Kelly Johnson. A high-fidelity receiver for general use requires a means of expanding or contracting the resultant band width, in order that the best compromise between fidelity and selectivity may be chosen. This paper describes a superheterodyne which has a preferred form of symmetrical expanding selector, as well as other features

Acoustic Testing of High-Fidelity Receivers, by H. A. Wheeler and Vernon E.

Whitman. Description of some interesting tests of receiver operation under home conditions.

High-Quality Radio Broadcast Transmission and Reception, by Stuart Ballantine; The Receiving System. More valuable data on the electro-acoustic fidelity of broadcast receivers, dealing mainly with the technique of loudspeaker placement.

Review of Contemporary Literature

A Review of 20 Years of Progress in Communication-Frequency Measurements, General Radio Experimenter, June, 1935. The whole 20-page issue is devoted to an interesting, brief review of the history of the G. R. Co., long famous for its measuring equipment.

The Behavior of High Resistances at High Frequencies. The Wireless Engineer (London, June, 1935. The distributed capacity of fixed resistors, which is unimportant at ordinary frequencies, becomes appreciably noticeable at the very short wavelengths, an effect discussed in detail in this informative article.

The New 838 Zero-Bias Triode. R/9, June, 1935. Practical operating data on a tube especially suited for medium-power amateur and communication transmitters.

Directive Antenna Systems for 14 Mc. Operation, by John D. Kraus. R/9, June, 1935. The ambitious amateur with a big back yard will find this "dope" useful if he wants to improve his transmission.

The Use of Condensers in Radio Receivers. The Aerovox Research Worker, April, 1935. Good educational stuff on the use of fixed condensers for coupling, blocking and by-pass applications.

The Present-Day Status of Broadcast Synchronizing. Electronics, June, 1935. Three systems now operating successfully point the way to expansion of broadcast facilities. This article reviews the methods used and points out that improved reception conditions and wider service areas are possible.

A Police Radio System for Newark, by Arnold B. Bailey. Bell Laboratories Record, June, 1935. Description of an up-to-date, ultra-high-frequency one-way system that already is proving highly successful. Of particular interest is the antenna, which is grounded to its support on the roof and energized by a coaxial conductor.

Noise-Suppression Antennas, by W. F. Osler. Service, June, 1935. The second and concluding part of a treatise on noise-reducing antennas, with good, practical information for the benefit of the servicemen who install them.

A Four-Band Exciter, by J. Herbert Hollister. QST, June, 1935. Instant band changing with circuit switching and fixed tuning; a good unit for advanced transmitting amateur.

Reports of the Radio Research Board, Council for Scientific and Industrial Research, Commonwealth of Australia. Radio engineers and students who find it profitable to follow the activities of brother engineers in other parts of the world will find much interesting reading in bulletins of the Australian Radio Research Board, a government organization that seems to resemble our own Bureau of Standards. Bulletins Nos. 87, 88 and 89 contain articles on such subject as the rotation of plane of polarization of long radio waves, frequency recorders, the characteristics of downcoming radio waves and long-distance observations of radio waves of medium frequencies.

Analyzer Booklet

The Supreme 391 P. A. Analyzer is the title of a 12-page booklet describing the applications of a special analyzer made for servicing public-address and sound film equipment. Contains seven diagrams and practical data of value to sound technicians. Copies of this booklet may be obtained free of charge from RADIO NEWS, 461 Eighth Avenue, New York City.

Transformer Bulletins

Catalogs R-1 and C-1 of the Kenyon Transformer Company lists a very complete line of transformers and choke coils for replacement, public-address and amateur purposes. Several audio amplifier kits are also described. To obtain copies free of charge, write to RADIO NEWS, 461 Eighth Avenue, New York City.

Sound Equipment

A description of a line of sound apparatus, ranging from microphones to rack-and-panel systems, has been published by Sound Systems, Inc. The sound technician, dealer and broadcast engineer will find this circular useful for reference purposes. To obtain a copy free, write to RADIO NEWS, 461 Eighth Avenue, New York City.

Amateur Equipment Catalog

A 48-page catalog devoted to amateur radio equipment has been brought out by Wholesale Radio Service Co., Inc., New York. The book contains about a dozen pages of helpful technical data, diagrams, lists of Q signals, etc. Readers can obtain copies, free of charge, by writing 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 radio manufacturers' catalog offers, which were described in detail in the June, July and August, 1935, issues. These booklets (J1 to J9, Jy2 to Jy5 and A1 to A5) are still 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.

J4—Resistor catalog of Electrad, Inc. 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.

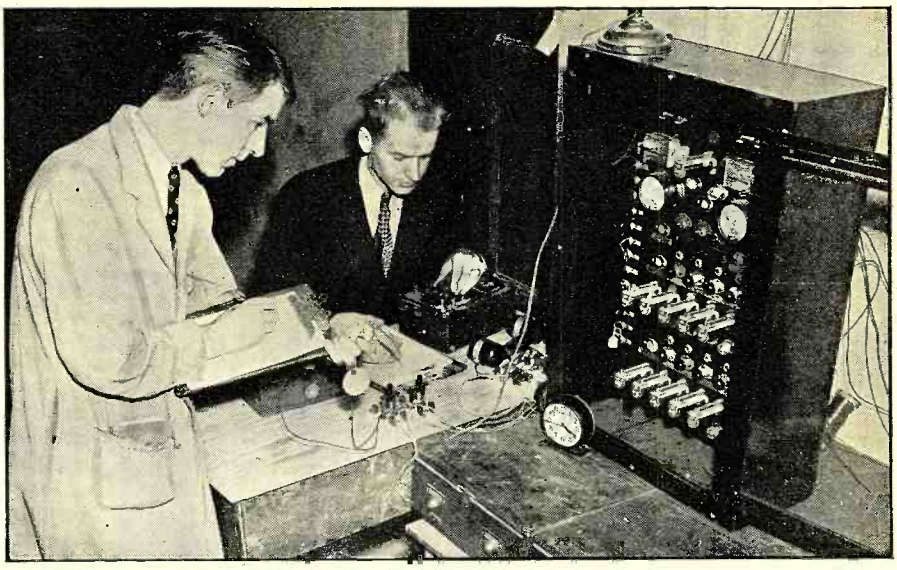
Jy2—New parts catalog of Birnbach Radio Company. Free.

Jy3—Data on Vacuum Tube Voltmeter Measurements published by Clough-Brengle Company. Free.

Jy4—"Increasing the Serviceman's Income," folder issued by Philco Radio & Television Corp. Free.

Jy5—Transformer Bulletin of American Transformer Corp. Free.

(*Turn to page* 180)



QRD? QRD? QRD?

CONDUCTED BY GY

THE recent loss of the large TWA transport plane with a cargo of human lives aboard has been traced indirectly to failure to get weather reports by radio. The investigation definitely placed the cause of the crash to weather conditions. To operate the radio communications equipment in the air service, the regulations at present only require the person so doing to hold a *third-class* radiophone or telegraph license. Airline pilots are keenly aware of the fact that radio communications *should not be part of their duty,* as when it is most needed they are then busiest and unable to devote their entire attention to it. Therefore, the only solution to this problem is to employ on all transport planes complete equipment, *plus an able radioman to perform this service!*

IN a recent issue of the ARTA appears a definite factual example of the victory which can be won through concerted and stick-together efforts on the part of radio men. The West Coast has been raised to the standards of wages and conditions to which all radio operators have aspired upon entrance into a field of professional labors. Wage increases ranging from ten dollars to fifty dollars per man have been won from shipping companies such as the Dollar Line, Pacific S.S. Company and the American Mail Lines.

Just to show what a feller can do towards keeping the oft-mentioned wolf from the doormat is the story of H. O. Merriman of Ottawa, Canada, Chief of the interference section of the Dominion of Canada. When he first started out it was with his total equipment strapped to his shoulders, earphones on his head and a portable aerial in his hand. Mr. Merriman's reports show that these man-made disturbances are caused by almost everything, from a loose connection on an electric iron to electric light signs, street-car motors and elevator machinery. This service has been developed over a period of ten years, until now it has reached a coast-to-coast width with 32 trucks continually moving. The U.S.A. is now starting its own campaign to do some tall eliminating.

The ARTA N'Yoick Local advises that the beach at this port and vicinity is pretty well crowded, although the Lakes and a slight increase in shipping has reduced the number some 60 or 70 men. Operators seeking assignments are advised that they may have to wait some two or three months on the beach before getting anything if they come to this port, as there are many others ahead of them. Take heed!

Pacific steamship owners now realize that radio ops are their employees and not employed by radio companies. Also, shipping men have been informed that it is a comparatively simple matter for them to obtain radio station licenses directly from the F.C.C. Therefore, as long as a radio op performs his duties to the satisfaction of the shipping company, they will not have to fear the dismissals which were practiced by radio companies because ops were not scaring up traffic for said outfits. This is one huge step upward toward proper conditions which are being fought for at the present time.

A new local office of the ARTA has just recently been opened at Wilmington, Calif., and from reports received "to see this office at 10 a.m., one would think that it certainly must be the city editor's office of one of the large daily newspapers, the way typewriters are pounding and phones ringing and men to be interviewed." This office has taken over the reigns of the southern part of California and from its first showing is proving a great success. There is great activity at the present due to the tanker strike which has about tied up this part of the coast and from latest reports, twenty-two ops are on the beach, striking. This office also takes care of the ops on the fishing fleet hereabouts and negotiations are in progress for agreements whereby the operator works on a base pay plus so much per ton for fishing. We understand that Simon Golden, the talkative one, is now out on the M.V. City of San Francisco, a tuna fishing boat, working under a part share arrangement. He would take this deal because his hunches are better than his figures.

There is always something new in this old world and something new has been developed out of all this strife—the "one-man" strike. Report has come in of such a case on the S.S. K. I. Luckenbach which held that vessel idle for several hours.

After the op walked off the ship, other union members followed and no cargo was worked in or out of the holds. Quick work by the local agent (of the shipping company at Seattle) settled the action temporarily, pending the official signing of an agreement. Rah, rah, rah, for this form, as it doesn't take too much man power to accomplish the same thing. Highly scientific, what!

And so, me hearties, comes another dawn and another day. Shipping companies continue to learn that an organization is only as good or as profitable as the morale of its men and a higher standard of living plus agreeable working conditions helps to build it up greatly. They should remember the part that radio and radio ops play when they are most needed and for this date we bring to memory the *S.S. Olinda* of the Munson Line, which with five passengers and crew, caught fire at sea June 10th, 1913. In response to the radio SOS call, the *U.S.S. Nashville* went to her assistance and rescued all. And that brings us to the illustration in our heading this month, for there is pictured two Bureau of Standards engineers at the controls of a fire-signal detector for shipboard which detects the presence of a flame up to 200 feet away. Maybe here's a chance for additional operators, as in all probability this device and its control panel will come under their jurisdiction. So with this to sleep on . . . ge . . . 73 . . . GY.

Radio in the C.C.C.

(*Continued from page* 164)

keynote of the educational program in the C. C. C. is vocational study.

