All-Wave Radio

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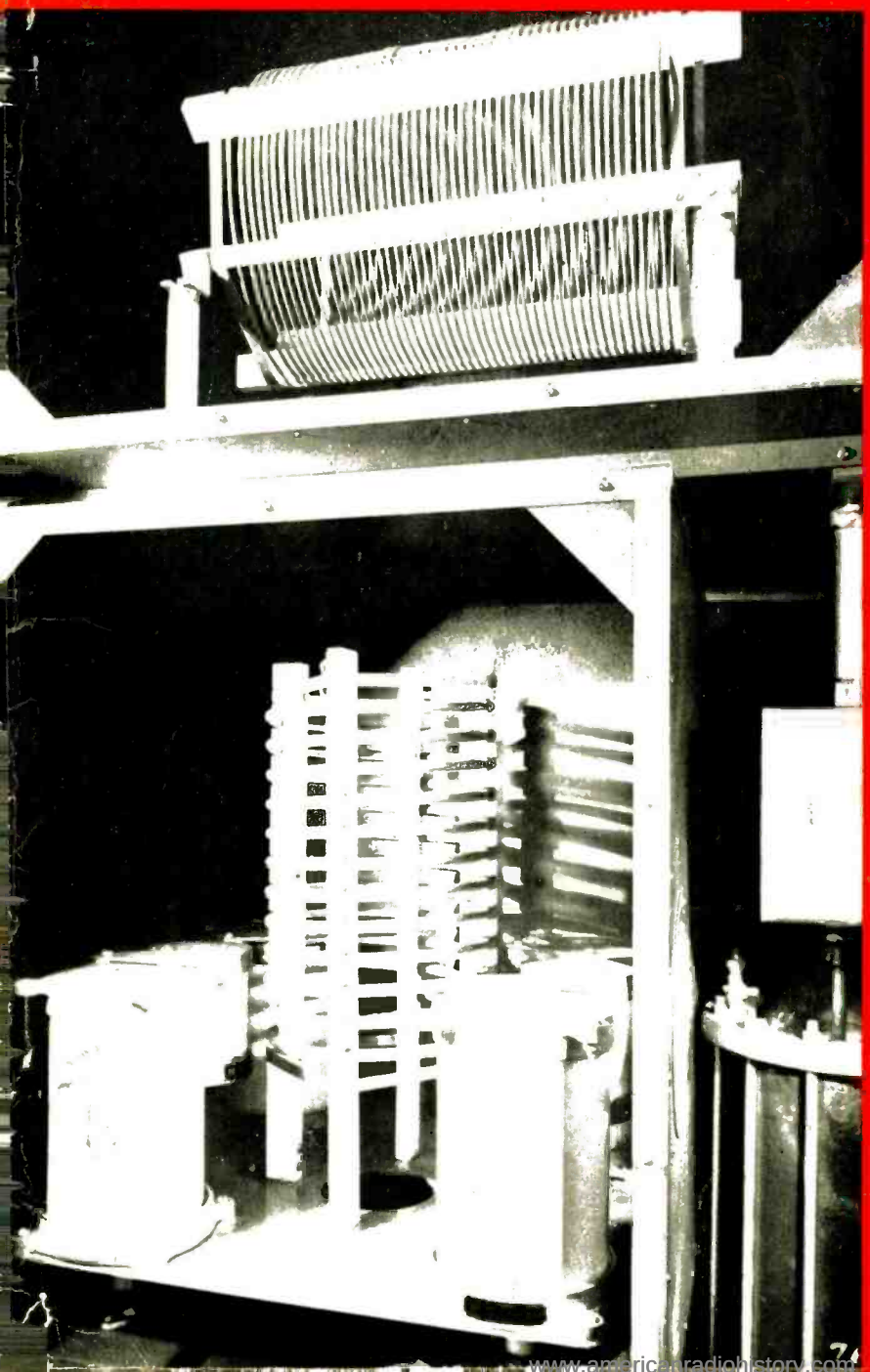
FEBRUARY 1938



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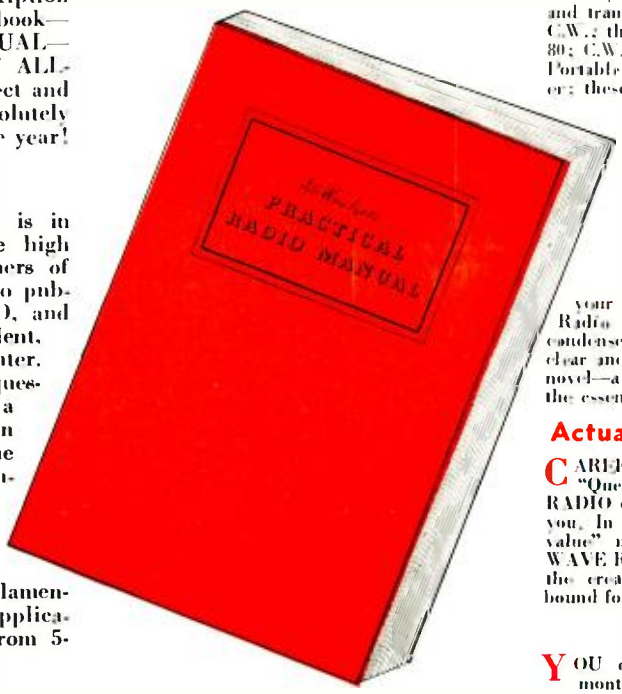

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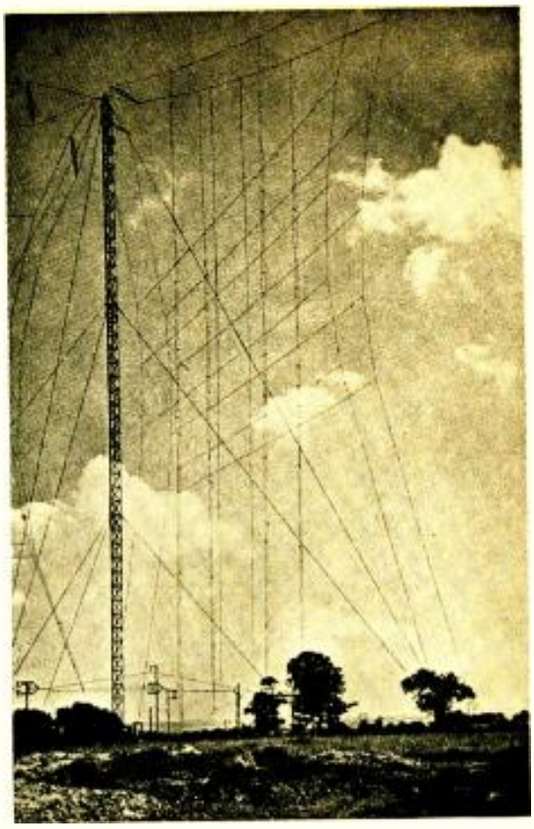
All-Wave Radio

EDITED BY M. L. MUHLEMAN

VOL. 4, NO. 2 FEBRUARY, 1938

COVER ILLUSTRATION

THE GIANT'S VOCAL CORDS—INDUCTANCE AND CAPACITY—COMES IN CONVENIENT COILS AND HANDY POTS, LIKE THESE IN THE NEW 50-KW WESTERN ELECTRIC TRANSMITTER FOR WHAS, LOUISVILLE, KY., WHICH WILL GO ON THE AIR ABOUT FEB 1ST. (Photo courtesy Western Electric Co.)



THE AERIAL ARRAY AT DAVENTRY, USED FOR TRANSMISSIONS TO THE FALKLAND ISLANDS AND SOUTH AMERICA, AND, IN THE REVERSE DIRECTION, TO NEW ZEALAND AND THE FAR EAST. (By courtesy BBC)

CONTENTS

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RADIO and the MACGREGOR ARCTIC

SOME bright chap once said, "We will have weather whether or not," which, of course, is quite to the point, but completely ignores the kind of weather we will have and when we will have it.

Weather has always been an important factor, but never so much as it is today. For one thing, the rapid growth of commercial air transportation has made the matter of dependable weather forecasting a fundamental necessity. The success of airplanes as common carriers and the very lives of their passengers depend on the precision with which flying and landing conditions may be reported.

Purpose of Expedition

The MacGregor Arctic Expedition, now frozen in at Reindeer Point, Greenland, is afield for the primary purpose of collecting data on all sorts of weather phenomena occurring near the North Pole. It is expected that a sufficiently large collection of such data will make it possible to pave the way for future predictions of a highly accurate nature that will provide forecasts of weather conditions in the United States a good deal ahead of time.

As closely as the layman can understand the complicated theory of weather prediction, it seems that low- and high-pressure areas, storms, and winds, originate at or near the North Pole. These conditions are presumed to have a controlling effect on the weather conditions in the Northern Hemisphere, and if this is the case, then the forecasters will have knowledge of weather conditions well in advance of their arrival here.

Thus, if the work of the MacGregor Arctic Expedition adds to the sum total knowledge necessary for long-range weather forecasting, all the hardships and sacrifices of the men and their families will have been well rewarded by the satisfaction which comes of knowing that something has been contributed to progress.

Captain C. J. MacGregor is the Commander of the Expedition. His initiative, planning, and scientific knowledge are the directing forces which the members of the Expedition feel sure will crown the venture with success. He has long been a recognized authority in his chosen field and has served as meteorologist with the United States Government at important posts. He has been connected with the U. S. Weather Bureau in Alaska for the past five years, and was head of the International Polar Year Expedition, at Point Barrow, Alaska, from 1932 to 1933.

The ship selected by Captain MacGregor is a three-masted schooner with auxiliary engines. The ship was christened *General A. W. Greely* in honor of the noted explorer of that name who, 54 years ago, studied weather at Fort Conger, Elesmore Island. The selection of a ship to sail northern waters must be made with great care. Each winter the ship is frozen in and a tremendous crushing power is exerted on it by the surrounding ice. When battling ice floes, heavy impacts are dealt the ship continuously. The soundness of the timbers and the shape of the hull must be such as to withstand this service.

Ice conditions are such that it will be impossible to move the *General A. W. Greely* before next July. If at that time it appears that more valuable data can be obtained by pushing still further north, the Expedition will push on as the ice laden waters will allow.

A. G. (Gerry) Sayre, radio operator of the MacGregor Arctic Expedition, seated by the audio and power rack section of the transmitter operating under the calls OX2QY and WAWG.

Rear view of the rack containing the power supplies for the entire transmitter, as well as the modulator.

Hams Cooperate

One of the major problems of the Expedition was that of maintaining communication with the outer world. As in many previous expeditions Amateur Radio was called upon to do the job. After interviewing over one hundred radio amateurs Captain MacGregor selected A. G. (Gerry) Sayre for the berth. Seven weeks before sailing date Gerry was notified that the job was his. There followed busy days of consulting other radio amateurs who had held like berths on other expeditions. Their suggestions and advice regarding radio equipment to perform satisfactorily under such exacting conditions were of great aid.

EXPEDITION

THE OX2QY-W10XAB-WAWG EQUIPMENT

BASED ON AN INTERVIEW WITH
MRS. C. J. MAC GREGOR

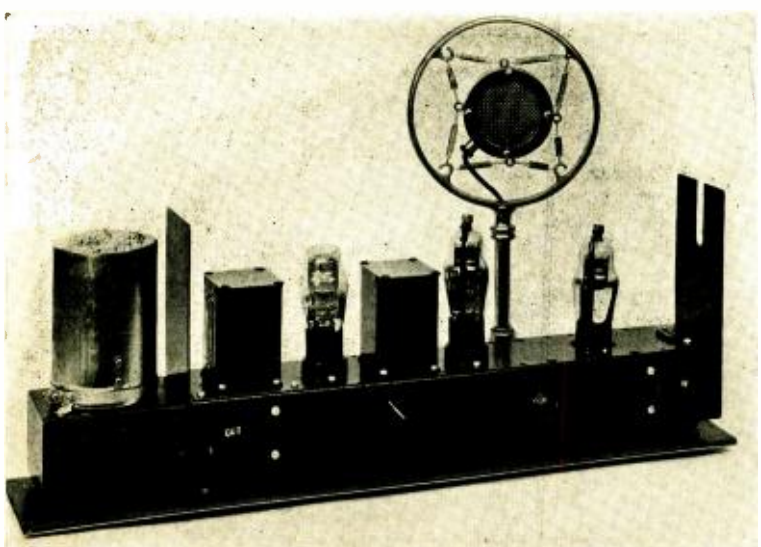
By FRANK P. KENYON
PRES., KENYON TRANSFORMER CORP.

Captain C. J. MacGregor, Commander of the Expedition, and the three-masted schooner "General A. W. Greely" before its departure. The schooner is now frozen in at Reindeer Point.