In those camps that have official stations, the woodsmen-students want to operate that station. For "Sparks" is a *big man* . . . new C. C. C. rulings have provided an exemption for the radio operators from mandatory discharge after 15 months' service. And for the average C. C. C. man, such a status is a goal worth attaining.

The Ham Shack

(*Continued from page* 149)

Calls Heard

By Edwin Hoover, 1819 East Fifty-fifth Street, Cleveland, Ohio, on 20 meter 'phone: CO2HY, CO2KC, CO2LL, CO2WZ, CO7HF, HH5PA, HI7G, HP1A, K4SA, VE1DR, VE4LA, VE5HN, W1AVG, W2ADJ, W2BCP, W2BYP, W2CLA, W2CRB, W2CZO, W2DYR, W2EUI, W2HFS, W2MO, W3ACX, W3AIF, W3BBO, W3BIH, W3BPH, W3CIJ, W3MD, W4ABG, W4AGP, W4AGR, W4AH, W4AHH, W4ALG, W4AUP, W4BFB, W4CJ, W4FK, W4HX, W4PI, W4QZ, W5AAQ, W5AEB, W5AFX, W5AHD, W5ALI, W5AMS, W5AMZ, W5AOO, W5AOT, W5AVM, W5AXA, W5AXU, W5AYF, W5BAT, W5BDB, W5BDG, W5BEB, W5BEE, W5BEQ, W5BFS, W5BGT, W5BIN, W5BMM, W5BOP, W5BVH, W5BYJ, W5CAE, W5CEO, W5CTC, W5CUA, W5CV, W5CYI, W5DCO, W5DCP, W5DDP, W5DNV, W5DQ, W5DUF, W5EBP, W5ECL, W5EFV, W5EPR, W5EUB, W5EVV, W5FJ, W5HJ, W5IT, W5LA, W5NF, W5OX, W5PP, W5SF, W5SH, W5UN, W5ZA, W5ZS, W6AM, W6AVU, W6BAY, W6BFP, W6CIN, W6CLL, W6CQG, W6DA, W6DCQ, W6DEP, W6DJJ, W6DLI, W6DMN, W6DTX, W6EIP, W6EQJ, W6ERT, W6FCL, W6FFN, W6GOY, W6HLY, W6HOE, W6IYH, W6IZH, W6KM, W6LR, W6WP, W6ZH, W7AIT, W7ALZ, W7AO, W7ARK, W7BCI, W7BCU, W7CAL, W7CFX, W7CHT, W8BNC, W8BRB, W8BUD, W8DI, W8DLD, W8EFW, W8FHE, W8FJP, W8FSS, W8HFE, W8HIH, W8IMU, W8JAI, W8KC, W8KJE, W8LIR, W9AEQ, W9AGO, W9ANZ, W9BBS, W9BCX, W9BEZ, W9BJ, W9BPK, W9BPM, W9CET, W9CJJ, W9CUH, W9CVN, W9DGM, W9DMF, W9EEL, W9EL, W9FDO, W9FSO, W9FWJ, W9FYP, W9GHI, W9GHY, W9HQT, W9IMZ, W9JEH, W9JNG, W9JRY, W9KFA, W9KGR, W9LD, W9LGT, W9LNB, W9OLG, W9OMM, W9OZK, W9PDI, W9PEP, W9PIY, W9PJQ, W9PV, W9RTQ, W9SBJ, W9YL, X1G, X1W, X2AH.

By W. A. Cantrell, 503 East Prescot Road, Liverpool, 14, England, on 20 meter 'phone: W1MG, W1AEG, W1AJZ (YL), W1JK, W1AFX, W1KZ, W2NB, W2HF, W2CTU, W2EUG, W2HHU, W2AMJ, W2HFS, W3PC, W4UP, W4UM, W4AOP, W4AXZ, W5BMM, W8HTX, W8GLY, W8DLD, W8LUQ, W8LQ, W9CJJ, W9BEG, W9DHI, W9BHT, W8AEQ, W9BCX, W9PJQ, W9FBI, ON4AP, CO2QZ, VP9R, VP6YD, VE4NI, VK3LRL.

By Reginald Watson, The School House, Wraysbury, Staines, England, on 20 Meter 'phone: W1AMG, W1DSY, W2DC, W2DE, W2AU, W2ZC, W2AMM, W2HFS, W2AN, W2FLO, W2HAU, W3AE, W3HY, W3AVN, W3PC, W3MD, W3AVN, W3BRG, W3EHY, W4AHH, W4AH, W8GLY, W8DVU, W9BHT, W9EEL, VE1DV, CO2HY.

The Code Guild

(*Continued from page* 149)

W8FQS—Phili-McMunn, 29 Ramble Ave., Chautauqua, 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.

The Valentine Super

(*Continued from page* 145)

ode is another condenser of such value that a measure of bass compensation is obtained when the slider is near to the grounded end of the resistance, or low volume position, without undue attenuation of the higher frequencies when greater volume is desired. Automatic volume control voltage is obtained from the high end of the potentiometer and is filtered by means of a 2 meg. resistor and .1 mfd. condenser. This voltage is available at one pole of the "a.v.c.-No a.v.c." switch, the other pole being connected to the various a.v.c. filters in the grid returns of controlled tubes. The blade of the switch is grounded. Audio frequencies pass to the grid of the 56 audio amplifier through a .02 mfd. mica condenser. Filtration is employed in the grid circuit of this tube also, and grid bias provided by a resistor in the cathode leg, its value depending upon the method of coupling to the amplifier. A noise control consisting of a 1 meg. rheostat and series .02 mfd. condenser is connected from plate to ground. Though somewhat beyond the scope of this article, the primary purpose of which has been to describe the V-8 tuner, a circuit diagram is given of the amplifier and power supplies used by the author. (Figure 1.) The parallel feed choke in the plate of the 59 triode combined with the .5 mfd. coupling condenser were chosen to favor response to frequencies in the neighborhood of 4500 cycles. The use of fixed bias on the 59 driver and 45 tubes, used Class A prime, allows of obtaining high output and adapts the amplifier to handle the very healthy signals supplied by the tuner. To prevent feed-back both tuner and amplifier are mounted on sponge rubber cushions, and the speaker baffle is similarly insulated from the bounding walls of the cabinet.

In conclusion, the author makes no extravagant claims for this tuner, but does say that from his own experience, and from that of others who have built it, results justify what may appear to be somewhat unusual methods of construction.

RADIO PHYSICS COURSE

ALFRED A. GHIRARDI

Lesson 44. Impedance

IN practical circuits in which there exists not only inductance but resistance also, it is necessary to know not only how to calculate inductive reactances but also how to combine reactance with resistance. The combined effect of all the reactance and all the resistance in a circuit is called the *impedance*. This is represented by the symbol Z. The impedance represents the *total* opposition to the current flow in an alternating-current circuit offered by both the actual ohmic resistance, and the apparent resistance or opposition due to the counter-e.m.f. of self-induction (and capacity as we shall see later). The applied alternating e.m.f. has to send current or electrons through the circuit against this total *impedance* in the circuit. The impedance in ohms of any alternating-current circuit is expressed by the formula:

$$\text{Impedance} = \sqrt{\text{resistance}^2 + \text{reactance}^2}$$

If the circuit contains resistance and inductance only (no capacitance), this may be expressed as

$$Z = \sqrt{R^2 + X_L^2} \text{ or } Z = \sqrt{R^2 + (2\pi f L)^2}$$

The relations expressed by the above formula may be represented by the right-angled triangle ABC shown at (B) of Figure 1. At (A) is shown the circuit condition of a resistor connected in series with an inductor. In (B) the true ohmic resistance R is laid off to a convenient scale to form the base line; the reactance X is laid off also in ohms to form the perpendicular; and the impedance in ohms is found by measuring the hypotenuse of the triangle (to scale), since the hypotenuse of any right-angle triangle is equal to the square root of the sum of the squares of the other two sides. This is merely a mathematical coincidence, however, resulting from the sine-curve variations of alternating e.m.f.'s and currents. Such a triangle is very frequently used to represent the relations between resistance, reactance, and impedance and also for convenience in obtaining other quantities. It is called a *vector diagram*. Another way of looking at this, is that since the voltage drop across the resistance is in phase with the current, and the e.m.f. of self-induction is 90 degrees out of phase with the current, resistance and reactance are really like two forces at right angles to each other, and the common principle of the parallelogram of forces which is applied for solving problems involving forces in mechanics, can be applied to them.

When the inductive reactance is small compared with the resistance, as shown at (C), it has very little effect. The line BC is short compared with AB, and the impedance line AC is not much larger than the resistance AB. If the resistance is kept the same and the reactance is doubled, or BC^1 equals $2 \times BC$, the impedance AC^1 is very much increased over its former value AC. When the reactance is very large compared to the ohmic resistance, as shown at (D), the impedance AC is very much greater than the resistance AB. This important fact should be remembered, for it is one of the reasons for making the inductance and inductive reactance of a tuned circuit as large as practical in order to obtain high gain.

In inductors where the inductance is very large compared to the ohmic resistance, the resistance may often be entirely neglected, and the total impedance of the coil may be considered as being due wholly to its inductive reactance. If the frequency is doubled in such cases, the reactance is also doubled and the current at the same applied e.m.f. is reduced to one-half.

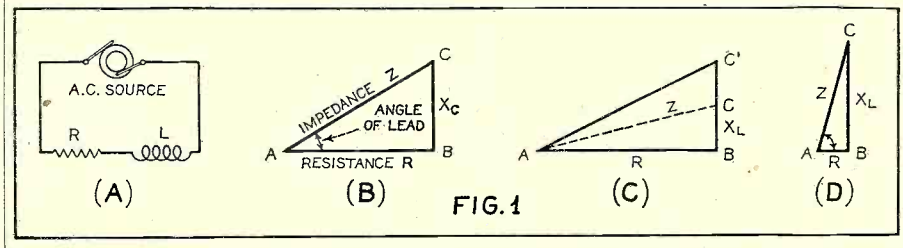


Figure 1. Vector relations of resistance, reactance and impedance in an inductive circuit.

The Technical Review (Free Booklet Service)

(*Continued from page* 177)

A1—Information on new Browning "35" receiver, issued by Tobe Deutschmann Corp. Free.

A2—New parts catalog of Wholesale Radio Service Company, Inc. Free.

A3—Data on a multi-testing instrument, published by Supreme Instruments Corp. Free.

A4—Condenser catalog prepared by Cornell-Dubilier Corp. Free.

A5—Instructive and interesting information on condensers published by the Sprague Products Company. Free.

New Stations for Panama

PANAMA CITY, PANAMA—The government has authorized Senor Jose Jaen y Jaen to install a radio broadcasting station in the city of Colon. The call letters of this station will be HP50 and it will work on a frequency of 1440 kilocycles. Another new station, which will be known as HP53 will be installed by Sr. Simon Vega at Bocas del Toro, Panama. This station will operate on a frequency of 9565 kilocycles.

The "Normandie"

(*Continued from page* 141)

ratus, enabling passengers to converse with land-telephone subscribers in France, England and the U. S. A., is contained in this room.

The transmitting unit of the radio-telephone equipment is designed so it can be used in connection with radio broadcasting work whenever desired. And it was called upon to serve CBS and NBC chains, daily, during the maiden voyage. Both networks had crews on board to handle the broadcasting from the ship. Alfred H. Morton, NBC program manager, and Paul W. White, CBS director of special event broad-

casts, headed their respective network staffs consisting of an announcer and an engineer. The departure from Le Havre, ship concerts, interviews with passengers and the arrival in New York were among the program subjects of the voyage.

The radio-telephone transmitter has a power of 1 to 1½ k.w. in the antenna, depending on the wave emitted. It has eight available waves between 17 and 70 meters. The radio-telephone receiver is in a special shielded cabin, independent of the commercial cabin. Compartments adjacent to the commercial cabin contain current distribution apparatus and storage batteries.

The bridge radio equipment includes transmission and reception apparatus for use in actual navigation work. In addition there is a radio direction finder and a "sounding" device.

Two motor lifeboats contain storage-battery radio distress signalling apparatus. The transmitters in the lifeboats are of the spark type.

Six antennas are especially located to permit simultaneous operation of two transmitters with the duplex facility of coinciding reception.

A novel international broadcast stunt in which the Normandie figured took place when the ship steamed up New York Harbor for the first time. NBC and the General Electric Company arranged for Washington officials to greet the ship by a "talking light beam". Land lines conveyed the greetings from Washington to the torch of the Statue of Liberty where the voices were converted into pulsations of light directed to the ship by a powerful reflector. A large concave mirror on the Normandie picked up the light rays and converged them on a photo-electric cell to convert the light waves back into sound. The voices were sent from shipboard to Radio City by short waves and thence by landline to W2XAF, Schenectady, which relayed the program to France.

The debut of the Normandie, and its extensive radio layout indicated that the world's largest liner will continue to be a constant source of interesting program fare to both the broadcast listener and the short-wave fan.

Impedance Match

(*Continued from page* 155)

3. For both branches in parallel:

$$Z_b = \frac{1}{\frac{1}{R_L + j\omega L} + \frac{1}{-j/\omega C}}$$

Adding the fractions and simplifying, this expression becomes

$$Z_b = \frac{R_L + j\omega L}{(1 - L\omega^2 C) + j R_L \omega C}$$

Now we must separate the j terms from those not containing j. This can be done if we can get rid of the j in the denominator. When the denominator is the sum of two terms, one which contains j, we can eliminate j by multiplying both numerator and denominator by the difference of these terms. In this case, therefore, we multiply by

$$[(1 - L\omega^2 C) - j R_L \omega C]$$

After doing this, and collecting terms, we have the final expression for the impedance of the branched part of the circuit. To this we add R, which is in series with the branched part. Finally, then, we have the complete expression for the impedance of the circuit.

$$Z = R + \underbrace{\frac{R_L}{(1 - L\omega^2 C)^2 + R_L^2 C^2 \omega^2}}_{\text{Resistive part}} + j \underbrace{\frac{L\omega(1 - LC\omega^2) - R_L^2 C\omega}{(1 - L\omega^2 C)^2 + R_L^2 C^2 \omega^2}}_{\text{Reactive part}} \qquad (4)$$

Now, if the impedance for a specific set of conditions is required, we must substitute the numerical values in formula (4). Often in substitutions we find that some of the terms become negligibly small and can be dropped out. For example, at a frequency where L and C are in resonance, the formula becomes:

$$Z = \sqrt{\left(R + \frac{1}{R_L C^2 \omega^2}\right)^2 + \frac{1}{C^2 \omega^2}}$$

The value for Z approaches infinity as R_L approaches zero, which is the case for any anti-resonant circuit of this type.

One of the advantages of the complex form of notation is that it enables us to start with any type of network and reduce it to one impedance (for any frequency) before making any numerical substitutions. On the other hand, we can transfer the complex notation into a vector diagram at any point along the line.

The general formula for the relation between current, voltage and impedance is frequently written

$$E = IZ$$

This always applies to any circuit or any part of a circuit, provided we remember that it is a complex formula, and all three of these quantities must be treated as such. (*In our next installment we will use this data to show when and why impedance matching is a requirement for distortionless transmission.*)

Dots and Dashes

(*Continued from page* 135)

of each system. Farnsworth's West Coast backer, J. B. McCargar, is said to be anxious to see Farnsworth's ideas in operation in America as well as in Europe.

Establishing Television in Holland

EINDHOVEN, HOLLAND — Experimenting with television on a larger scale than heretofore, Philips Lamps, Ltd., of this city, will establish a test transmitter operating on a wavelength of about 7 meters. The new station will be located here. A 3-meter transmitter has been used by the Holland radio firm for some time. The company has emphasized that while considerable laboratory progress has been made, there will be no practical television service for the general public immediately. It is understood that Philips has developed a television receiver yielding a projected picture of unusual sharpness and brightness.

A New Belgian Television System?

BRUSSELS, BELGIUM—Leon Damas, a young radio engineer of Charleroi who has occupied himself with television problems for the last few years invented a new system of television, it is reported. The new system permits the transmission of image and sound on the same wavelength in complete synchronism, it is reported. Moreover, it is said that Damas has succeeded in transmitting television images in natural colors. The young inventor was aided in his work by Prof. Baethelmans of the Jesuit College at Charleroi.

A New Tuning Indicator

NEW YORK, N. Y.—A new tube, designated 6E5, which is designed as a visual tuning indicator, has recently been announced by the RCA Manufacturing Co. The tube has a fluorescent target located in the dome of the bulb. When the tube is in operation this target becomes luminous and shows a circle of light. A sector of this circle will remain dark, the angle of the sector depending on the bias on one of the elements of the tube. The shaded angle will vary from 90 degrees to

(*Turn to page* 192)

The RADIO WORKSHOP

¶ Items of interest for beginners, experimenters and radio constructors.

A Handy Tool

The cutting of tube-socket holes or any large size cut-out in a metal chassis is probably the most troublesome job in home radio-set construction. It is difficult only because so few radio constructors are familiar with the proper tool for that purpose and the proper means of supporting the chassis itself, during the drilling operation.

The tool for the job is a very simple and inexpensive device called a circle cutter which fits in any standard hand brace. While three sizes are available it is only necessary to possess the medium size model, (costing a little more than a dollar) for radio construction work. This size is capable of cutting holes from 1 to 4 inches in diameter in aluminum, steel, bakelite, hard rubber and wood.

To anyone who has laboriously made socket holes with a small drill, a cold chisel and a file, the circle cutter will be an absolute revelation. Holes that previously took 15 or 20 minutes can now be made in 15 or 20 seconds, and furthermore, they are really round!

As the cutting tool of the cutter takes a healthy bite out of the metal chassis, the latter must be braced securely so that there is no possibility of twisting and the best aid for this is a large husky vise, but a small one is satisfactory if it is supplemented by some short pieces of 2 by 4 wood blocks and a couple of ten-cent C clamps. The accompanying illustration shows how a 12 inch steel chassis was handled in a vise having only 2¼-inch jaws. A 6-inch stub of a 2 by 4 was first tightened in the vise in a vertical position, and the chassis held in place over it by a single clamp, as shown. The drilling pressure was then applied against the heavy wood, which in turn was solidly supported by the vise. The chassis remained perfectly fixed and the holes were made in quick order.

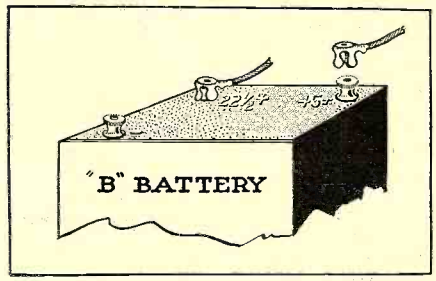
The same set-up was used in cutting holes in the short sides of the chassis. In this case the clamp was merely turned around so that the handle was out of the way of the long arm of the circle cutter.

In cutting 2- and 3-inch holes in panels for meters, it is advisable to use a scrap piece of board as a backing in the vise. This will prevent the panel from buckling under the pressure of the brace. To avoid clamp marks, place bits of hard wood under the feet of the clamp and tighten the latter carefully.

ROBERT HERTZBERG,
New York City.

Simple Battery Connector

A practical and time saving connector for either A or B dry batteries or any type of apparatus having knurled nut terminal connections, can be made from grid-control clips, as used on screen-grid type tubes.



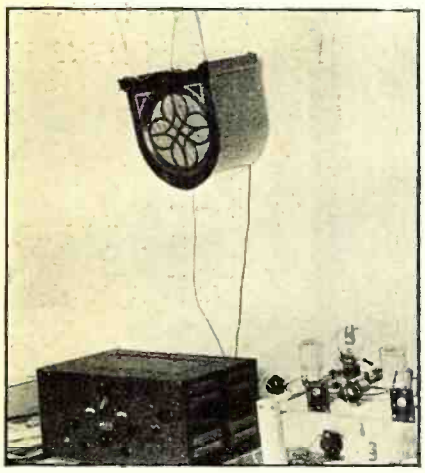
The three leaves of the clip are bent together so that when the clip is pressed on the knurled nut terminal it will grip it firmly. If this is done properly the clip becomes a quick change positive contact and shakeproof connector.

STEVEN S. ERICKSON,
Evanston, Ill.

Simple Idea for Suspending Separate Speaker

The separate loud speaker employed with many popular types of short-wave sets is something of a nuisance if placed on the operating table, particularly so if the set uses plug-in coils.

A good stunt is to hang the speaker from the ceiling just far enough above the table to clear all apparatus. In the cellar or



attic radio "shack" this is the work of only a few minutes. Some odd lengths of aerial wire and a few screw eyes are all that are needed.

The speaker should be inclined downward a little so that the sound is directly in line with the operator. Incidentally, removing the loud speaker from the operating table seems to eliminate slight microphonic effects, previously present.

ROBERT HERTZBERG,
New York City.

Home-Made Radio Cement

A good grade of radio cement can be easily made at a small cost from acetone and celluloid. Experimenters and servicemen will find a cement of this kind extremely handy for cementing speaker cones, insulating coils, repairing tube bases, etc.

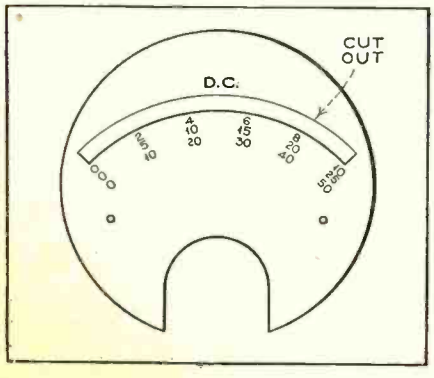
A small amount of acetone and a few strips of celluloid may be procured from any drug store. Next obtain a small bottle with a brush attached to the cap. A discarded bottle formerly used for fingernail polish answers the purpose very nicely. The celluloid strips are dropped into the acetone, where they slowly dissolve to form the cement. If the cement becomes too thick, simply add more acetone; if too thin, add more celluloid.

JOS. S. NAPORA,
Uniontown, Pa.

Replacement Dial

It is not necessary to replace the dial on a small meter when its range is changed, as for a revamped testing instrument, if the new range requires the same number of dial divisions.