Sufficient transmitter power was required to maintain a daily schedule with the New York *Times* on c.w. for news bulletins. The NBC rebroadcasts scheduled made it necessary that the speech equipment and modulator be suitable for high-quality transmissions—that is, good frequency response, low harmonic content and low hum level. From these requirements a phone-c.w. transmitter having about 500 watts input to the final was decided upon.

Contacts with manufacturers of commercial units indicated that it would be impossible to obtain such equipment before sailing date, so Gerry was faced with the problem of building a complete job himself. More busy days and nights followed in which parts manufacturers were contacted and the necessary components obtained. Here again the willingness of amateurs to lend a hand was in evidence. A group of Newburgh hams turned in and gave their help at night after working all day. One in particular—John Smith, W2BCR—took four days off from his regular work to help put on the finishing touches.

The excellent job they did is attested to by the fact that the Expedition station has maintained two-way communication with the *Times*, has transmitted several programs for NBC rebroadcast, and up to the present has worked over 400 amateur stations, including the Holden Expedition, in British Guiana.



View of the speech amplifier and microphone. Both units are spring-suspended to eliminate possible microphonics due to vibration.

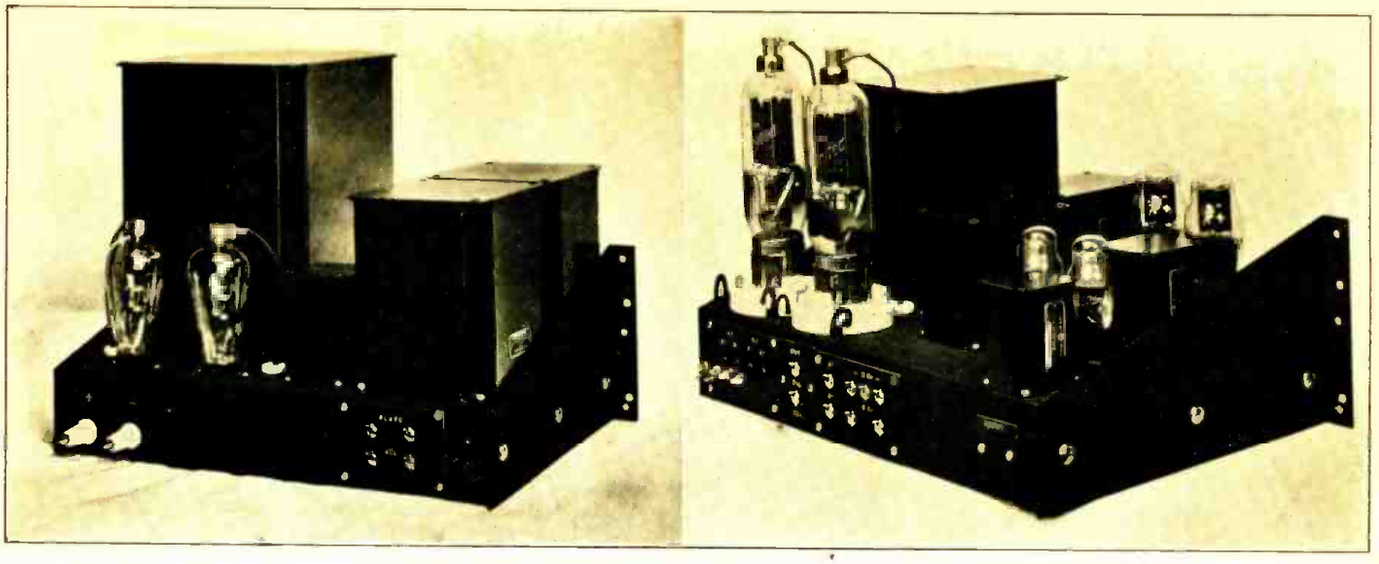
Calls and Frequencies

The station calls allocated to the MacGregor Arctic Expedition are OX2QY, W10XAB, and WAWG. The headquarters and field transmitters are licensed by the FCC to operate on the following frequencies: 2398 kc., 3492.5 kc., 4797.5 kc., 6425 kc., 8655 kc., 12,862.5 kc., 17,310 kc., 31,100 kc., 34,600 kc., 37,600 kc., 40,600 kc., and 86 to 400 megacycles. The headquarters station, OX2QY, can be heard most any evening on 14,368 kc., about 7:40 E.S.T. and later.

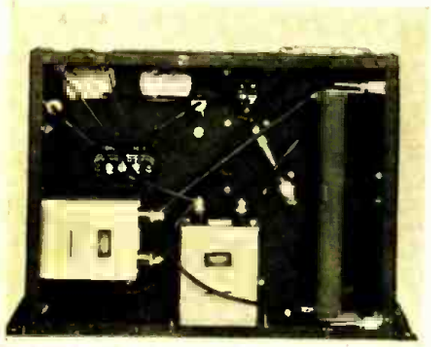
The transmitting equipment is powered by a four-cylinder gasoline motor-generator set which delivers 115 volts, 60 cycles, at a rated load of 5 kva. Approximately one gallon of gas is required for each hour the transmitter is in operation.

The Radio Equipment

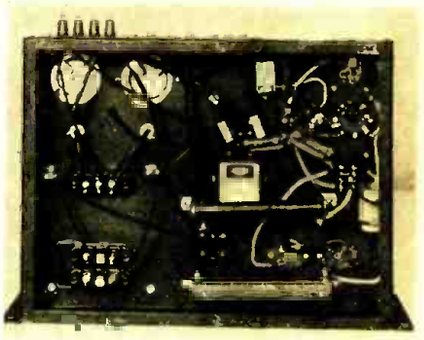
Two standard Par-Metal 60-inch racks house the main transmitter. One rack is devoted to the modulator and all power supplies, while the other rack contains the r.f. equipment. The speech amplifier is a separate unit. Each chassis in both racks has its own terminals for input and output so that all interconnections may be made by external cables. This serves two purposes: Any servicing



The Class C Power Supply is shown above at the left, and the Modulator at the right. The diagrams are Figs. 5 and 7 respectively on the opposite page.



Under-chassis view of Class C Power Supply.



Under-chassis view of the Modulator Unit.

necessary is facilitated because the faulty chassis may be readily isolated. Secondly, the companionway of the ship is so small that the racks must be entirely taken down to get them into the cabin.

The ship's receiving equipment consists of a Hallicrafters Super Sky Rider. Mrs. MacGregor employs a similar receiver at her home for listening-in on the Expedition transmissions.

In addition to the main transmitter and receiver, ultra-short-wave transceivers are included for use in the field by exploring parties. These serve to keep them in touch with the base camp and to transmit reports on weather phenomena.

When men are isolated from the outside world for long periods of time, radio plays a very important part in their daily life. On most expeditions "Sparks" is requested to give code practice, and Gerry is doing his part on the MacGregor Expedition. This is an ideal way for the men to spend the long winter evenings and also prepares the members of the spring exploring parties for the operation of the transceivers. For this reason, extra sets of headphones and battery-operated audio oscillators form an important part of the expedition equipment.

Duplicate parts are items not always mentioned, but they often mean the difference between success and failure. Spares for all parts from pistons for the gas engine down to the most insignificant nut and lock-washer are essential. The lack of the most minor replacement part when needed is fatal—so, in effect, two

SPEECH AMPLIFIER POWER SUPPLY (FIG. 1)

T1—Kenyon type T-214 transformer
CH1—Kenyon type T-151 choke
CH2—Kenyon type T-151 choke
C1—Cornell-Dubilier type F-6020 condenser, 2 mfd., 600 v.
C2—Cornell-Dubilier type F-6020 (3 in parallel) 2 mfd., 600 v.
1—Sylvania type 5Z3 tube

MODULATOR POWER SUPPLY (FIG. 2)

T1—Kenyon type T-667 transformer
T2—Kenyon type T-360 transformer
CH1—Kenyon type T-521 choke
CH2—Kenyon type T-177 choke
2—United Electronics type 966 tubes
C1—Cornell-Dubilier TJ-20020 condenser, 2 mfd., 2000 v.
C2—Cornell-Dubilier TJ-20020 (3 in parallel) 2 mfd., 2000 v.
R1—I.R.C. type HO, 75,000 ohms, 200 watts

EXCITER POWER SUPPLY (FIG. 3)

T1—Kenyon type T-655 transformer
T2—Kenyon type T-355 transformer
CH1—Kenyon type T-151 choke
C1—Cornell-Dubilier TJ-6040, 4 mfd., 600 v.
R1—Ward Leonard type 507-65 resistor, 25,000 ohms
1—Sylvania type 5Z3 tube

CLASS C BIAS SUPPLY (FIG. 4)

T1—Kenyon type T-656 transformer
T2—Kenyon type T-360 transformer
CH1—Kenyon type T-154 choke
R1—I.R.C. type HO, 10,000 ohms, 200 watts
2—United Electronics type 966 tubes

CLASS C POWER SUPPLY (FIG. 5)

T1—Kenyon type T-663 transformer
T2—Kenyon type T-360 transformer
CH1—Kenyon type T-161 choke
CH2—Kenyon type T-161 choke
C1—Cornell-Dubilier TJ-25020, 2 mfd., 2500 v.
C2—Cornell-Dubilier TJ-25020, 2 mfd., 2500 v.
R1—I.R.C. type HO, 100,000 ohms, 200 watts
2—United Electronics type 966 tubes

PROTECTIVE RELAYS
(Externally mounted)

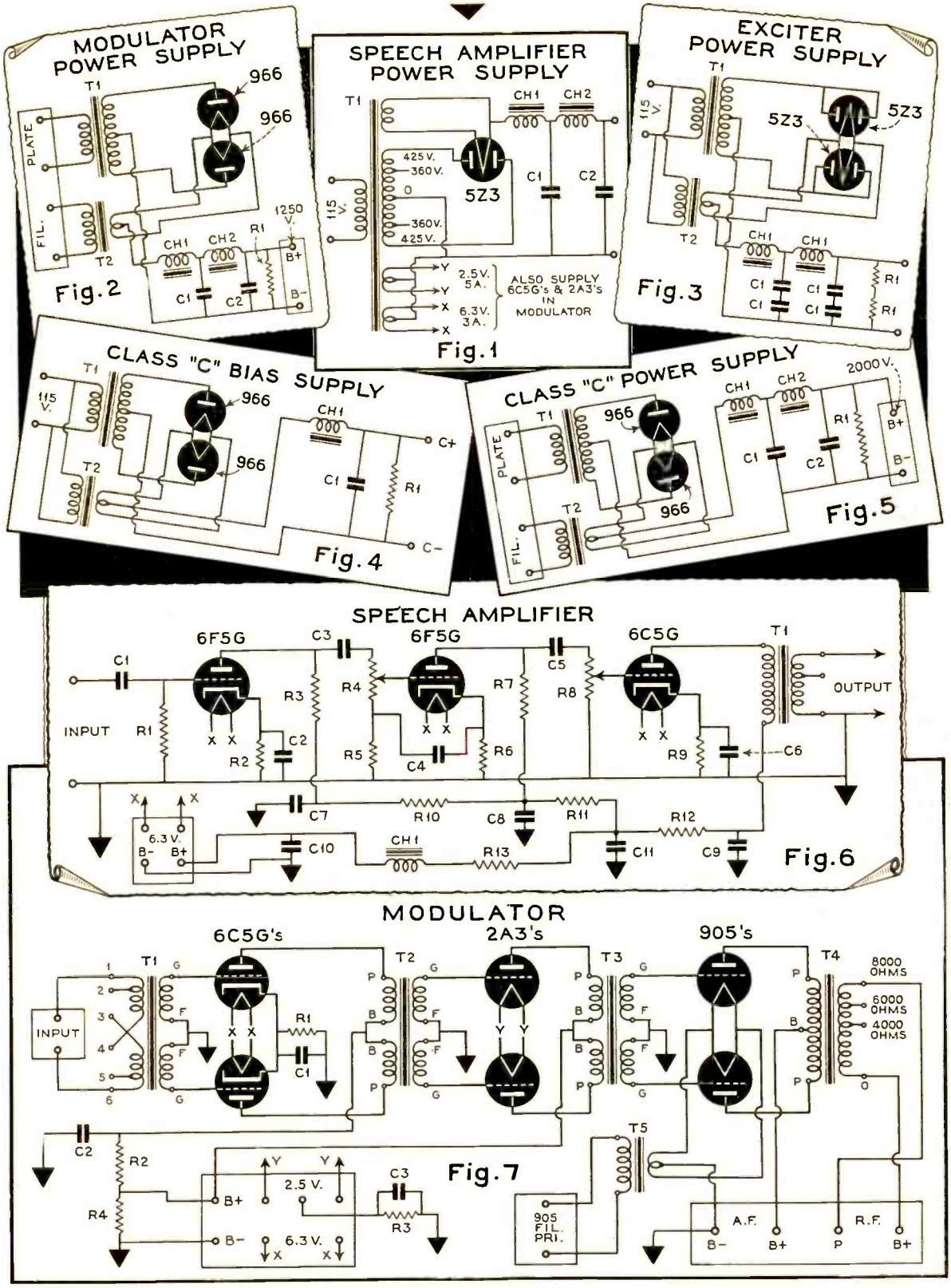
1—Ward Leonard BUL-351 time delay
1—Ward Leonard 507-507 keying
1—Ward Leonard 507-515 underload
1—Ward Leonard 507-513 overload
1—Ward Leonard 507-521 antenna