Cut out a round piece of heavy drawing paper or Bristol board the same size and shape as the old meter dial. An arc is then cut out of the new dial as shown, so that when placed over the original meter dial it leaves the original scale divisions visible. Then the numbers for the new ranges can be placed on the paper dial with India ink. By using this method, the original meter scale is retained, giving more accurate results than a home-made substitute. Also, you can change dials as often as you wish when experimenting, without the expense of a new dial.



C. G. GROVER,
Salt Lake City, Utah.

(*Turn to page* 188)

What's New in Radio

(*Continued from page* 175)

ence caused by reflection, feed-back, audience noise, etc. If desired the instrument can be changed from uni-directional to non-directional, instantly and at will.

A "CQ" Key

(*Continued from page* 147)

inches in diameter, cut out with a common fly-cutter. The dots and dashes were laid out on paper with a ratio of 1:3, the spaces between letters being somewhat greater than the length of a dash. This space was doubled between words. The space between parts of a letter is the most difficult to judge, depending upon the rider. At first, a space equal in length to a dot was tried, but this was insufficient, a lot of filing being necessary. A dot-and-a-half length may be sufficient, but two-dot length is recommended. Then the rider will not have to be bent almost to a right angle but can be straightened out somewhat to a "smoother" angle. If bent too sharp, the action is "pecky" causing a chatter. A smooth and even action is, of course, desirable. When the characters are proportioned on paper the design is transferred to the disc. Clamping the disc in a vice, the "roughing" is done with a hack-saw and the job is filed clean with a jewelers' file. Two files, coarse and fine, will save a lot of time. Two blades "in parallel" in the hack-saw will also save time. The job is simple and interesting and should not take over a few hours. A second disc will, of course, go much faster. For mounting, the center hole is tapped for a 6-32 screw and a lock nut employed.

The contact pieces are mounted on brass angles which are fastened by one of the original gear-box screws. They must be insulated from the box and from each other, of course, the amount and type of insulating depending upon the voltage in the keying circuit. The breaking of plate voltages over a few hundred volts is not recommended. A relay should then be used.

A standard size 2- or 4-ohm rheostat will control the speed of the motor. The motor may run satisfactorily on 4 volts without a rheostat.

Backstage

(*Continued from page* 171)

long tour a national "open" radio tournament was arranged to bring new talent to the mike. The plan was to conduct the auditions in each city of the tour and bring the best man and woman of each locality to the Tuesday night broadcast. A cash award accompanied each microphone appearance. After national eliminations, four finalists were to be brought to New York for the awarding of grand prizes. Professional and amateur singers were permitted in the auditions, as, of course, the word "open" implied.

The DX Corner (Broadcast Band)

(*Continued from page* 167)

p.m., C.S.T., Daily; WHIS, 7-9, 12-3, and 6-8 p.m. E.S.T., Daily; WHBQ, 7:30 a.m.-10:30 p.m. C.S.T., Daily and 1:30-2 a.m., Wednesdays except first Wednesday of the month.

Would like very much to correspond with any foreign readers of the DX Corner."

Observer Nichols (Connecticut): "Station KRNT, 1320, Des Moines, Iowa, can be caught as they sign off after CBS chain program, at 1:00 a.m. E.S.T. every night, as they practically always give some little item with their sign off, time, etc., that can be used to verify them."

Observer Kentzel (New York): "CMBX, 1380, Havana, Cuba, announces that they are on the air every Sunday between 1:30 and 6:00 a.m. E.S.T. with a DX program."

Observer Elcheshen (Ohio): "I totalled up the mileage of all the stations I have received. For instance. Chicago—airline distance 303 miles, Cuba—1360 miles, etc. Well! here are the results—

B. C. B.	618,767
S. W.	106,651
Police	24,054
Amateur phone	1,309,095
Miles total	2,508,567"

Observer Wilson (Virginia): "My receiving equipment has changed to an RCA-Victor 'Magic Brain' all-wave receiver, model 281 (12 tubes). Perhaps this fall and winter, I shall be able to send you some good lists of distant stations heard on this new receiver."

Observer Parfitt (Virginia) reports 248 stations heard since the first of the year with 231 verified. The 15-watt KFPM, Greenville, Texas, is one of his best catches. He offers the following tips: "WSVA, 550 kc., regular schedule 7:00 a.m. to 5:30 p.m. or sometimes till 6:00 p.m. E.S.T. WOPI, 1500 kc., from 7:00 a.m. to 9:30 p.m. E.S.T. weekly and 10:30 a.m. to 9:30 p.m. Sundays. WILM, 1420 kc., is on every weekday morning at 7:00 a.m. E.D.S.T. WDBJ, 930 kc., has moved up 1 hour and comes on now at 7:00 E.S.T. Anyone needing KGA, 1470 kc., can get them most any night after 2:00 a.m. E.S.T. They sure are consistent."

Observer Robinson (Nova Scotia): "LS2, Radio Prieto, 1190 kc., Buenos Aires, Argentina, has been heard as loud as R7-8 fairly consistently lately from a little after sundown until WOAI overrides them. CMQ can be heard nightly after CRCT signs off on 840 kc. Have a veri from "mystery DX" station mentioned in July R. N. He was an amateur on 990 kc. so couldn't advertise name. Between 9:30 and 10 p.m., A.S.T. on July 25th, heard LS2, 1190; LR9, 1030; LR3, 950; LR6, 870; LR5, 830, all coming in fair to good. LR8 spoiling WHAM. LS8 spoiling WNAC, ZP9 good sometimes on 890 kc. Spaniard on 1140 good. (static R8.)"

Observer Bohm (Sweden): "DX reception has been bad during the last months. There are no U. S. stations audible, only some South Americans, LR2, LR3, LR4, LR5, LR6 and LS8. Those Argentineans are best received from 1:30-3:30 a.m. Middle European Time. The best U. S. station during the last DX season was KOA of Denver, Colorado. Many times I heard this station with R8, on nights when KOA was very strong, there was no trace of LR5 on the same frequency, however, at the times KOA was weak, LR5 was heard in the background. The best verified station during the last season is KFDM in Texas, also not to forget KZRM, Philippine Islands."

Observer Mathie (New Zealand): "I have been showing RADIO NEWS to several friends here in New Zealand and their comments are universally favorable. Several are now purchasing your magazine for the DX notes.

"The South American stations are coming in exceptionally well and at present (June) can be heard from 3 p.m. (N.Z. time) onwards. The best received being: LS2, LR5, LR3, LS9, LR4, LR6 and LR8. All these stations can be heard up to 30 feet away from my receiver. Some of the Mexican stations are also good. XEPN, XENT, XELO, XFB, XEW, XEFO and XEAW being the best. The best DX, however, is logging the VK amateurs, some of whom are allowed on the broadcast band (between 1114 and 1500 kc. after 1 a.m. N. Z. time). These stations have a maximum power of 25 watts. So DX'ers can imagine how elusive some of them are. 1YA, Auckland, is now using 10 kw.; 3YA, Christchurch, is to be increased from 2.5 kw. to 10 kw. any time now. Tenders have been let for a new 10 kw. station for Dunedin, and it is reported that the new station for Wellington (to be built next year) will have a power of 60 kw."

Observer Lyell (South Africa): "Although the peak period for reception of U.S.A. stations in this country has come not a single U. S. A. station has been heard up to the present—not the slightest trace. The weather continues unsettled and stormy here—a most unusual thing for this time of the year. The Argentine stations continue to come through during the early morning hours, although quite a few of the medium-powered ones have not been heard. Even the European BC stations have been erratic and with the exception of Rome on 713 kc., which has been heard fairly regular, only the more powerful ones have been picked up, and these at about R3-R4."

Observer Tucker (Alaska): "Received my L.P.O. appointment. It took 50 days to reach me in the mails. Reception this spring has been fair with California stations coming in at 8 to 9 p.m., the best of which were KFI, KPO, KGO and KNX.

"The transpacific stations are heard best between 10 and 11:30 p.m. The best of these are 2YA, 570 kc.; 5CK, 635 kc.; 1YA, 650 kc.; 3YA, 720 kc.; 3LO, 800 kc.; 3ZR, 940 kc.; 4BH, 1380 kc.; KGU, 750 kc.; KGMB, 1320 kc."

Observer Prats (Puerto Rico): "Static is somewhat improved but is still bad enough to prevent reception of about two-thirds of the stations normally heard during the good season. Stations now being heard (letter dated June 26th) are: WJZ, WEAF, WLW, WABC, WHAS, WWL, WLS, WENR, XEAW, WCAU, YV1RC, WBZ, KYW, WTAM, KSL, WOAI."

The Service Bench

(*Continued from page* 173)

dary, and the conventional tube rectification circuit substituted. (In some instances, a slight readjustment of voltages may be necessary.)

"Upon completion of the alteration the set operated with full efficiency. The cost of the job was about one quarter that of a new vibrator unit." A. W. Tytler, Jr., and L. L. Hotsenpiller, Roanoke Radio Service, Kansas City, Mo.

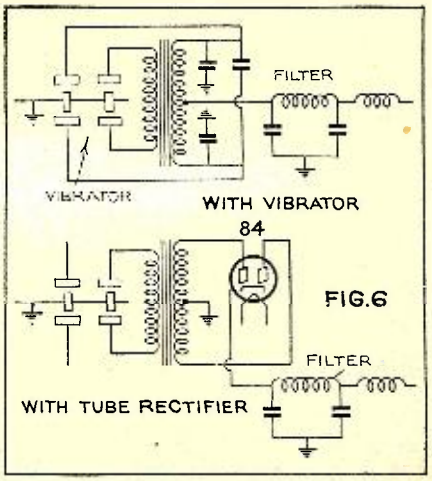
Test for Hum

George Miers, of Miers' Radio Shop, Easton, Pa., immediately suspects the electrolytic condensers in cases of hum in receivers employing this type of capacitor. He suggests tipping the receiver on its side, while in operation, and note any change in the hum intensity. If it decreases, it is a definite sign of a faulty electrolytic condenser.

SERVICE NOTES

The Radio Manufacturers Service has arrived at an agreement with the Western Union Telegraph Company, whereby anyone in need of radio service need merely call Western Union to secure the expeditious attention of an R. M. S. member. The cost to the serviceman is only 10 cents per service call obtained in this way, and to the customer, the price of the telephone call plus the usual radio repair charges. Expert servicemen who are interested, and who are not already members of the R. M. S., may secure full information by writing to Philco, Philadelphia, Pa. Ask for the June issue of the *Philco Serviceman*, which, in addition to details regarding the telegraph service, contains other sales promotional data of interest to the serviceman.

RECTIFIER CIRCUITS



Super DX-8

(*Continued from page* 145)

right, the control knobs serve the following purposes. First comes the "a.v.c." switch; when turned to the right the sensitivity control is manual, turned to the left it is automatic. Next follows the frequency range switch; in the extreme left position the frequency range is from 18 to 9 megacycles. Turning the knob clockwise, the next band covers from 9.5 to 5.5 mc., the third band covers from 6 to 3 mc. and the fourth from 3.5 to 1.6 mc.

The third knob permits switching from speaker to phone. The fourth knob (in the center), is the sensitivity control. Then follows the beat oscillator switch, which is "on" when turned clockwise. Knob number six is the "on-off" switch and volume control combined, while the last is the "stand-by" switch which cuts off the plate supply.

From this brief description it will be evident that this new receiver provides an array of valuable features usually found only in the more expensive "communication" type receivers—yet the cost of complete parts to build the "Super DX-8" puts it within the reach of many amateurs and short-wave experimenters who cannot afford these manufactured receivers.

Parts List

1—Foundation Kit consisting of: Chassis and Panel.

1—Gen-Ral Coil Kit No. 34 consisting of:
1—multi-wave unit—18 to 1.5 megacycles.
1—LCX 200D-V-M 507 kc. series wound i.f. unit, input—top grid.
1—LCX200D-V-M 507 kc. series wound i.f. unit, output—bottom grid.
1—Heterodyne Oscillator—507 kc.
3—Planagraph Prints.

1—Power Transformer.
1—Reliance 140 mmfd. band-spread condenser, type 2K140.

2—4 Prong Tube Sockets, 1½ inch mtg. centers.
4—6 Prong Tube Sockets.
2—5 Prong Tube Sockets.
1—7 Prong Tube Sockets.

C4, C6, C7, C27—.05 mfd., 200 volt.
C5, C8, C10, C11—.01 mfd., 200 volt.
C9—.0001 mfd. mica condensers.
C12, C17—1. mfd. 400 volt.
C13—5. mfd. 25 volt.
C14, C16—.01 mfd. 400 volt.
C15—10. mfd. 25 volt.
C18, C19, C20—8 mfd. 450 volt. Screw type mounting.
C25—.1 mfd., 200 volt.
C26—.00025 mfd. mica condenser.
C28, C29—.10 mfd., 400 volt.
C30—.2 mfd., 200 volt.
C31—.001 mfd. mica condensers.

R1—25,000 ohm volume control with taper.
R2—150 ohm 1 watt carbon resistor.
R3—40,000 ohm 1 watt carbon resistor.
R4, R8, R14—250,000 ohm 1/3 watt carbon resistor.
R5—13,000 ohm 2 watt carbon resistor.
R6—200 ohm 1/3 watt carbon resistor.
R7—25,000 ohm 1/3 watt carbon resistor.
R9—1,000,000 ohm 1/3 watt carbon resistor.
R10—200,000 ohm 1/3 watt carbon resistor.
R11—500,000 ohm pot. type volume control.
R12—5,000 ohm 1/3 watt carbon resistor.
R13, R17, R21, R22—50,000 ohm 1/3 watt carbon resistor.
R15, R18—500,000 ohm 1/3 watt carbon resistor.
R16—3,000 ohm 1/3 watt carbon resistor.
R19—500 ohm 1 watt carbon resistor.
R20—20,000 ohm 1 watt carbon resistor.

6—Aluminum Tube Shields.
2—Rotary Type Switches s.p.d.t.
2—Rotary Type Switches s.p.s.t.
2—Insulated Binding Posts—"ANT."
1—Plain Binding Post—"GND."
1—Pair Phone Tip Jacks.
1—Wiring Harness.
1 ft. ¼ inch shielding.
2 ft. shielded wire.
6 ft. power cord with plug attached.
1—8-inch dynamic speaker, 2,500 ohm field with output transformer for 2A5 tube.
8—¾-inch diameter black bakelite knobs.
1—½-inch diameter rubber grommet.
3—¼-inch diameter rubber grommet.
5—2-lug insulated terminal strips.
2—1-lug insulated terminal strips.
2—Fibre shoulder washers.
2—Fibre plain washers.
2—58 type tubes.
1—2A7 tube.
1—2A6 tube.
1—2A5 tube.
2—56 tubes.
1—280 tube.

Servicemen's Profits

(*Continued from page* 153)

the mere sum of seventy-five dollars. The result was simply this: He installed a photo-electric cell and relay near the door in such a way (Figure 1) that when the truck drivers backed up to the building to unload, the rear end of the truck would interrupt a beam of light and ring a "loud" bell at a critical distance. The man who made the installation did not buy a complete photo-electric unit but rather only the components that he could not himself assemble. The job (with cell) cost him only $25.00. The light source was made from an automobile light reflector, a bell ringing transformer and an auto light.

This is the kind of electronic equipment that these small manufacturers can buy and the radio man can sell at a reasonable price with some margin of profit. And there are plenty of other little jobs that can be done with such equipment about small plants. Automatic counters can be placed on punch presses (Figures 2) and conveyor machinery, burglar alarms can be installed, elevators can be prevented from starting until the gates are closed and many, many other chores that only photo-electric equipment can do, *can be done!* But this business is not available to fellows who sit in their places of business and recall the "good old days" when sets were sold with seventy-dollars margin and tubes brought a dollar profit for each sale. *Get out and get busy—get that brain working along the lines pointed out here and you also can cash in!*

Testing the HRO

(*Continued from page* 150)

crystal filter circuit arranged so that it can be used in this fashion for c.w. reception or, by a phasing adjustment, for radio telephone reception where a somewhat lesser degree of selectivity can be utilized. The set employs 9-tubes (without the power pack) using a 58 or a 6D6 in the first and second pre-selector short-wave stages. A 57 or 6C6 tube is used for the first detector and, coupled electronically to this, the oscillator tube is of similar type. A 58 or a 6D6 is used in each of the two i.f. stages followed by a 2B7 or a 6B7 for the second detector, with a 2A5 or a 42 tube used as the output. The c.w. oscillator tube is a 57 or a 6D6, also coupled to the second detector. The schematic circuit is shown herewith.

The rack-and-panel mounted job consists of this receiver, together with the power supply (which is the bottom unit); and the speaker and coil case units. The unit just above the speaker is the coil case for the calibrated band-spread, ganged, plug-in coils.

The front of the receiver contains the main tuning dial, center, and at left, the S-meter (for determining signal strength) underneath which appears its push button and a jack for headphones. Just below this is the audio-frequency volume control. Below this is the snap switch for turning "on-or-off" the a.v.c. and the bottom control knob turns "on" the oscillator and gives a small frequency variation for adjusting beat note. Below the main tuning dial there is the drawer of four tuning circuits for a given frequency band, that can be inserted in a jiffy merely by pulling out on the two handles. At the right, the top control is marked "selectivity" and below that is the control for "phasing" in the crystal circuit. The snap switch, next below, cuts the B power "on-and-off" and the bottom control of all is the r.f. gain (which we formed a habit of keeping fully on most of the time and controlling volume of reception almost entirely with the audio control). We could go on talking about this receiver for many thousands of words but as space is limited and as the HRO Instruction Manual goes into this matter in profuse detail, we will simply state some of the results we have obtained with the receiver. We think that for c.w. reception the crystal circuit really afforded the sharpest and most reliable non-interfering reception that we have so far had the pleasure of experiencing. Signals from all over the world were tuned in and, in many cases, when and if interference cropped up, an adjustment of the phasing control and the oscillator setting, as well as the selectivity control, cut it out in every case we tried. This was true of both amateur c.w. reception from 10 meters all the way up to the broadcast frequencies. It was really a pleasure to be able to control the heterodyne frequency without having to change the tuning or putting it "off frequency".

On the 20-, 80- and 160-meter amateur phone bands the receiver well demonstrated its exceptional sensitivity and selectivity (especially when the phasing adjustment of the crystal was used) and many hundreds of amateur stations were actually logged on my log sheets. To cut a long matter as short as possible, I am listing some of the American and foreign call letters from the 20-meter band log. These calls were written down, as heard, during the station announcements: W1AHI, W1DIO, W1AUC, W1CHG, W1CAV, W1BBN, W1GBE, W1FZO; W2HQY, W2EUG, W2HFS, W2AIT, W2FLG, W2UEP, W2EEN, W2ICU, W2AN, W2CFU, W2ART, W2MB, W2DVU, W2AAK, W2KIZ, W2CLS, W2FKL, W2KX, W2CQK, W2KR; W3AXT, W3AIR, W3DHM, W3BSY, W3BLO, W3IX; W4FQ, W4BLH (portable), W4AAK, W4BDD, W4DCK, W4DUX, W4AXO, W4KH, W4ALG; W5ZS, W5BDB, W5DND, W5LA, W5DCP, W5ECL, W5AEB, W5LAR, W5BGT, W5CCB, W5AXU, W5DG, W5BIN, W5BGW, W5PP, W5ZA, W5UN, W5AHJ; W6BGY, W6AQV, W6ZH, W6LR, W6EBJ, W6IZB; W7BCF, W7BCI, W7DNP; W8FSA, W8IGO, W8FA, W8AMY, W8KAZ, W8CDW, W8JTW, W8HTV, W8JVR, W8KJE; W9NLP, W9BJW, W9DHF, W9GBG, W9GJY (portable), W9PIY, W9CET, W9OJC, W9DEF, W9APP, W9ARK, W9DTP, W9GF, W9TPC, W9BJ, W9FQ, W9DHC, W9GXE, W9BFC, W9JEZ, W9BIF, W9RGF, W9QC, W9LBX, W9JNG, W9WX, W9LAI; VE1CR, VE2CA, VE2FG, VE2BD, VE2EE, VE3LL, VE3IX, VE3DB, VE3DF, VE3KW, VE4HQ, VE4NI, VE4BF, VE4GD, VE5HN; TI3AV, TI2RC; COfRY, CO6OM, CO2HY, CO6WW, CO2LL, CO2RA; HJ5ABE (must be a harmonic), HC1FG, HI7G, HP1A, HH5PA, X1G, X1W, X1T, VP3BG, VP5PA, VP5PZ, VP6YB, VP6PS, PY1VB, PY1BB; LU6AP, VK2EP, VK2YW, ZL2KI, ZE1JO (?) LA1G, ON4AU, ON4AC, OK2AK, K4SA, K6BAZ, VO1I, VO8A, CT1BY, EA4AO. The total list of 20-meter amateurs (when their mileage was figured up from New York) total 262,125 miles. I plotted these distances in some spare time from airline maps. The log on 80 meters and 160 meters gave 72,850 miles for the total distance. The log of c.w. stations both amateur and commercial gave a total of 480,645 miles. During these tests I made a habit of tuning in some local amateur with a stand-by receiver and then tuning the HRO to a distant station he was trying to QSO. In many cases the HRO brought in the complete return message without interference while at the same time the local amateur would report QRM.

The receiver also proved its worth as a very efficient short-wave broadcast receiver and one that I would heartily recommend for any Short Wave Listening Post Observer. The log shows reception and identification of over 100 short-wave DX stations, received from 41 foreign countries, outside the United States. The total mileage of these stations from New York was 324,660 miles. The calculation for the total mileage of all short-wave stations logged during the week's period is 1,140,280 miles (if I have not made a mistake in addition). I consider this a very excellent record for any receiver.

I did not do much on the broadcast band with this receiver as the static on these bands was heavy. However, I did identify a few West Coast stations and many at lesser distances throughout the United States. The tone quality on broadcast reception was all that could be desired. Next month I will point out some of the technical features of the receiver.