SPEECH AMPLIFIER (FIG. 6)

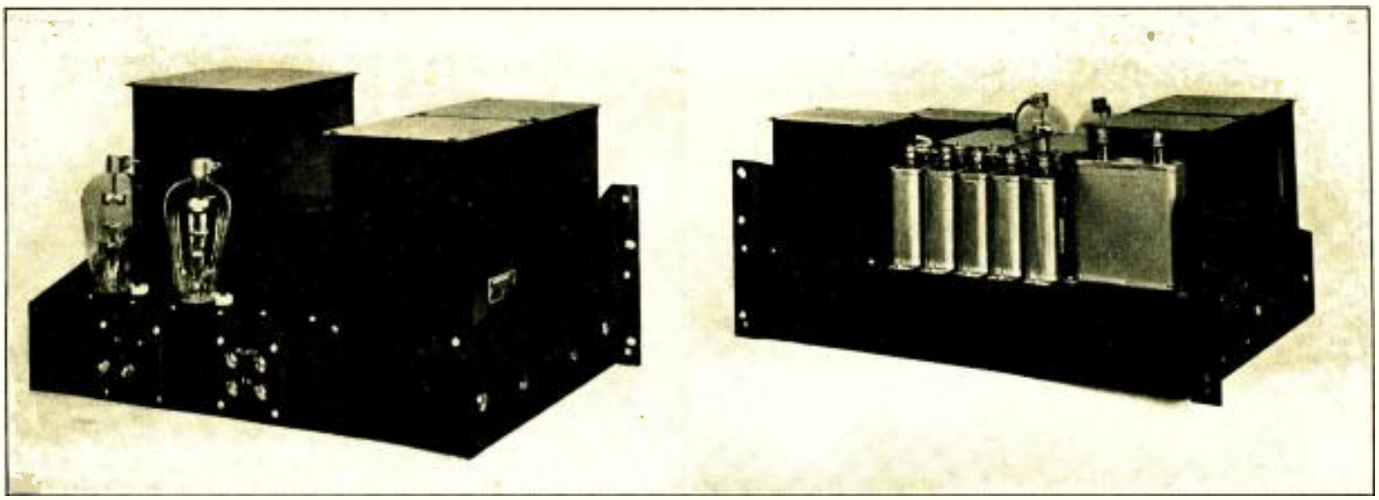
R1—I.R.C. 250,000 ohms, 1 watt
R2—I.R.C. 8000 ohms, 1 watt
R3—I.R.C. 250,000 ohms, 1 watt
R4—I.R.C. 250,000-ohm volume control
R5—I.R.C. 50,000 ohms, ½ watt
R6—I.R.C. 4000 ohms, 1 watt
R7—I.R.C. 250,000 ohms, 1 watt
R8—I.R.C. 250,000-ohm volume control
R9—I.R.C. 1000 ohms, 2 watts
R10—I.R.C. 50,000 ohms, 2 watts
R11—I.R.C. 25,000 ohms, 1 watt
R12—I.R.C. 2500 ohms, 2 watts
R13—I.R.C. 2500 ohms, 2 watts
C1—Cornell-Dubilier .006 mfd.
C2—Cornell-Dubilier 1.0 mfd.
C3—Cornell-Dubilier .05 mfd.
C4—Cornell-Dubilier 0.5 mfd.
C5—Cornell-Dubilier .05 mfd.
C6—Cornell-Dubilier 0.5 mfd.
C7—Cornell-Dubilier 1.0 mfd.
C8—Cornell-Dubilier 0.5 mfd.
C9-C10-C11—Cornell-Dubilier PE-A6888 electrolytic, 8-8-8 mfd., 600 v.
2—Sylvania type 6F5G tubes
1—Sylvania type 6C5G tube
T1—Kenyon type T-101 transformer
CH1—Kenyon type T-156 choke

MODULATOR (FIG. 7)

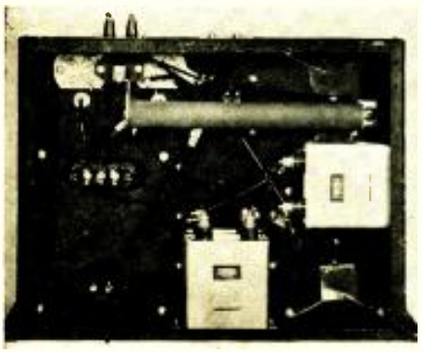
T1—Kenyon type T3 transformer
T2—Kenyon type T-54 transformer
T3—Kenyon type T-259 transformer
T4—Kenyon type T-470 transformer
T5—Kenyon type T-361 transformer
C1—Cornell-Dubilier DA-4050 paper, 0.5 mfd., 400 v.
C2—Cornell-Dubilier DA-4200 paper, 2 mfd., 400 v.
C3—Cornell-Dubilier DA-4200 paper, 2 mfd., 400 v.
R1—I.R.C. 600 ohms, 1 watt
R2—I.R.C. 10,000 ohms, 2 watts
R3—Ward Leonard WL-507-215, 500 ohms, 100 watts
R4—I.R.C. PF4, 20,000 ohms, 50 watts
2—Sylvania type 6C5G tubes
2—Sylvania type 2A3 tubes
2—United Electronics type 905 tubes



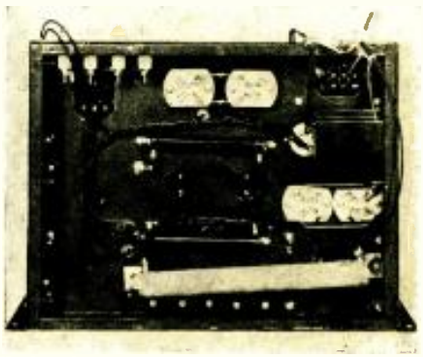
Schematic diagrams of the units contained in the speech channel and power rack of OX2QY—MacGregor Expedition, described in the accompanying article. Parts values are given in the lists on the opposite page.



The Modulator Power Supply is shown above at the left, and the Exciter Power supply at the right. See the diagrams of Figs. 2 and 3 on page 65.



Under-chassis view of Modulator Power Supply.



Under-chassis view of the Exciter Power Supply.

transmitters, one assembled and the other in parts, are essential equipment.

Base Camp Antenna

Antennae are always a problem in the Arctic. The tallest vegetation in some locations is scarcely ankle high. Poles or towers for the erection of an antenna must therefore be a part of the equipment carried.

The necessary poles were cut when the ship made port in Nova Scotia, on the way north. These were from six to eight inches in diameter and about forty feet long. Upon arrival at Reindeer Point, the poles were thrown overboard and floated ashore.

The erection of the antenna for the main transmitter was one of the most difficult jobs encountered in the whole radio installation. The polar ground, of course, is never thawed more than a few inches below the surface, and it is very rocky. After looking over the available space, a rhombic antenna was decided upon. It occupies a space about 200 by 500 feet, on a line almost due south. Its height ranges from 50 to 35 feet. On the north is a cliff about 1000 feet high, but to the south is the bay. On the other side of the bay, over a mile away, there is another high cliff. The antenna feeder has an impedance of 580 ohms, and is 350 feet long. The far end of the rhombic is terminated in a Ward Leonard 800-ohm plaque resistor.

The speech channel for the main transmitter was divided into two sections—the speech amplifier and the modulator. These units were designed to give a uniform frequency response from 60 to 8000 cycles, a hum level sufficiently low for rebroadcast purposes, low microphonic tendencies and absolute stability with an overall gain of 120 db. and an output of 250 watts at less than 5 per cent distortion.

Since crystal microphones of varying levels were to be used, the speech amplifier could not always be operated near full gain. In order to maintain the best signal-to-noise ratio, it was found desirable to operate the first two stages of the speech amplifier at the maximum possible level. This is because the tube noise level is nearly the same regardless of the signal level. Thus, any increase in signal level is a gain in signal-to-noise ratio.

The Speech Amplifier

The manner in which this affected the speech amplifier design will be seen from the diagram of Fig. 6. There are two 6F5G tubes resistance-coupled to a 6C5G. The 6C5G is transformer-coupled to a 500-ohm line. Two volume controls are incorporated, one in the grid circuit of the second 6F5G and the other in the grid circuit of the 6C5G. In operation the first volume control is set as near maximum as possible without overloading the 6F5G. The second volume control is then set at whatever position necessary to produce the desired output level.

The advantage of this type of volume control over one used in the grid of the first 6F5G is evident when it is considered that the latter method would make it possible to control only the signal level, while the former method permits the reduction of the noise level of the two stages at the same rate as the signal.

The speech amplifier was built on a 3½" x 19" chassis equipped with a dust cover and four conical springs to absorb vibration and reduce microphonics. This unit sits on the operating table, making it convenient for gain control within arm's reach. Both plate and filament voltages are taken from the individual speech-amplifier power-supply unit located in the audio and power rack of the transmitter proper, and brought to the speech amplifier through shielded cables. This isolates the low-level stages from magnetic hum pickup sources.

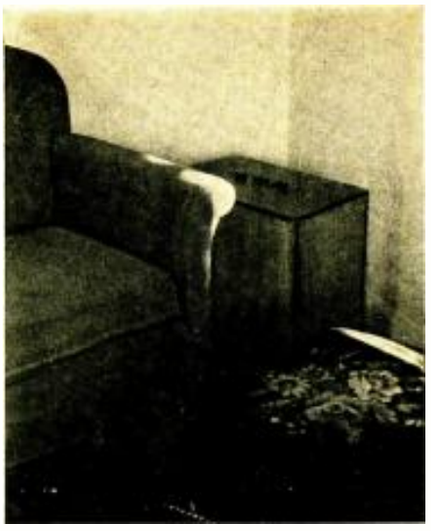
The Modulator

The 500-ohm line output of the speech amplifier is taken by shielded cable to the input of the modulator. This amplifier, diagrammed in Fig. 7, consists of a line to push-pull grid input transformer, push-pull 6C5G's transformer-coupled to push-pull 2A3's which in turn drive the 905 modulators. This circuit is entirely conventional and dependable.

The 905's require approximately 5 watts to drive them to full output. The 2A3's are capable of delivering this at minimum distortion with a comfortable amount of audio power held in reserve. Operated at 1250 volts plate the 905's are zero bias tubes capable of delivering a maximum of 300 watts audio. Since the input to the Class C final stage is 500 watts, the modulators are never required to deliver their full rated output. This reserve power insures the low distortion content desired.

(Continued on next page)

INEXPENSIVE CABINET for AWR AUTOMATIC



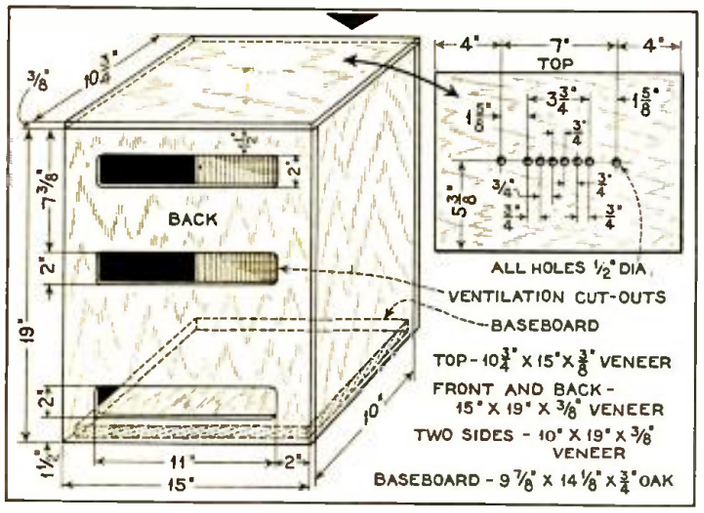
The neat chair-side cabinet specially designed for the AWR Automatic.

THE article detailing the design and construction of the "AWR Automatic" push-button-tuned receiver, which appeared in the January issue of ALL-WAVE RADIO, has aroused so much interest that we are carrying the subject one step further and providing here an illustration of the special arm-chair cabinet built for the job as well as a sketch covering the details of its construction.

By G. S. GRANGER

The cabinet baseboard is ¾-inch oak, heavy and strong enough to provide proper anchoring, for the receiver chassis which is mounted vertically by means of the special brackets described last month. The top and sides of the cabinet are fashioned from ⅜-inch veneer and finished in walnut. The overall dimensions of the base fall short by 1/16 inch of the inside dimensions of the cabinet sides as too snug a fit proved troublesome. Since the cabinet must be lowered onto the baseboard holding the chassis, and since it was desirable to make provisions for easily removing the cabinet for chassis inspection, we decided to leave plenty of baseboard clearance and take up the slack on all four sides by means of washers or collars placed over the ends of the fastening screws.

Ventilating ports are cut into the back side of the cabinet for the purpose of maintaining a comparatively low temperature on the inside. The three ports face the chassis base upon which the tubes are located.



Complete details covering the construction of the cabinet for the AWR Automatic receiver. Note that the base is of heavier material, since it must support the receiver chassis.

It will be noted from the illustration that the fidelity switch control does not extend through to the cabinet top. Since it is left in the high-fidelity or wide-band position for local reception, there is little need for top-of-panel control. Instead a pilot light has been mounted in the same relative position on the cabinet top. This light, which provides the only indication other than sound that the receiver is turned on, is wired directly to the "x" terminals of the 6.3-volt filament winding on the power transformer—T7 in the schematic diagram.

Construction of the cabinet is a simple job for anyone having a few tools handy. The veneer can be obtained from your local supply house cut to size—or you can turn the whole job over to a carpenter or cabinet maker. It will cost you surprisingly little.

MAC GREGOR EXPEDITION

(Continued from opposite page)

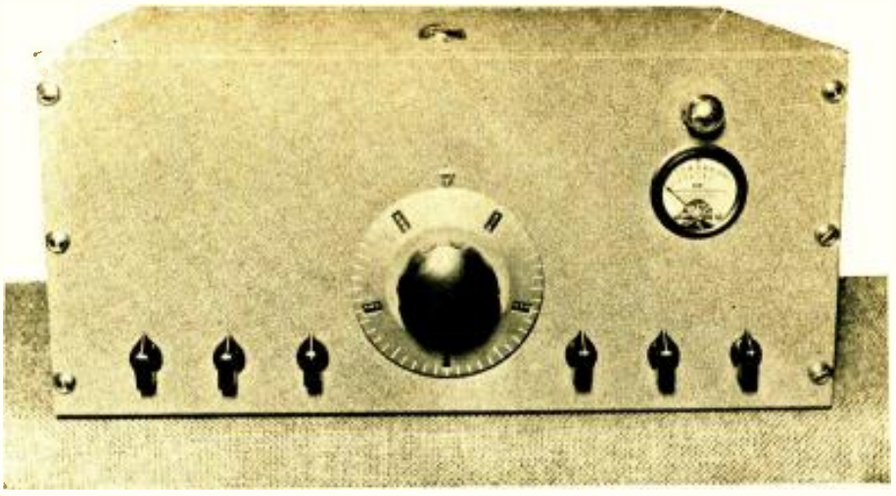
The Power Supplies

The power supplies for the a.f. and r.f. channels, shown in Figs. 1 to 5, are of standard, conservative construction, full-wave choke input rectification being used throughout. Special attention was paid to their design to make certain that all parts were working below their maximum ratings. The largest possible safety factors in insulation consistent with space limitations were allowed throughout.

Protective relays were used to provide the maximum insurance against the loss of irreplaceable parts. All mercury-vapor rectifiers were provided with time-delay relays so that the filaments would be up to proper temperature before plate voltage was applied. The Class C stage is protected by overload and underload relays. If excitation is lost, power will immediately cut off. If the modulators lose their load, plate voltage is immediately removed. This protective system, in addition to conventional safety devices, has so far prevented the loss of a single important component.

(A description of the units comprising the r.f. section of the main transmitter will be presented in our March issue.—Editor)

Grateful acknowledgment is accorded the following companies who donated the equipment and components employed in the radio installation: A. E. Miller, North Bergen, N. J., *(Crystals);* American Radio Hardware Co., New York *(N. V. S. Parts);* Astatic Microphone Labs., Youngstown, Ohio. *(Microphones);* Bassett Research Corp., Detroit, Mich. *(Antenna Feeder);* Belden Mfg. Co., Chicago, Ill. *(Wire);* Burgess Battery Co., Freeport, Ill. *(Batteries);* Cornell-Dubilier Elec. Corp., Plainfield, N. J. *(Filter Condensers);* Corning Glass Co., Corning, N. Y. *(Insulators);* Coto-Coil Co., Providence, R. I. *(Coils);* Globe Wireless, Ltd., New York *(Gammatrons);* Hallicrafters, Inc., Chicago, Ill. *(Receivers);* Hammarlund Mfg. Co., New York *(Condensers & Coils);* Hygrade-Sylvania Corp., New York *(Receiver Tubes);* International Resistance Co., Philadelphia, Pa. *(Resistors);* Kenyon Transformer Co., New York *(Transformers);* Par-Metal Products Corp., Long Island City, N. Y. *(Cabinets and Chasses);* Raytheon Mfg. Co., New York *(Transmitting Tubes);* United Electronics Co., Newark, N. J. *(Rectifier & Modulator Tubes);* Vibroplex Co., Inc., New York *(Vibroplexes);* Ward Leonard Electric Co., Mount Vernon N. Y. *(Relays);* Zenith Radio Corp., Chicago, Ill. *(Windchargers & Receivers).*



FRONT-PANEL VIEW OF THE THREE-BAND U.H.F. SUPERHET. NOTE GRAY FINISH.

A 3-BAND U. H. F. SUPERHET

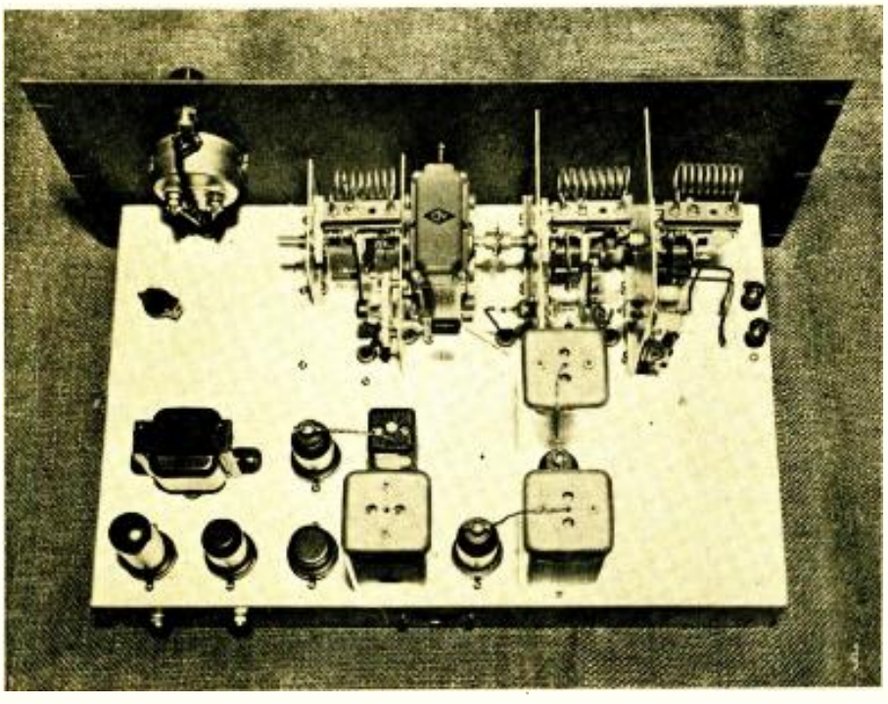
HAM RECEIVER COVERING 2.5, 5 AND 10 METERS

By R. H. ASMUS • W2HGU

THE design of an ultra-high-frequency superheterodyne is, fundamentally, the same as that of a standard superheterodyne working on the more usual frequencies from 550 kc. up to 20 megacycles or so. If, however, the ultra-high-frequency receiver is to be as effective in operation as its more standard brethren it must have its design materially altered in four particulars.

"The Four Horsemen"

First is the choice of tubes and L/C ratios in the high-frequency section. The high capacities of standard tuning condensers, even when set at minimum capacity, seriously limit the amount of inductance obtainable in the ultra-high-frequency coils. This limited inductance reduces, in turn, the signal voltage built up at the grids of the tubes. Then, also, the large elements of standard tubes cause resultant high inter-electrode capacities. These capacities, which run as high as 10 or 11 mmfd. in certain tube types, are effectively in shunt with the tuning capacities, causing a further reduction in possible signal voltage. Also, the greater spacing of the elements in standard tubes increases the "transit time" of the electron flow in the tubes. The result, at ultra-high frequencies, is a phase shift which lowers the input impedance of these tubes to but a few thousand ohms. This abnormally low input impedance, being also across the high-frequency inductances, further reduces the signal voltage build-up. The net result is that when standard tubes and tuned circuits are placed in operation on the ultra-high, the resultant signal gain is far lower than that possible with the same tubes and circuits at the lower frequencies. As the set noise generated by these same stages remains at the same level regardless of frequency, a very poor signal-to-noise ratio is obtained.



Top-of-chassis view of the U.H.F. Superhet. Note air-wound plug-in-coils.

The second design consideration concerns the image-frequency response. The strength of the image frequencies is directly dependent upon the percentage difference between the i.f. frequency employed and the signal frequency. With the use of the usual 465-kc. i.f. frequency the image frequency is 930 kc. removed from the signal frequency. With operation confined to the lower frequency bands the signal circuits (r.f. and detector stages) can discriminate effectively between the signal and image frequencies. On the ultra-high-frequency bands, such

as 2.5 or 5 meters, the degree of discrimination of the signal circuits between two frequencies removed by but 930 kc. is too small to be of consequence.

The third point to be considered is the degree of selectivity best suited for ultra-high-frequency operation. As the majority of 10-meter stations are crystal-controlled, a sharp i.f. section is permissible, even a crystal filter being useful at times. On the other hand, the 2.5-meter stations are usually of the self-excited "frequency modulated" type, calling for a very broad i.f. frequency response for most effective reception. As both types of transmitters are in use on 5 meters it is a toss-up as to the selectivity characteristics most useful on this band. High selectivity will discriminate against the self-excited transmitters, favoring the crystal-controlled types. A broad frequency characteristic will nullify the effectiveness of the crystal stations.

COIL TABLE

Band	L	L1	L2
2.5 m.	2 turns ⅜" dia.	2 turns ⅜" dia. ½ turn cathode tap.	9 turns ⅜" dia. 3 turn cathode tap
5.0 m.	8 turns ⅜" dia.	8 turns ⅜" dia. 1½ turn cathode tap.	8 turns ⅜" dia. 3 turn cathode tap.
10 m.	12 turns ¾" dia.	13 turns ¾" dia. 2 turn cathode tap	12 turns ¾" dia. 3 turn cathode tap.

The fourth consideration is that of "noise silencing." Ignition noises from automobiles are most disturbing on the lower wavelengths, from 10 meters down. Even on 20 meters such noises are not of material consequence if a horizontal doublet, with low-impedance feeders, is used. On 2.5, 5 and 10 meters, however, only the loudest stations may be received through the auto ignition barrage. While a noise silencer is, therefore, only a useful adjunct to the low-frequency receiver, it becomes a vital necessity to the ultra-high-frequency receiver.

The U.H.F. Circuits

The above four particulars have been taken into consideration in the design of this receiver in such a manner that its effectiveness in reception on 2.5, 5 and 10 meters is as great as the average ham receiver on the 20, 40 and 80 meter bands, respectively.

Three acorn type tubes solve the high-frequency tube problem. The 956 remote cutoff type is used in the r.f. stage, the 954 sharp cutoff type in the detector and a 955 triode for the high-frequency oscillator.