Canadian Television

(*Continued from page* 143)

programs with your chin resting on the receiver," says Mr. Peck. "The average radio listener sits from 10 to 15 feet from his set while he receives broadcast programs and it is unlikely that he will change his habits for television. Both theory and experiment prove that a 16-inch picture scanned by 180 lines contains all the detail that it is possible for the human eye to see at a distance of 10 feet or more. In other words, any detail in excess of 180 lines would be wasted unless the observer wanted to sit almost on top of his receiving set. Home movies can offer no more usable detail than can 180-line television, when viewed under similar conditions. We have consistently adhered to mechanical scanning because of its inherent superiority over other forms. In the first place, a cathode-ray tube which lasts about 1000 to 2000 hours before growing dim, costs approximately $75.00 in a size large enough to produce even a nine-inch picture. Then, too, our system requires a maximum voltage no greater than that used in the power stage of ordinary receivers. We use 350 volts, as compared to the cathode-ray tube's 1000 to 5000 volts. Our only elements which wear out are the light-valve tube and the light-source bulb, both of which last some 5000 hours and have a combined cost well under two dollars.

"We are now completing a new scanning system which is smaller and lighter than any heretofore constructed. It is driven by a 1/100 horsepower motor—smaller and cheaper to operate than many electric fans. And our light-valve is operated by only 1/20 watt; it cannot overheat! Add to this the fact that our picture is in black-and-white, as compared with the cathode-ray tube's varying shades of pea-soup green and you have several good reasons why we believe the mechanical scanner, with its low initial cost and its freedom from trouble, to be

the only answer to the problems which have previously confronted television."

It has consistently and repeatedly been stated that television is still several years away. Peck, on the other hand, claims he has produced a system which the press and the public have pronounced satisfactory. So Peck readily admits that television has arrived. You can look for announcements by leading Canadian radio manufacturers, in the very near future, stating the appearance of Peck receivers on the market—and at a surprisingly low price. The Federal Communications Commission in the United States has, in all good faith, been guided in some measure by the statements of leading radiomen in making its estimate of the status of television, according to general rumors. Consequently, the Commission has made it rather difficult for the independent television companies to secure broadcasting licenses here. But when Mr. Peck went to the Radio Commissioners of Canada, explained his system to them and showed them evidences of performance, a Canadian license was promptly granted, and VE9AK came into being.

A diagram of the receiving apparatus which will soon be commercially available in Canada is shown on these pages, together with a brief description. There are, however, two features of the commercial job, full size working models of which have been produced by Peck, which will be of interest to every radio-minded reader.

First, the cabinet is entirely different from the earlier odd-appearing television receivers which have been produced in the past. With the top closed, it looks like any handsome console radio receiver. But when television images are being received, the top of the cabinet is lifted, like the lid of a phono-radio combination, and the 14-inch by 16-inch ground-glass screen, upon which the picture is reproduced, automatically swings into place. This screen is removable, however, so that a larger picture, up to five feet wide, may be projected onto the wall.

Second, the same cabinet that contains the television receiver equipment also houses an all-wave radio broadcast receiver and high-fidelity loudspeaking system. In this way, the set owner is assured not only of the sight-and-sound programs being sent out by the Peck station, but of all the sound broadcasts any other radio set will receive, as well.

Programs, long a bugaboo of television companies, present no particular problem to the Peck Corporation, which uses films and is now opening negotiations with the leading producers to make comedies, animated cartoons, features, shorts and musicals available on the air. This, it is expected, will give the "looker-in" the greatest stars of the screen as ordinary entertainment.

Besides this, Peck is planning to use his direct pick-up for sports, dramatic, educational and musical broadcasting. He does not worry about where the talent is coming from, but points to the precedent of radio, which simply went ahead and did the job. The Peck organization will, until television stations are permitted to sell time, defray the costs of talent, being reimbursed by income from the sale of Peck television receivers by companies licensed to manufacture them. After television stations are permitted to sell time, as do broadcasting stations, the talent bill will be defrayed by sponsors.

Mr. Peck is also planning to open a station in the United States some time before the coming winter. Other than stating that it will be located in the New York area, and will operate with sufficient power to bring his broadcasts to some 10,000,000 people, he refuses to comment until final arrangements have been completed.

Ten Meters Active Again

Several months ago we had a department devoted to 10-meter activity. It seems as though our plea for activity has been answered, as during the late spring and early summer a number of new stations appeared on the band, supplementing the number of pioneers who have stuck by the band during periods of good and bad activity.

During the last spring the band seemed to open up for some real DX. Increased activity may be partly responsible for this. A number of stations have put exceptionally fine transmitters on the band, and it is not uncommon during favorable conditions to hear out-of-district stations and even some out-of-country signals.

One of the most active pioneers on the band is W2TP. 2TP's present layout uses a 203-A in the final amplifier with about 200 watts input. He may be heard almost every Sunday afternoon working DX with good reliability. W2TP has been on the band since 1928 and still sticks by it, alternating his activity with 20-meter operation. He was heard recently working a ninth district station using only 3 watts input. The 9, despite the low input, was R8 in New York.

On the other hand, a number have put high power on 10 meters. Several are using as high as 500 watts, but the average is far less. Most of the "boys" on 10 are using less than 100 watts and are doing excellent work.

The chief obstacle in 10-meter transmission and reception is the antenna. It requires much experimentation and care in its erection. It is desirable to make field-strength measurements and adjustments until low-angle radiation is obtained. A vertical antenna, of course, is best. If a horizontal antenna must be used, a full-wave Zeppelin gives better radiation characteristics than a half-wave horizontal.

Ten meters is ideal for summer work, due to the almost complete absence of static. However, if you are unfortunate in being located on a much-traveled highway, it is not so good. Ignition QRM is the chief source of interference—Packards and Fords being the most serious offenders!

100 Miles on 5 Meters

NEW YORK, N. Y.—About a year ago, Mr. James Millen (W1HRX) of Malden, Mass., and the headquarters of the American Relay League (W1AL) at West Hartford attempted to form a chain of ultra-short-wave stations which would link Malden, Hartford, New York, Baltimore and Washington. Now a report comes from amateur station W3AZG at Riverton, N. J. (across the river from Philadelphia) that a conversation between Station W2DLG, the Hotel New Yorker and station W2AMJ in Bergenfield, New Jersey, was picked up at Riverton. This establishes a 100-mile communication on 5 meters which is something of a record. The station at the Hotel New Yorker, was operated by Mr. Arthur H. Lynch and the station at W2AMJ is owned and operated by Mr. Frank Lester. This event has given new hope among the amateurs for the possibility of covering larger distances with ultra-short-waves. A new series of tests is being organized in order to try to better this record.

The New 6B5 Tube

PROVIDENCE, R. I.—The Triad Mfg. Co. of Pawtucket, R. I., has put on the market a new tube designated as 6B5, which represents a radical departure in tube construction. The 6B5 is an improvement on the former 2B6, or triple-twin tube, but the cathode of the input section is internally connected to the grid of the output section and not to any prong on the tube base. To all appearances the plate circuit of this first plate section is not closed. However, the output section is a tube with a very high amplification factor which is so designed that the grid circuit impedance serves as the output impedance of the first section. In this way it is possible to eliminate a great number of parts and accessories which otherwise would have been necessary. For instance, it is possible to replace a 42 pentode by a 6B5 and have a few parts left over. For such a replacement the bias resistor should be short-circuited; no other changes are necessary. The 6B5 in such a circuit will deliver approximately 4 watts.

It should be understood that the 6B5 tube is not a Class B tube, but it is a triode tube designed and employed for Class A reproduction. The filament requires a potential of 6.3 volts and a current of .8 amperes. When used as a single ended amplifier the ratings are as follows: output plate, 300 volts; input plate, 300 volts; grid bias, 0 volts; output plate current, 45 m.a.; input plate current 8 m.a.; amplification factor, 58; plate resistance,

24,100 ohms; mutual conductance 24,000 microohms; load resistance, 7,000 ohms; power output with 5% total harmonic distortion, 4 watts; input volts for rated power, 15 volts r.m.s

The tube can be employed with the same supply voltages in a push-pull circuit. In that case, the load resistance from plate to plate should be 10,000 ohms. The total power output is then 10 watts. Further, the tube can be employed in a "high efficiency push-pull" circuit. The characteristics for this circuit are: plate supply, 400 volts; fixed grid bias, minus 13 volts, or, self bias resistor of 140 ohms shunted by 25 mfd., or, reduction of input plate voltage to 270 volts. Static output plate current (per tube) 40 ma.; static input plate current (per tube) 6.5 m.a.; load resistance (plate to plate) 10,000 ohms; power output at 5% total harmonic distortion, 20 watts. Under these conditions an input signal of 60 volts r.m.s. must be applied from grid to grid.

A 19 Tube Set

(*Continued from page* 146)

compensated first audio amplifier
2—42's as triode connected Class A audio driver stage
4—42's as triode connected push-pull parallel, Class A Prime 35-watt output stage
2—5Z3's in parallel as rectifiers

In terms of sensitivity, no difficulty is had in obtaining ½ to ½ microvolt absolute on all five bands. Outstanding, however, is the use of two r.f. stages on all tuning bands. The voltage amplification of these two stages is 400 times as against approximately twenty times for the conventional single r.f. stage. In actual practice, the two r.f. stages coupled with i.f. gain so low as to introduce no i.f. noise, result in total inherent noise of not over 20 milliwatts, with a 1.0 microvolt unmodulated carrier applied, which when modulated 30% at 400 cycles produces a total signal output of 500 milliwatts, thus giving the signal to inherent noise ratio of 25:1 with all receiver controls wide open!

To successfully utilize such available sensitivity on weak signals also requires a high order of frequency stability to prevent "drifting". All r.f. inductances are adjusted for absolute uniformity, and all r.f. oscillator and i.f. circuits are tuned with air condensers which are impervious to humidity, temperature and vibration. Going even further, inductances, air-trimmer condensers and even tuned circuit wiring are heat isolated and shielded from tubes and bleeder resistors. These precautions provide permanence of dial calibrations and of original sensitivity and selectivity.

In Figure 1, the tubes at the immediate left of the gang condenser shield, rear to front are: first r.f. stage, second r.f. stage, first detector, and 76 oscillator. A total of four sets of five r.f. tuning inductances each are located in the eight round copper shields at the right of the chassis.

Examining the circuit diagram of Figure 3, the three i.f. tubes are coupled by high Q, 3 section Litz-wound transformers T5, T6, T7 and T8. For high fidelity (broad) reception, switch SW2 cuts out the first two stages. Gain is more than sufficient with the single remaining i.f. stage for reception of local stations, or stations strong enough to override all local noise and interference.

For the 18,000 cycle admittance band needed for full range high-fidelity reproduction, i.f. transformers T7-T8 are over-coupled, and adjusted for a band-pass resonance curve having a substantially flat top and steep sides for elimination of adjacent channel heterodyne whistles—hence the 9,000 cycles cut-off.

When the two extra i.f. stages are cut in for selective distant reception, they narrow the admittance band down to about 8 kc., yet without serious side-band cutting. The gain contributed by the first two i.f. stages is only 12. This low gain is intentionally obtained at quite some effort in order to keep down inherent circuit noise.