The tuning condensers are of the midget low-capacity type, having a minimum capacity of 4.5 mmfd and a maximum of 20 mmfd. No coil forms are used at all, the coils being air-wound. Plug and jack strips render these air-

ALADDIN
2—type A3500 interstage i.f. transformers (T, T1)
1—type A3502 diode i.f. transformer (T2)
1—type C3550 b.f.o. transformer (T3)

AMERICAN RADIO HARDWARE
3—type 1004 3-plug jack strips
9—type 1002 3-plug strips
6—octal wafer sockets
1—4-prong wafer socket

CORNELL-DUBILIER
3—type 3L-5S1 .01 mfd. mica (C1, C2, C5)
4—type 5W-5T1 .0001 mfd. mica (C6, C7, C18, C19)
3—type DT-4S1 .01 mfd. paper (C10, C14, C20)
10—type DT-4P1 .1 mfd. paper (C9, C11, C12, C13, C15, C16, C17, C21, C24, C26)
1—type ED-3250 25 mfd. 50v. electrolytic (C22)
2—type ED-3050 5 mfd. 50v. electrolytic (C23, C25)

HAMMARLUND
3—type MC-20-S tuning condensers (C, C4, C8)
1—type MEX mica trimmer (C3)
3—type S-900 acorn sockets

NATIONAL
1—type PWO drive unit
3—shaft couplings
3—grid clips (metal tube size)

PAR-METAL
1—type SC-128 cabinet (gray finish special order)
1—type 3679 aluminum rack panel (gray finish special order)
1—type 15211 heavy duty cadmium plated chassis

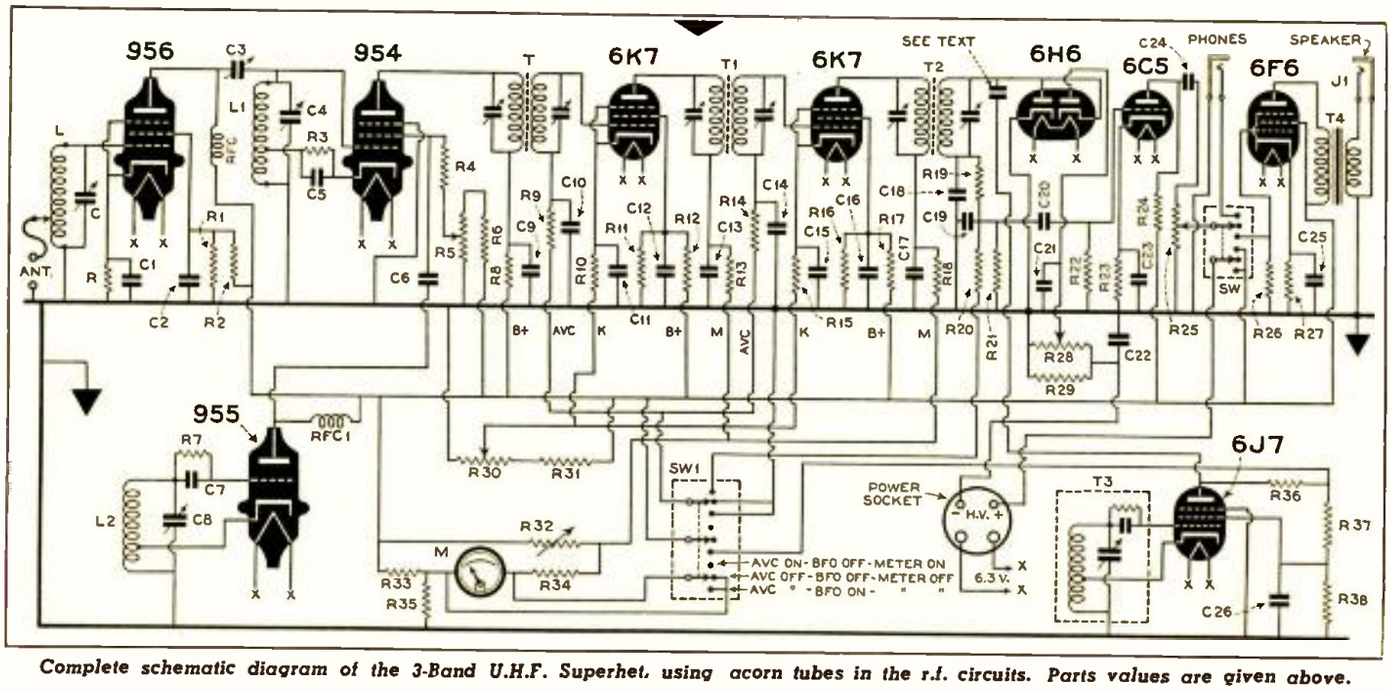
RCA
1—type 956 tube
1—type 954 tube
1—type 955 tube
2—type 6K7 tubes
1—type 6H6 tube
1—type 6C5 tube
1—type 6F6 tube
1—type 6J7 tube

RME
1—Volume-level indicator

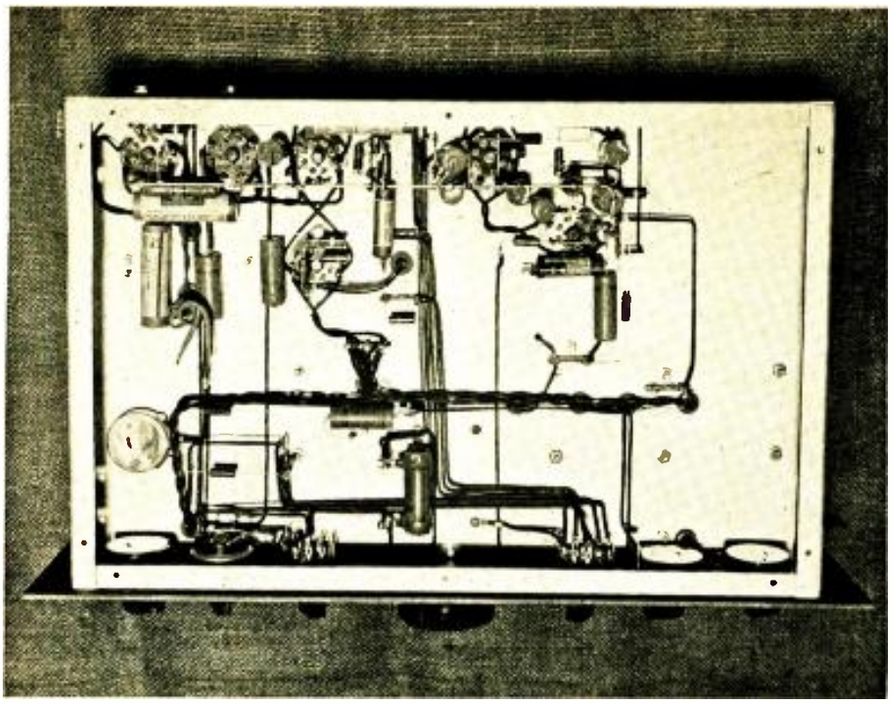
THORDARSON
1—type T-68S06 output transformer

YAXLEY
2—type A-1 jacks (J, J1)
1— 50,000-ohm potentiometer (R5)
1—500,000-ohm potentiometer (R25)
1—10,000-ohm potentiometer (R28)
1—25,000-ohm potentiometer (R30)
1—1,000-ohm potentiometer (R32)
1—type 330 panel light
1—type 762 switch (SW)
1—type 763 switch (SW1)

IRC
½-watt carbon
2—500 ohms (R, R34)
6—50 ohms (R1, R4, R11, R16, R19, R38)
7—100,000 ohms (R2, R6, R12, R17, R35, R36, R37)
1—1500 ohms (R3)
1—30,000 ohms (R7)
3—2,000 ohms (R8, R13, R18)
3—250,000 ohms (R9, R14, R24)
2—350 ohms (R10, R15)
1—3 megohms (R20)
1—1 megohm (R21)
1—5 megohms (R22)
1—3500 ohms (R23)
1—500,000 ohms (R26)
1—1000 ohms (R33)
1—watt carbon
1—50,000 ohms (R31)
10 watt wire-wound
2—500 ohms (R27, R29)



Complete schematic diagram of the 3-Band U.H.F. Superhet, using acorn tubes in the r.f. circuits. Parts values are given above.



Under-chassis view of the U.H.F. superheterodyne showing location of parts.

wound coils plug-in for band changing. The insulation of these strips is Mycalex. This combination of air-wound coils mounted on Mycalex strips introduces the least possible losses for a plug-in type of coil. The three tuning condensers are mounted on inter-stage baffles in an "upsidedown" position. Each jack strip has an extra hole drilled in it. A bolt down through this hole screws into the mounting foot of the tuning condenser, with a metal spacer to hold the strip a half-inch above the condenser. This construction provides the shortest possible tank leads. The top view photograph shows the exact position of each coil.

The interstage baffle plates also mount the acorn tube sockets, in the positions shown. A departure from normal practice is made in the case of the r.f. and detector tubes. It is customary to plug these tubes into their sockets so that the long (plate) end projects from the side of the sockets bearing the mounting prongs. In this case, however, it was found advantageous to let the short (grid) ends of the tubes project from the prong side. This made it possible to place the sockets on the same sides of the baffles as the tank circuits. In doing this, remember that the screen-grid and suppressor-grid terminals on these two sockets reverse when the tubes are reversed. The r.f. and detector sockets are mounted with their cathode pins nearest the panel, while the oscillator socket has its cathode pin pointing downward.

With the tubes, tuning condensers and coils mounted in the positions detailed above, the various tank and other r.f. leads will be as short as it is possible to get them with the particular components used. In wiring-in the bypass condensers on the r.f. and detector stages the top mounting screws on the two tube sockets should be used as the common ground points for their respective stages. Remember that a fraction of an inch of wire possesses appreciable inductance at 2.5 meters, so wire accordingly. Every fraction of an inch saved in wire length in these stages is therefore important.

Flexible couplings connect each tuning condenser to the main PWO drive unit. All tuning condensers are faced with their mounting bushings toward the meter. The "ground" ends of all coils also face the meter. Various other combinations were employed in developing the receiver, the coils at one time being mounted from the baffles directly, at right angles to their present positions. Experiment showed the present layout to be most effective.

Various methods of coupling to the r.f. coil from the antenna are possible, depending upon the antenna. Two binding posts are mounted on a strip of Mycalex. One goes to the ground end of the coil. The other goes to the center jack on the mounting strip. The r.f. coil can be tapped at various turns until the best match to the antenna is effected. Proper coupling to the antenna is, in this way, automatically taken care of by plugging in the proper coil for the band used.

The I.F. Circuits

The second and third design considerations of image frequency response and selectivity, respectively, must be considered together, as the high i.f. frequency necessary for satisfactory image suppression also reduces the degree of selectivity of the i.f. stages. This is because the selectivity characteristics of a given i.f. stage, or stages, reduces proportionately as the i.f. frequency is increased. A practical compromise for both image suppression and selectivity in this particular receiver is reached by using two iron-core i.f. stages operating at a frequency slightly higher than 4000 kc. A set of iron-core transformers with a tuning range of 3000 kc. to 5500 kc. are used. The bandwidth of these stages can be increased by increasing the i.f. frequency, and vice-versa. The coupling between the primary and secondary of these transformers is also adjustable, further increasing the available selectivity adjustment. The best adjustment for this receiver was found with the coupling adjustments left at the original factory settings and the i.f. frequency set at 4200 kc. The overall gain of the two iron-core stages with these adjustments was found to be comparable to that obtained from two stages of air-core i.f. stages operating at 465 kc.

The first i.f. transformer, T, is located directly behind the 954 detector tube, the first i.f. tube behind that and the second i.f. transformer, T1, at the rear of the chassis. The physical line-up of the i.f. components then "turns a corner" and runs progressively over to the rear corner of the chassis in the same order as shown on the diagram.

Noise Silencer

The fourth consideration in the design of the receiver, that of noise silencing, is handled by the 6H6 tube, in addition to the functions of detection and generation of an a.v.c. voltage. The circuit is that of the "noise damper" which was described in detail in previous issues of ALL-WAVE RADIO. The left-hand diode section of the 6H6 is used for both detection and a.v.c. The audio component of the signal is fed through C20 to the grid of the first audio stage, while the a.v.c. voltage is fed to the grids of the two 6K7s in the i.f. stages through R20. The right-hand section of the 6H6 is connected in *reverse* across the audio section of this tube. With the arm of the noise-silencing potentiometer, R28, set at its left or ground end, a stage of balance exists and no audio voltage is generated. As the arm of R28 is advanced a potential difference is introduced between the two sections of the 6H6 equal to the voltage drop between the arm and ground end of R28. All signal and noise voltages applied to the 6H6 which are below this value of potential difference will pass on to the audio stages. All voltages above this value will again "balance out" and cause no audio signal. The noise silencer control, R28, is adjusted so that the negative voltage applied to the noise diode plate is just above the voltage of the signal being received. The signal

(Continued on page 99)

THREE VIEWS OF THE 5-METER SUPER-REGENERATIVE RECEIVER WITH ACORN DETECTOR TUBE.

SIMPLE 5-METER RECEIVER

By GUY FOREST

A COMPANION receiver for the ultra-high-frequency a.c.-d.c. transmitter described last month, matching it in appearance and dimensions, is simple to build. Together, the two units constitute a complete 5-meter amateur station, suitable either for casual contacts in the band, or as one terminal of a two-way channel.

The receiver, in common with the transmitter, needs only an external power source of 6 volts d.c. A 45-volt B battery enclosed within the receiver supplies plate voltage—space being provided for a battery of sufficient size to give economical, long-lived service. Should the transmitter be powered by an a.c. pack, the 6-volt leads out of the receiver may connect to the transmitter filament source.

The Circuit

Extended experiments with many types of tubes, detectors, separate interruption oscillators, and so on, finally came back to the circuit shown. It embodies a maximum of simplicity and dependability, of sensitivity and signal output.

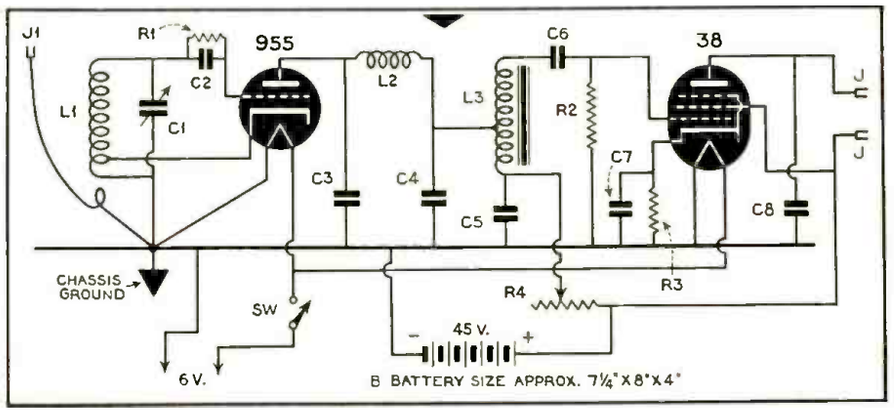
The 955 acorn tube acts as a super-regenerative detector, with self-quenching. The variable resistor, R4, controls the degree of quenching. The 955 cathode should be tapped up into the coil, L1, enough so that the detector quenches with R4 advanced one-third to one-half. This will be about ¼ turn up, as noted on the legend.

The tuning dial, the control knob on R4, and the s.p.s.t. toggle switch, for the filament circuit, make up the controls on the panel. For connection of the headphones the twin tip jack, JJ, mounts in the lower left corner. Under a tip-jack mounting-screw head a small wire hook should be fastened, on which to tie the end of the phone cord; otherwise, a phone tip too easily may jerk out and short across the B battery.

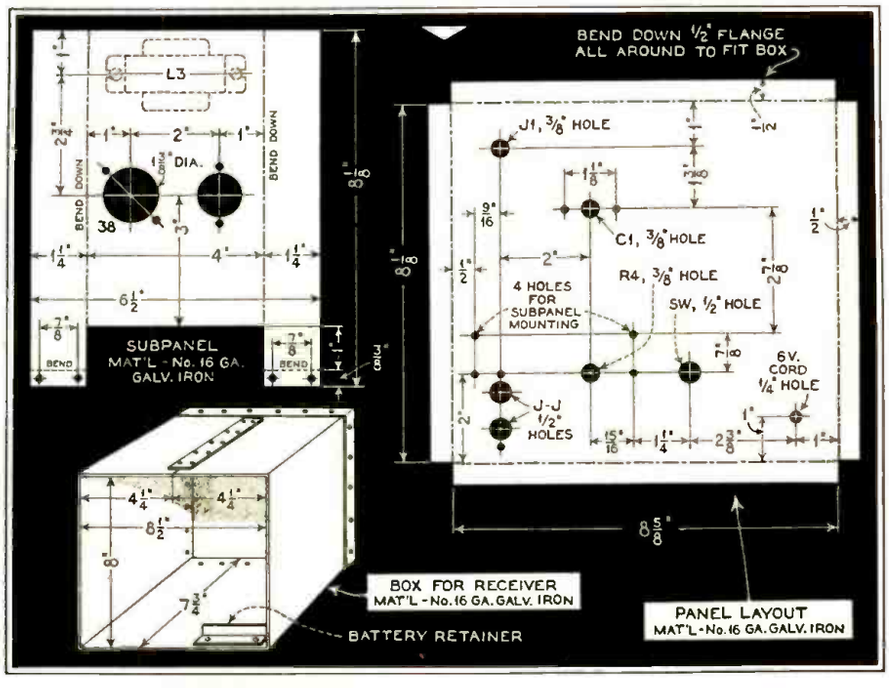
The Antenna

The length of the antenna, if greater than three feet or so, has an appreciable effect on the signal pickup. A long an-

(Continued on page 111)



C1—Cardwell Trim-Air 15 mmfd. variable condenser
C2—Mica condenser, .00004 mfd.
C3—Mica condenser, .0005 mfd.
C4—Mica condenser, .0005 mfd.
C5—Paper condenser, 1.0 mfd., 200 v.
C6—Paper condenser, .01 mfd., 400 v.
C7—Paper condenser, 1.0 mfd., 200 v.
C8—Paper condenser, .01 mfd., 400 v.
R1—2 megs., ½ watt resistor
R2—1 meg., ½ watt resistor
R3—1000 ohms, 1 watt resistor
R4—Variable resistor, 250,000 ohms
L1—6½ turns No. 14 copper bushar, ⅝" inside dia., 1" long, tapped ¼ turn up for cathode
L2—Lattice-wound r.f. choke, 60 mh.
L3—Audio coupling impedance, 3 to 1 ratio
J1—Insulated tip jack for antenna
J-J—Twin tip jack for headphones
SW—Filament control s.p.s.t. toggle switch



A NEW VOICE FOR "PITC"— PITCAIRN ISLAND

By LEW BELLEM • W1BES
Chief Engineer, Coto-Coil Co., Inc.

PITCAIRN — that tiny island in the South Seas—is steeped in an atmosphere of romanticism and adventure. It was here, in 1790, that the small band of mutineers from His Majesty's Ship *Bounty* sought refuge from the ire of the British Crown. Edward Young, a midshipman on the *Bounty* was one of the nine Englishmen who sailed away from Tahiti in 1789 and eventually settled on Pitcairn Island.

Andrew Young . . .

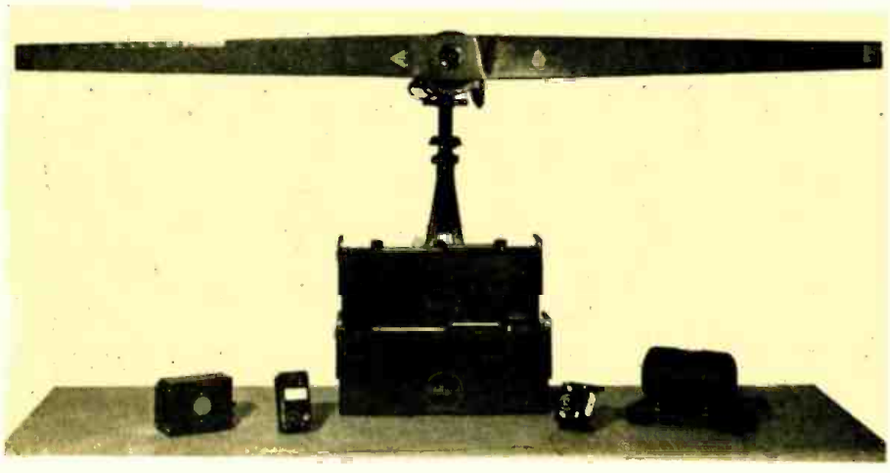
One hundred and twenty years later found one Andrew Young, a direct descendent of the colorful midshipman, living on the same island where most things remain much the same as they were when the men from the *Bounty* first set foot on the rockbound shores.

Last year Alan Eurich, W8IGQ, then radio operator aboard the Schooner *Yankee*, visited Pitcairn and met Andrew Young. He was shown what few people have seen—the island radio station, PITC.

Unversed in the mysteries of radio, and having only the crudest equipment on hand, Andrew Young had still managed to contrive a radio transmitter and receiver with which he was able to contact the few ships that occasionally passed his remote island community. In Andrew Young, Eurich recognized the true amateur spirit.

Eurich's story of Andrew Young and his pitiful "PITC" was responsible for the plan to assist the natives of Pitcairn that they might in the future have adequate and foolproof communication facilities at their disposal. The idea was enthusiastically received by all manufacturers who were contacted, and without exception they agreed to donate the equipment and components required for a complete installation.

Carl Madsen, W1ZB, who had maintained contact with Eurich aboard the *Yankee* throughout her world cruise, apprised him of the project under way. As a consequence W8IGQ was able to provide a complete report on conditions on the island and offer suggestions regarding the design and selection of satisfactory equipment. He stressed the importance, for instance, of high-grade insulation, since the salt air enveloping Pitcairn had demonstrated its bad effects on usual forms of insulation. He also reported that no source of primary power was available.



Source of primary power—the windcharger, the two 6-volt storage batteries and the dynamotors for providing the high voltages. Also shown is a small test set for trouble shooting.

The Plan Takes Shape

It was decided at the outset that storage batteries and a wind-driven generator for charging purposes would be the only practical source of power for the operation of the transmitter and receiver. Storage batteries of large capacity were selected to take care of heavy loads and at the same time provide suf-

ficient reserve during periods of low wind velocity. Since both transmitter and receiver would have to operate entirely from this power source, dynamotors were selected to provide plate power.

The next point considered was the wavelengths on which the transmitter should operate. Since communication with passing ships was an essential, it was decided to include means for tuning to 600 meters. The 20- and 40-meter amateur bands were chosen for long-distance work, and provisions were made for phone work in these two bands. A receiver was selected that covered all three of these wavelengths and had sufficient sensitivity, selectivity and bandspread to meet all conditions that might be encountered.

In both the design and selection of the equipment it was necessary to keep in mind at all times that it be conservative of battery drain, as well as simple and foolproof as possible from the standpoint of connecting and operating, since Andrew Young has had no experience with tube transmitters.

Power Source

A 12-volt battery system was chosen to minimize IR drop in the feed lines. This consisted of two Willard 6-volt, 300-ampere-hour batteries connected in series. A Parris-Dunn 12-volt windcharger was obtainied to supply the battery charging current. This outfit provides an 8-ampere charging rate in a 20-mile wind. There is a cut-out which disconnects the batteries when the wind velocity falls below 6 miles per hour. This prevents the batteries from discharging through the line when the charging rate is too low. The windcharger is mounted on a 12-foot steel tower which will permit Young to get the 8-foot impeller well above ground and in favorable wind stream. Since the storage batteries will provide the desirable reserve power for 8 to 10 hours' operation in the event of lulls in wind velocity, it should be possible to operate both transmitter and receiver in excess of 10 hours a day without fear of power failure.

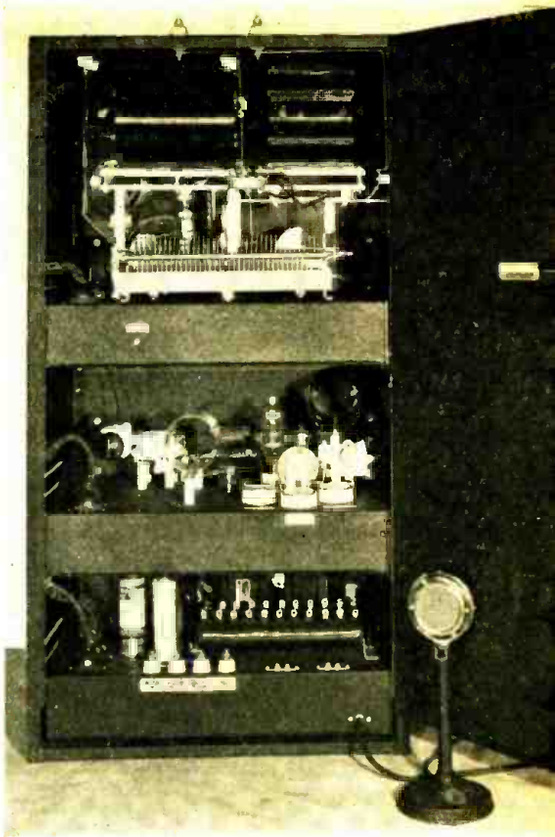
The Audio Channel

The transmitter consists of three separate chassis mounted in a Par-Metal 36-inch rack-and-panel cabinet, as shown in the accompanying front and rear views. The lower deck contains the speech amplifier and modulator, and a power distribution center for the 750-volt dynamotor and storage battery supply. The circuit of this unit is shown in Fig. 1. A Shure Model 70S crystal mike feeds a 6J7 tube resistance-coupled to a 6C5 which in turn is transformer-coupled to 6C5 push-pull drivers for the 6L6 modulator tubes.

Obtaining maximum performance from these tubes was quite a problem since they obtain their 450-volt plate supply from a bleeder network, and bias from the cathode resistor. It was learned that while poor voltage regulation was a stumbling block to the securing of a satisfactory level of a.f. output, the real hinderance was a variation in bias. This was minimized by returning the 6L6 grids to the negative battery lead and using a lower value of cathode bias resistor. This provided a fairly steady bias of 25 volts even when over-driving the amplifier.

Individual bleeder networks are provided in this unit, one for the a.f. channel and the other for the r.f. oscillator. In this manner voltage variations appearing across the a.f. bleeder, R10-R12, on modulation peaks cannot influence the oscillator voltage.