Following the i.f. amplifier is the amplified automatic volume control system which not only levels off output at maximum undistorted power output on weak signals in order to eliminate fading and blasting, but also prevents input r.f. amplifier overload on strong local stations.

The a.v.c. actuating voltage is taken from the highest voltage point—the last i.f. plate, further amplified by the pentode section of the 6B7, then rectified by its diodes and applied to the first and second r.f., first detector, and second and third i.f. control grids to automatically regulate sensitivity and volume.

The second detector consists of the diode elements of the 85 tube, resistance coupled to the manual volume control in the grid circuit of the 76 first audio amplifier. Coupled to the second detector in the 76 audio oscillator adjusted for maximum signal strength and a clean, stable note.

The visual tuning meter is a vacuum-tube voltmeter, and swings on very weak signals. In conjunction with the sensitivity control, it can be used for signal strength measurement from day to day, or as an R-meter. The signal voltage amplified and rectified by the 6B7 is further amplified by the triode section of the 85 before it is applied to the tuning meter.

The three-stage audio amplifier starts with the 76 voltage amplifier which has bass and treble compensation (boost) controllable by the separate Bass and Treble tone controls. It feeds through a Clough tuned push-pull transformer to the pair of push-pull triode connected Class A 42's in the audio driver stage of the power amplifier.

This push-pull stage feeds the four 42's in the triode connected Class A Prime power output stage. The audio amplifier (including all preceding r.f. and i.f. circuits) can be adjusted by means of the two tone controls to be flat from 30 to 9000 cycles, or to be up 8 db. at bass and treble ends, or to be down 30 db. at bass and treble ends for very weak signal reception in noisy locations. Undistorted power output is 35-36 watts with 5% total harmonic distortion. Harmonic distortion is below 1% up to 10-watts output, and below 2% up to 20-watts output.

The power supply uses the 5Z3 rectifiers in parallel for ample safety factor to furnish a total of 388 volts at 240 ma. to the tuner and amplifier. The large flat mounting power transformer has an electrostatic shield for line noise reduction. It feeds the three section filter which uses an input choke cushioned on rubber to prevent vibration destroying quality in high fidelity reproduction, and the two speaker fields. A total of 46 mfd. of wet electrolytic capacity is used in the filter, its last two condensers being the new self-regulating type which automatically regulate power supply voltage as tubes warm up.

The output amplifier feeds the speakers, the 13-inch bass speaker covering the tone range of 30 to 4000 cycles, and the 5½-inch "tweeter" or high-frequency speaker overlapping at 3000 cycles and going on up to 9000 cycles. A simple dividing filter is used to level off the 3000-4000 cycle overlap range.

Such then, is a general description of a flexible all-wave receiver designed to satisfy every requirement that can be set up today—a real musical instrument, and for the broadcast or short-wave DX-hound, a real distance-getter on all wavelengths.

Navy Searchlight

(*Continued from page* 140)

able soon for President Roosevelt in addressing huge crowds on the White House lawn. Lack of adequate loudspeaker facilities for the President's recent addresses on the lawn are said to have prompted this action.

It is probable that the new device will soon be made available through the regular commercial channels of the Gray-Bar Company. It had been called, during a recent demonstration for the sales force of this company, "The Bull Horn". The suggestion has been made that all American vessels be equipped with a device of this kind for emergency operation where spoken directions or commands may be heard above the tumult of the wind and wave or the crackle of flames, for rescue purposes.

Radio Work Shop

(*Continued from page* 183)

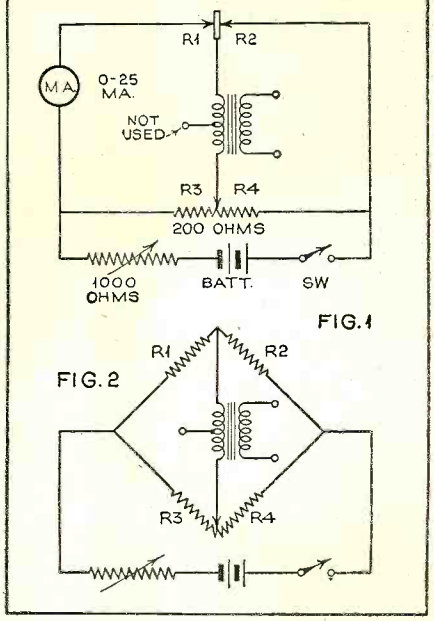
An Improved Microphone Connection

In the usual method of double-button microphone connection, employing a center-tapped coupling transformer, there will be more current flowing in one-half of the transformer than the other unless both buttons have exactly the same resistance, with resulting partial core saturation. In order to eliminate this unbalanced current through the transformer, the writer devised a circuit whereby the microphone transformer carries only the modulation current.

The circuit is shown in Figure 1. Since the transformer carries no microphone current, the center-tap is not needed. A close study of the circuit reveals that it is merely an adaptation of the Wheatstone bridge

where the two buttons form two arms of the bridge and the potentiometer forms the other two.

Figure 2 shows the circuit in bridge form. R1 and R2 are the resistances of the carbon granules, about 100 ohms each. When R1 and R4 are equal to R2 and R3, the bridge is balanced, and no direct current flows through the transformer. However, if R1 increases while R2 decreases



in resistance, from modulation, the bridge becomes unbalanced and the modulated current flows through the windings.

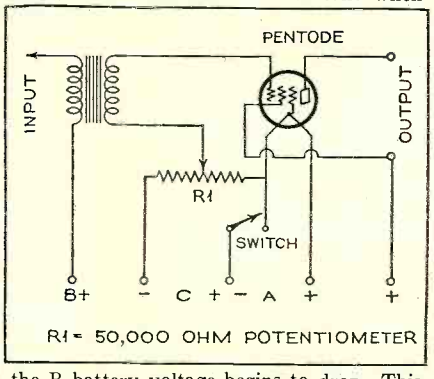
It is not necessary to measure the microphone current through each button individually, because when the bridge is balanced the current through each button is the same.

In balancing the bridge, adjust the microphone current to the desired value, then disconnect one end of the battery and move the potentiometer arm back and forth while rapidly tapping the battery connection on and off until the loud clicks from the loudspeaker disappear. If desired, a milliammeter may be placed in series with the microphone transformer to indicate zero current when the bridge is balanced.

JESS M. REED,
Los Angeles, Calif.

Bias Adjuster for Battery Sets

Many battery receivers, especially those using pentode type tubes in the output stage, have a distorted or thin tone when



the B battery voltage begins to drop. This is usually due to incorrect C bias for that particular voltage on the plate of the tube.

The diagram shows a bias adjusting arrangement which will overcome this difficulty, since it allows the bias to be set at the point where best results are obtained.

A 50,000 ohm potentiometer can be used. A lower value would result in a wasteful drain of the C battery.

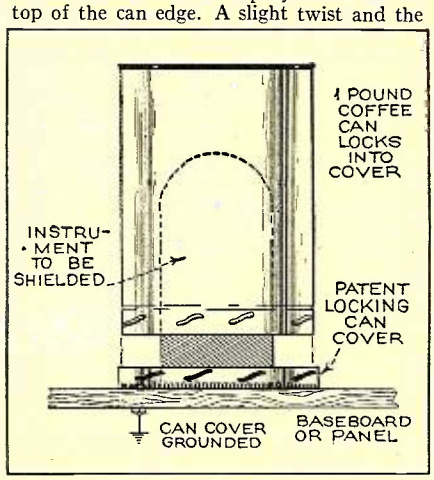
The same idea is applicable to electric sets and is helpful in preventing harshness, especially in short-wave receivers.

H. D. HOOTON,
Beech Hill, W. Va.

Shielding With Tin Cans

I find that tin coffee cans make excellent shields both in r. f. and a. f. circuits.

Obtain a coffee can with the patent locking-cover, these have short grooves around the sides that lock with projections on the top of the can edge. A slight twist and the



cover is removed. To use as a radio shield, fasten the cover to the baseboard or panel with small bolts, which are grounded. The transformer or other radio part is then mounted inside of the cover. Then the can is inverted and twisted into its locked position.

L. B. ROBBINS,
Harwich, Mass.

An Engraving Kink

After reading the Experimenters' Department for a great many years I have decided to send in one of my own experiments and hope that others may benefit from this suggestion as I have from their ideas.

Recently I completed the construction of a set analyzer and the only remaining job was the engraving of the panel. Inquiries among the commercial engraving companies showed me that the cost was too high for my pocketbook and I decided to try my own hand, inscribing the panel.

I took a small three-cornered file and ground the end to a sharp point and then practised lettering and numbering, on an old piece of bakelite. When I thought my efforts were in keeping with a workmanlike engraving job I went to work on the analyzer panel and I turned out a first class job.

After inscribing the panel I dipped the end of my finger into a can of white enamel paint and rubbed the paint into the grooves of the engravings and with a piece of cloth I wiped the excess paint from the panel. Three coats did the trick and the job was not hard to look at.

H. E. GRANCHIE,
Youngstown, Ohio.

Foreign Station Addresses

Observer Routzahn (Pennsylvania) suggests that the DX Corner would serve a useful purpose if it would publish, from time to time, the correct mailing address for some of the foreign stations. As a start in this direction he sends in information on a number of stations that he happened to have on hand at the time.

The Editor would be glad to know what other readers think of this idea. If you like it, shoot along such authentic addresses as you have on hand. Those given by Mr. Routzahn are as follows:

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CMOX. Apartments Hotel, 8 & 19 Sts., Vedae, Havana, Cuba.
CP-4. Cassila Correo, 637 La Paz, Bolivia.
Cologne, Germany, Reichs Rundfunf Gef. m.p.h. Reichsender Koln, Germany.
LR-5. Radio Excelsior, estudios Mainu 462, Buenos Aires, Arg.
Poste Parisien, 4 rue de General-Foy, Paris, France.
XEWZ. Avenida Juarez 75, Apartado 291, Mexico, D.F.
YV1RO Apartado 290, Caracas, Venezuela.
5CK. Australian Broadcasting Commission G.P.O. Box 347c, Adelaide, Australia.
4QG. Queensland Division, Aus. Broadcasting Comm., J. W. Robinson, Mgr.

Midwest Tuning Meter

Apparently the difficulty which has been encountered by owners of Midwest 1934 models 16-tube receivers has been finally overcome. L. G. Chavez, of Los Angeles, has been experimenting with this ever since the advantages of a tuning meter were pointed out in this department some months ago. His conclusion is that the only position in which the meter can be used effectively is in the plate circuit of the first i.f. tube. The meter he uses is an 0-1 milliammeter, shunted by a 200-ohm rheostat, and is connected between the plate filter resistor of this tube and the B-plus line. His meter scale is divided into 10 divisions which he has numbered in reverse. With no signal tuned in, the rheostat is adjusted until full-scale deflection is obtained (zero on his reverse scale). Then any signal tuned in will cause the needle to move back down the scale. A high-power local station such as KFI causes the meter to retard the full length of the scale, distant stations cause less retardation and very weak stations cause a barely appreciable movement. Thus he is able to obtain a definite measure of the signal strength of every station tuned in.

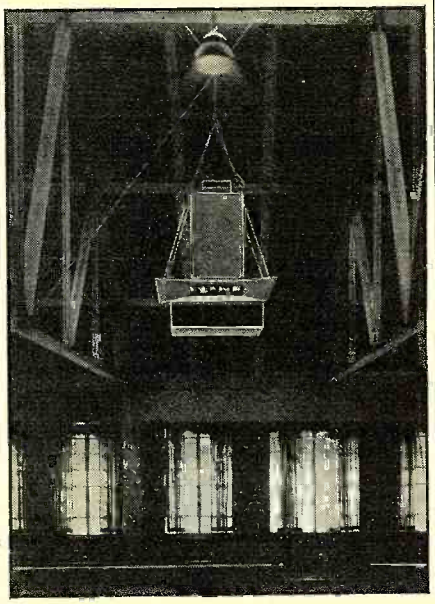
This information from Mr. Chavez will undoubtedly interest a large number of Midwest owners, several of whom have written in asking for specific information on the proper tuning meter connections with this receiver.

A New Resonator

THE problem of properly distributing sound in large halls, without echo effect, is still incompletely understood and certainly not yet solved. In one hall in New York City several large installations had been made by a number of concerns, none of them being entirely satisfactory. Echo effect would be so bad that no one could understand the speaker. Employing only a single reproducer, one installation did get some success but the volume of sound was unbearable close to the reproducer and not enough at other points.

The arrangement, pictured above, was finally found to work well, giving a surprisingly even distribution of sound with but one loudspeaker. The "Resonator" is an invention of M. A. Volf, of New York, and is a "different" type of construction. One dynamic speaker is used in conjunction with a large number of organ pipes. These pipes are of different lengths and diameter, each tuned to a different pitch. They are located at various distances from the cones, the distance depending on the wavelength of the tone in question. The theory is that each of these pipes transmits and reinforces the pitch to which it resonates and, there being such a large number of pipes, there is a pipe for practically every musical note. The speaker pictured above contains 380 pipes. Smaller cabinets have been made for the home, having as little as 65 pipes.

Now, however, we come to the unusual



part, the distribution of the sound. The only way, so the inventor claims, to make one's self heard all over the hall, is to talk into a shallow tank of water. The speaker, having its pipes vertical, sends the sound waves straight downward until they hit the water level. Then the waves are conducted by the water to the edges of the tank. These edges, being at a certain inclination, and the reflecting surfaces above it, distribute the sound in all directions with minimum distortion.

Through RADIO NEWS, the inventor offers a complete set of blueprints with all specifications for such a job, free, to the first 250 readers requesting them. Address your requests to: Volf Acoustical Laboratory, Inc., 48 West 48th Street, New York City.

Dots and Dashes

(*Continued from page* 181)

approximately 0 degrees. When the grid of this tube is connected to the controlling voltage of the a.v.c. system, the shaded angle will become narrower when a station is tuned in. Exact tuning is indicated by the narrowest shaded angle obtainable.

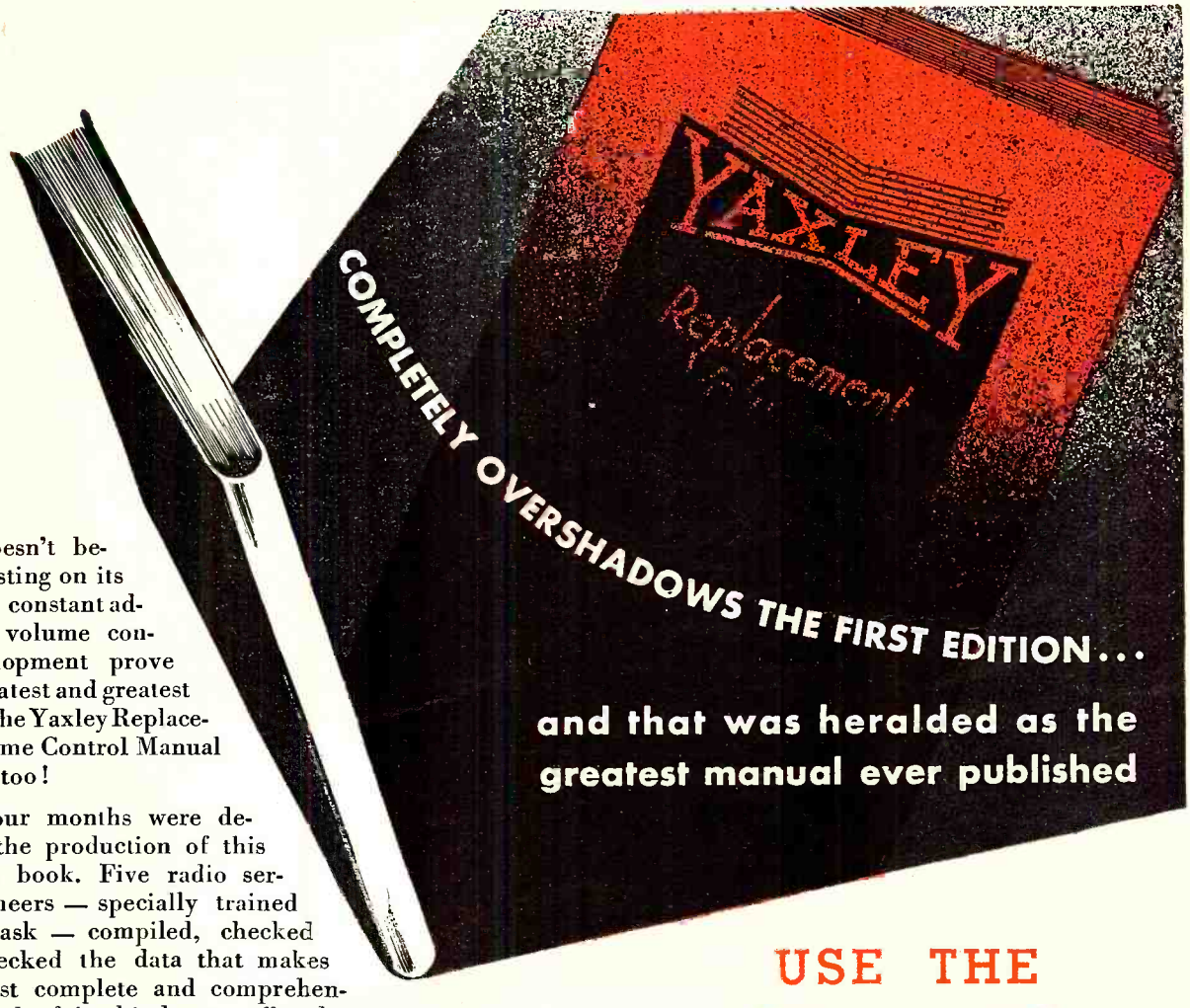
Radio in Palestine

TEL-AVIV, PALESTINE—Mr. S. Lubin, the Managing Director of the International Radio and Music Stores of this city corrects the figures given in the June issue regarding the number of broadcasting stations and receiving sets in various countries. Palestine has at present approximately 12,000 receiving sets of which probably 70 percent are of American manufacture, says Mr. Lubin. There is a small broadcasting station operating at Tel-Aviv which sends out programs on an irregular schedule. A new 20-kilowatt station, to be operated by the Government of Palestine, is now being built.

Radio-LL Increases Power

PARIS, FRANCE—Since the prohibition of advertising matter on the French Government radio stations, the small French private station Radio-LL has been doing such booming business that the Compagnie Nationale de Radiodiffusion, the owner of the station, could increase its capital considerably. It is now proposed to increase the power of the station which is only .8 kw.

The YAXLEY 1936
Replacement Volume Control Manual



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EVERYWHERE, radio enthusiasts are saying: "Have you seen the new 18-tube, 6-band, Acousti-Tone V-Spread Midwest?" It's an improvement over Midwest's 16-tube set, so popular last season. This amazingly beautiful, bigger, better, more powerful, super selective, 18-tube radio . . . is not obtainable in retail stores . . . but is sold direct to you from Midwest Laboratories at a positive saving of 30% to 50%. Outperforms $250 sets. Approved by over 120,000 customers. Before you buy any radio write for FREE 40-page catalog. Never before so much radio for so little money. Why pay more? You're triply protected with: *One-Year Guarantee, Foreign Reception Guarantee and Money-Back Guarantee.*

PUSH-BUTTON TUNING

Now, offered for first time! Simply pushing Silencer Button hushes set between stations . . . while pressing Station Finder Button automatically indicates proper dial position for bringing in extremely weak stations.

METAL TUBES

This Midwest is furnished with the new glass-metal counterpart tubes. Set sockets are designed to accept glass-metal or METAL tubes, without change. Write for FREE facts.

80 ADVANCED 1936 FEATURES

Midwest's brilliant performance made possible by scores of advanced features, many of them exclusive. Only Midwest tunes as low as 4½ meters and as high as 2400 meters...6 bands...18 tubes... push button tuning...acousti-tone V-spread design ...pre-aged adjustments...Fidel-A-Stat...Triple Calibration...etc. See pages 12 to 20 in FREE catalog. Six-bands . . . offered for first time! E, A, L, M, H and U . . . make this super deluxe 18-tube set the equivalent of six different radios . . . offer wave bands not obtainable in other radios at any price! Now, 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!

FULL-SCOPE HIGH FIDELITY . . . SPLIT-HAIR SELECTIVITY

Now, get complete range of audible frequencies from 30 to 16,000 cycles as being transmitted by four new High Fidelity Broadcasting stations—W1XBS—W9XBY—W2XR—and W6XAL. Bring in distant, weak foreign stations, with full loud speaker volume, on channels adjacent to powerful locals.

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Davison, Mich. A radio engineer confirmed my opinion — that no other make of radio will compare with my Midwest for tone, selectivity, volume, ease of tuning and wider range. It is great entertainment. R. F. Collier.

Praises World-Wide Reception

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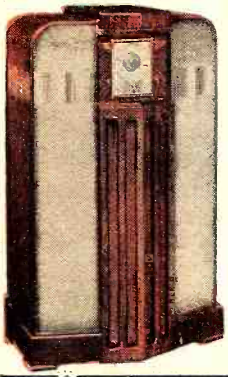

Acousti-Tone V-Spread Design

(Pat. Pending)

Send for FREE 40-page catalog illustrating new 1936 Midwest models and chassis in four colors. Full Scope High Fidelity Console, at left, shows dispersing vanes and exclusive V-front that propel High Fidelity waves uniformly to the ear.

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SAVE UP TO 50%

No middlemen's profits to pay — you buy at wholesale price direct from laboratories . . . saving 30% to 50%. Increasing costs are sure to result in higher radio prices soon. Buy before the big advance . . . NOW . . . while you can take advantage of Midwest's sensational values. You can order your 1936 Full Scope High Fidelity Acousti-Tone radio from the 40-page catalog with as much certainty of satisfaction as if you were to come yourself to our great radio laboratories. You save 30% to 50% . . . you get 30 days FREE trial . . . as little as $5.00 puts a Midwest radio in your home. Satisfaction guaranteed or money back. Write, today, for FREE catalog.

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