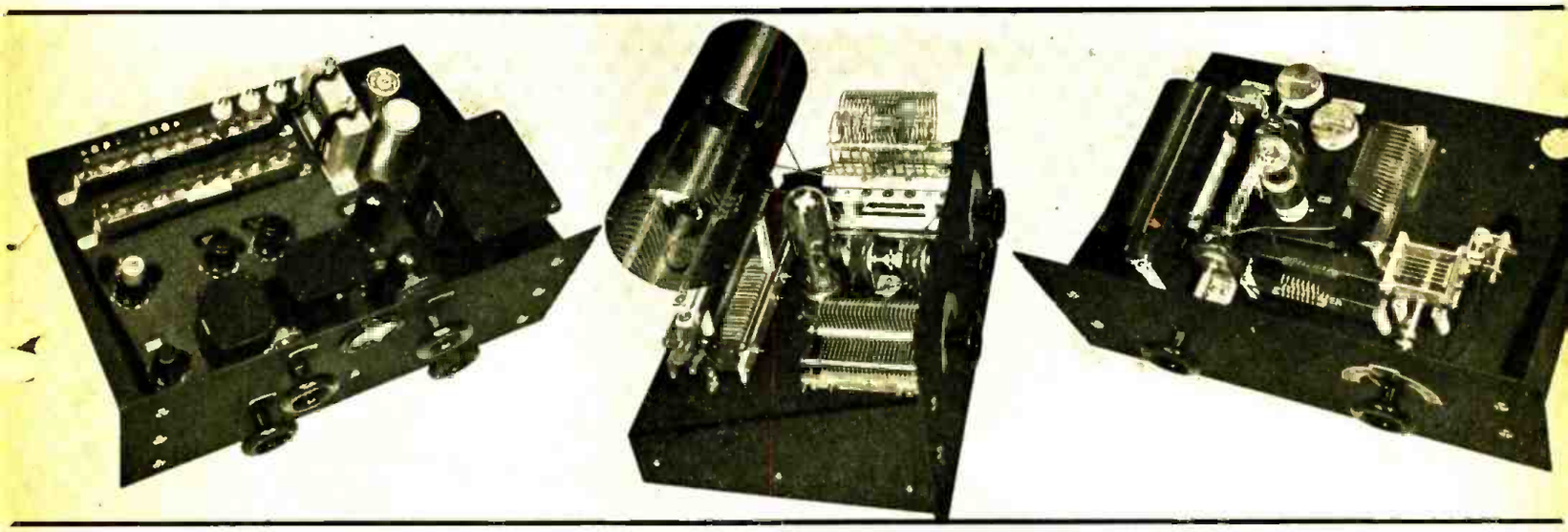
A three-position selector switch of the rotary type permits the choice of c.w. or phone operation. In the off positon all filaments in the transmitter are cold; in the c.w. position only the oscillator and final amplifier filaments are energized and the high-voltage supply to the a.f. bleeder is opened, thus reducing the load on the dynamotor. In the phone position the a.f. bleeder is connected to high voltage and the oscillator keying terminals are shorted, thus providing a continuous carrier.



Rear of transmitter cabinet, with door open, showing the three chassis shown separately below, and the microphone. The lower chassis is the power distribution and audio system.

The Crystal Oscillator

The central chassis carries the crystal-controlled oscillator. The circuit is shown



From left to right: power and audio chassis, the final amplifier chassis and the crystal-controlled oscillator chassis.

in Fig. 2. This employs an RCA-807 with cathode regeneration to provide adequate drive on all bands for high-level modulation. Three Bliley type VP4 crystals are employed, one each for the 20, 40 and 600-meter bands.

The selection of any one crystal and its associated tank inductor is taken care of by means of the ganged Ohmite band switches, SW1-SW2. The 50-mmfd. tank condenser, C5, is connected from the plate of the 807 to ground so that it is in circuit on all three bands irrespective of the band-switch setting. On 600 meters, however, a 150-mmfd. condenser, C6, equipped with a locking device, is shunted across the tank coil, being automatically picked up by the band switch. The 50-mmfd. condenser is brought out to a front-of-panel control for tuning on 20 and 40 meters, and provides sufficient capacity to induce resonance on 600 meters at which wavelength it parallels the 150-mmfd. condenser.

The Final Stage

The uppermost chassis in the transmitter cabinet accommodates the final amplifier stage. The circuit is shown in Fig. 3. An Amperex ZB-120 was chosen because of its very high mu and consequent low bias and driving requirements. It will be noted from this diagram that the 600-meter circuit is capacity loaded in the same manner as the identical circuit in the crystal oscillator.

Provision was made in the 20- and 40-meter bands for individual doublet antennas. Both tanks have internal variable link coils terminating in Alsimag 196 bushings arranged along the top of the transmitter cabinet. Two half-wave doublets cut to proper length for each band, with 75-foot lengths of Bassett concentric cable permanently attached, are included ready for connection to their respective terminals. The 600-meter output is designed to feed a Marconi antenna by means of a shunt-tuned antenna pick-up coil, L4, coupling between this coil and L3 being varied by loosening two wing nuts and sliding the antenna coil mounting. A Triplett Model 341 r.f. meter on the upper panel indicates antenna resonance, the external thermocouple being located in the antenna lead at the rear of the chassis.

All essential circuits are wired to the upper panel which carries the five Triplett meters. They indicate the 807 plate current, filament voltage, antenna current on the 600-meter band, the ZB-120 filament voltage and plate current. The filament voltage for the 807 and ZB-120 is controlled by the rheostats, R15-R16, located on the power chassis, a red line on each voltmeter scale indicating the proper operating voltage. No series resistance was required in conjunction with the 6.3-volt a.f. tubes since they are paired up and wired in series-parallel across the 12-volt battery supply. This reduces battery drain. The 2-inch meter on the bottom panel indicates the total current con-

AEROVOX
C1—0.1 mfd. paper
C2—10 mfd., 50 v. electrolytic
C3—4 mfd., 450 v. electrolytic
C4—4 mfd., 450 v. electrolytic
C5—10 mfd., 50 v. electrolytic
C6—10 mfd., 50 v. electrolytic
C7—25 mfd., 250 v. electrolytic
C8—8-8 mfd., 450 v. electrolytic
C9—4 mfd., 600 v. oil filled
C10—2 mfd., 2000 v. oil filled
C11—25 mfd., 250 v. electrolytic

IRC
R1—2 megs, 1 watt
R2—3,000 ohms, 1 watt
R3—100,000 ohms, 1 watt
R4—300,000 ohms, 1 watt
R5—20,000 ohms, 1 watt
R6—500,000-ohm gain control
R7—2000 ohms, 1 watt
R8—1000 ohms, 1 watt

KENYON
T1—Type T58 transformer
T2—Type T255 transformer
T3—Type T459 transformer

OHMITE
R9—200 ohms, 20 watts
R10—30,000 ohms, 200 watts
R11—30,000 ohms, 200 watts
R12—2500 ohms, 200 watts
R13—10,000 ohms, 200 watts
R14—25 ohms, 10 watts
R15—Model H rheostat, 2 ohms, 25 watts
R16—Model J rheostat, 2 ohms, 50 watts

PAR-METAL
1—15213 chassis
1—3604 panel

RCA
1—type 617 tube
3—type 6C5 tubes
2—type 6L6 tubes

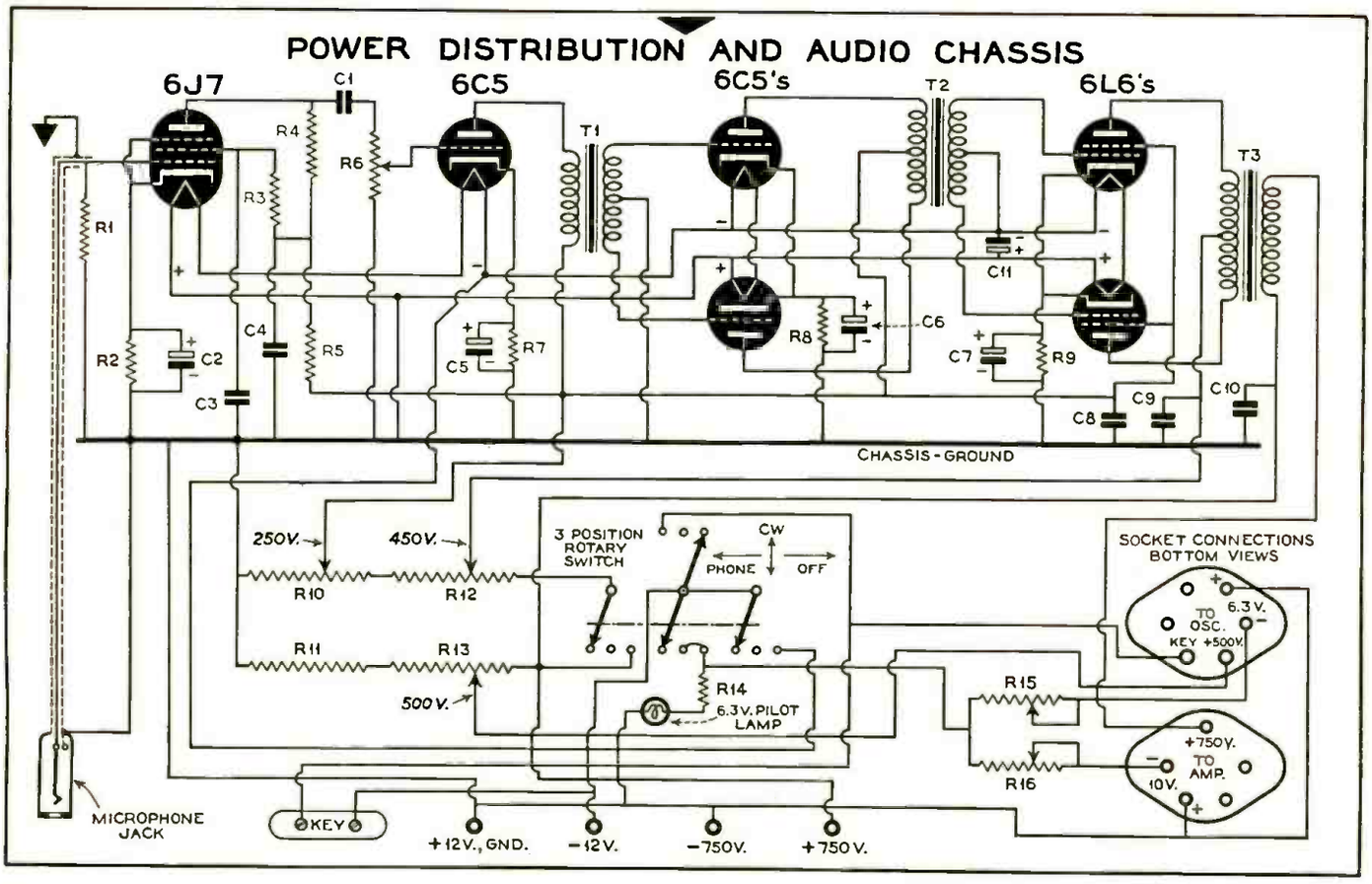


Fig. 1. Schematic diagram of the power distribution and audio chassis. Note manner in which bias is obtained for the 6L6 modulators.

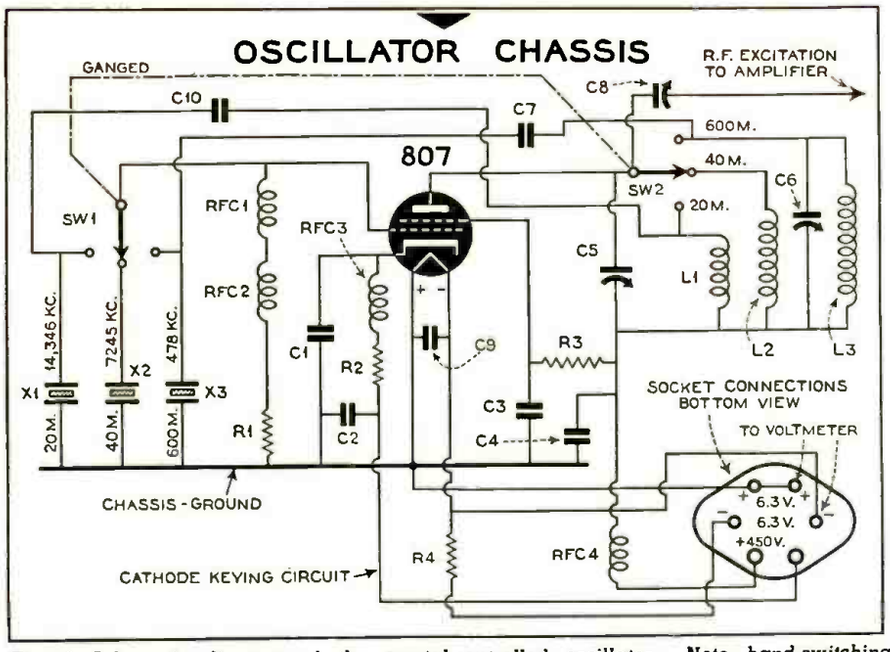


Fig. 2. Schematic diagram of the crystal-controlled oscillator. Note band-switching system for the three frequencies.

AEROVOX
C1—250 mmfd., 1000 v. mica
C2—25 mfd., 600 v. paper
C3—25 mfd., 600 v. paper
C4—.01 mfd., 1250 v. mica
C9—.25 mfd., 600 v. paper

BLILEY
X1—Type VP4 crystal, 20 meters
X2—Type VP4 crystal, 40 meters
X3—Type VP4 crystal, 600 meters

CARDWELL
C5—Type MT50GS variable, 50 mmfd.
C6—Type MT150GS variable, 150 mmfd.
C7—8 mmfd. midget padder (feedback)
C8—Type ZR25AS variable (coupling) 25 mmfd.
C10—Feedback condenser, 2 mmfd.

COTO
L1—20-meter inductor
L2—40-meter inductor
L3—600-meter inductor
RFC1—18 mh. r.f. choke
RFC2—2.5 mh. r.f. choke
RFC3—2.5 mh. r.f. choke
RFC4—2.5 mh. r.f. choke

OHMITE
R1—50,000 ohms, 20 watts
R2—750 ohms, 10 watts
R3—10,000 ohms, 20 watts
R4—5 ohms, 25 watts
SW1—Crystal selector switch
SW2—Inductor selector switch

PAR-METAL
1—15213 chassis
1—3604 panel

RCA
1—type 807 tube

sumed by the modulator while also serving as a check on percentage of modulation.

Outputs

With a total input of 250 ma. at 750 volts—the maximum output of the Pioneer dynamotor—this transmitter is capable of a measured carrier output of 60 watts fully modulated. The filament-heating current consumed when all tubes are energized for phone operation is 4.1 amperes, while the dynamotor draws a total of 28 amperes under these conditions. Due to a saving of 100 ma. when the modulator is cut for for c.w. operation, the output may be raised to 80 watts by tightening the link coupling to the feeder.

In view of Eurich's reports on island conditions, every precaution was taken in design, construction and choice of parts to preclude the possibility of breakdown. All resistors and fixed condensers were chosen to operate well below their ratings. Insulating materials were selected with great care. Mounting post insulators, bushings, terminals and inductor mountings are all made of Alsimag 196. The Cardwell variable condensers have Mycalex supports. Power circuits are carried to each successive deck by means of plugs and sockets, allowing each chassis to be pulled for repairs or check-up. All of the flexible wiring and cables have a specially treated, lacquer-coated wire since ordinary fabric-covered wire is often a source of trouble when exposed to moisture. Spare parts have been included to take care of any possible breakdown of the equipment.

The Receiver

As the Sargent model 11-MF receiver aboard the *Yankee* had proved highly satisfactory under adverse climatic conditions, a similar set was obtained for PITC. The choice was further justified by the fact that Andrew Young had the opportunity of operating the receiver during the *Yankee's* stay at Pitcairn. Accordingly, the model 11-MF battery-operated receiver, covering all frequencies from 30 mc. to 100 kc. was procured. This receiver, with a total of four tubes, has a stage of r.f. and adequate bandspread for all com-

(Continued on page 98)

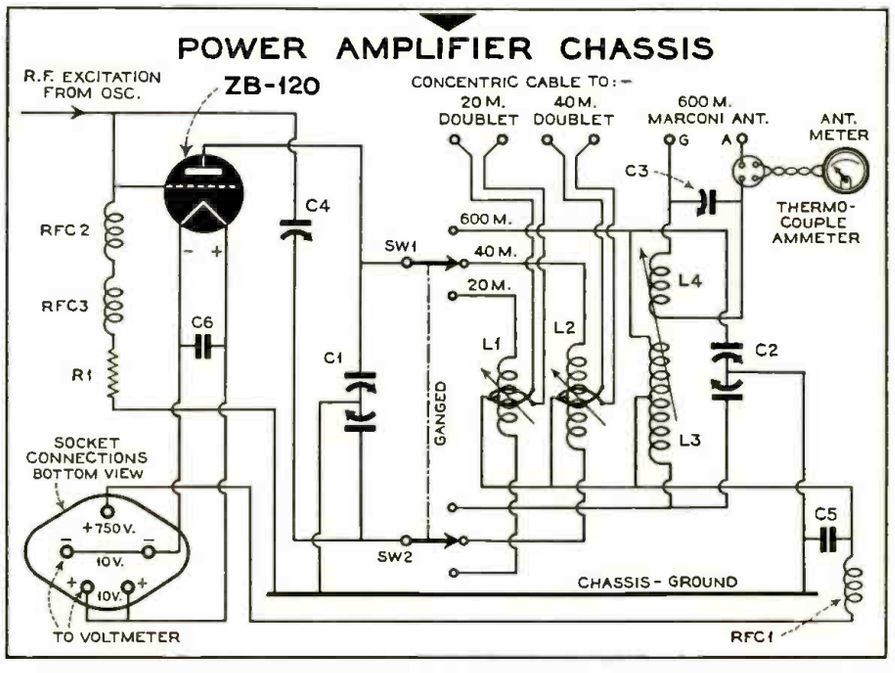


Fig. 3. Schematic diagram of the final amplifier using a ZB-120. Connections for three separate antennas are provided.

AEROVOX
C5—500 mmfd., 2500 v. mica
C6—.01 mfd., 1250 v. mica

AMPEREX
1—type ZB-120 tube

CARDWELL
C1—Type XG50KD split stator, 50 mmfd.
C2—Type XP325KD split stator, 325 mmfd.
C3—Type XT440PS single section, 440 mmfd.
C4—Type NA14NS neutralizing, 5-14 mmfd.

COTO
L1—Type 20BTVL tank inductor
L2—Type 40BTVL tank inductor
L3—Special tank inductor, 600 meters
L4—Special antenna inductor, 600 meters
RFC1—Type CI12 r.f. choke, 2.2 mh.
RFC2—18 mh. r.f. choke
RFC3—Type CI11 r.f. choke, 2.5 mh.

OHMITE
R1—2500 ohms, 20 watts
SW1—Inductor bandswitch
SW2—Inductor bandswitch

PAR-METAL
1—15213 chassis
1—3606 panel
1—MP-53 meter panel
1—SC3513 cabinet (for entire transmitter)

Globe Girdling

By J. B. L. HINDS

THE BOSTON "MAPPARIUM" . . . TAQ—TURKEY . . . SIX MEXICANS DELETED . . . CO'S ZRJ-ZRK-ZRH . . . NEW W8XK . . . SPW-SPD QRM . . . PRA8 BACK . . . NOVA SCOTIAN

New Stations

Kc.	*Meters*	*Call*	*Location*
9523	31.50	ZRH	Roberts Heights, South Africa
9110	32.93	COCA	Havana, Cuba
7010	42.80	XEME	Merida, Mexico
6010	49.92	CJCX	Sydney, N. S., Canada
6010	49.92	PRA8	Pernambuco, Brazil
4820	62.25	HJ7ABB	Bucaramanga, Colombia

Station Changes

New Frequency	*New Call*	*Old Call*	*Old Frequency*
9930	——	COBC	9350
9833	——	COCM	9840
9606	ZRK	ZTJ	9606
9580	VLR	VK3LR	9580
9495	——	HJ1ABE	4860
8920	——	COKG	8930
6130	——	XEUZ	6120
6028	——	HJ4ABP	4880

Stations Deleted

Kc.	*Meters*	*Call*	*Reason*
12300	24.39	CB615	Not in service

Non-Authenticated Stations

Frequency	*Call*	*Location*
17760	PZF	Dutch Guiana (Jan.)
15650	JFZ	Japan (Oct.)
15290	VUD4	India (Feb.)
15195	TAQ	Turkey (Feb.)
15170	——	Peru (Feb.)
15160	VUE3	India (Feb.)
14010	VK5DI	Australia (Oct.)
11870	VUD3	India (Feb.)
9950	COCU	Cuba (Jan.)
9625	JFO	Japan (Dec.)
9575	VUD2	India (Feb.)
9565	HP5S	Panama (May)
7600	HC1RJ	Ecuador (May)
7200	HC1AJ	Ecuador (May)
7100	——	Mexico (Jan.)
6600	HI6H	Dom. Rep. (May)
6465	YV3RD	Venezuela (Feb.)
6128	OAX7A	Peru (May)
6120	HP5Z	Panama (June)
6085	VUE	India (Feb.)
6050	XEKM	Mexico (Nov.)
6000	OAX5A	Peru (May)
5835	YV5RR	Venezuela (Nov.)

IF you are ever in Boston, Massachusetts, and you are a follower of globe or mercator maps of the world in connection with your travels in DX, you should not miss the opportunity to step inside the new Christian Science Publishing House and pass into the Mapparium—"a place for the map".

A sphere, 30 feet in diameter, the framework of which is bronze, is so constructed as to form 10-degree latitudinal and longtudinal divisions, within which are fixed sections of glass painted on the concave side which represent exactly the whole surface of the earth as it appears in its true spherical shape on the outside of the great ball which we know as the earth. The topography of of the surface is not represented. Through this translucent sphere there extends a glass platform or runway which permits visitors to pass through the spherical room and gaze about at a world from pole to pole which is a true projection of the world's outer face.

There are three openings into the globe, an entrance from the main stair hall, another from the reception room, and a window aperture from the main lobby. The entrances from hall and reception room are connected by a glass bridge, the framework of which is made of aluminum and stainless steel, the floor and sides being of structural glass from 1 to 1½ inches thick. Ventilation is arranged by a current of air which comes in under the bridge and is drawn out at the north pole. Clocks placed about on the equatorial line, where meridians mark the changes of time zones, make it possible to know the time at any moment in any section of the world. The illumination consists of about 300 electric lights placed outside the sphere. Their effect, in addition to flooding the interior of the sphere with a colorful glow, is to give the sense of three dimensions. The land masses stand out, the mountains have height, the waters have depth.

During the first four or five months after its opening some 50,000 visitors, from all corners of the earth, passed through the sphere, pointed out from the bridge their homeland and noted its connections to those countries surrounding it. If one but knew the thoughts of all. Those of the writer were doubtless different from the rest, and first dwelt on the wish that such a room was part of his home, with an efficient receiver on the bridge connected with an aerial running in from the North Pole, where one could see before him where the signal received came from and note the time at the point with that of his own.

Probably many would have thoughts of interdependence, mutual responsibility, neighborliness and universal good-will, and rightly say, "Well, we're pretty close together after all," for speaking in terms of completeness, the Mapparium adds to its geographic service a quietly permeative sense that all the earth is intended, a simple, intimate place, rightly designed for friendship and unity, which seems so lacking in the present day and age of turmoil and strife.

Possibly it remains for radio to be the instrument through which will be woven these bonds of sincerity and friendliness among the nations and peoples of the world so that it will be an understandable one as first intended.

Special photo-veri from COGF, Matanzas, Cuba.

Radiophone and Experimental Stations

GCW, 9800 kc., Rugby, England. (9790 kc. Berne list) heard in Brooklyn, N. Y., testing with WNA, 9170 kc., Lawrenceville, N. J., at 6:04 p.m.

YSJ, 13410 kc., San Salvador, El Salvador, heard testing in Roanoke, Va., at 10:20 a.m.

KKZ, 13690 kc., Bolinas, California. carries Columbia Broadcasting programs daily.

WOA, 6755 kc., Lawrenceville, N. J., heard in New York signing off with GDW, 4820 kc., Rugby, England, at 10:37 p.m.

KWV, 10840 kc., Bolinas, Calif., heard in Louisiana, testing with KBB. 8710 kc., Manila, P. I., at 9 a.m.

HSJ, 7955 kc., Bangkok, Siam, heard in Oregon calling and talking with KUW, 9110 kc., Manila, P.I., at 11:49 p.m.

SUZ, 13820 kc., Cairo, Egypt, heard by Chicago listener testing with GBB, 13585 kc., Rubgy, England, at 2:57 a.m.

PCK, 18410, Kootwijk, Holland, heard upstate New York, 7:24 to 7:48 a.m. broadcasting organ concert and talking with Bandoeng, Java.

W2XGB, 8655 kc. and 12862.5 kc., Hicksville, New York, transmits musical programs nearly every day and broadcasts news items at 9 a.m. and 5 p.m. Very good signals are maintained.

VQG, 19620 kc., Nairobi, Kenya Colony, Africa, heard by upstate New York listener signing off voice test with GAD, 19480 kc., Rugby, England, at 8:06 a.m.

CMA5, Havana, Cuba, reported by many as being heard broadcasting musical programs on 8630 kc., 10890 kc. and 15505 kc. Is owned and operated by Cuba Transatlantic Radio Corporation and while the call may be given in each case as CMA5, the assigned calls for the various frequencies operated bear regularly designated call letters and so appear in the complete station lists. It will be made more clear to you by referring to frequencies 5780, 8630, 11560, 15505 and 17260 kc. in November, 1937, list, and while these do not cover all frequencies used by the operating company, it will show you the calls for the frequencies mentioned.

Down Under Stations

The Singapore short wave-stations to serve Malaya will probably be on the air about March, 1938. The suggested wave to be used is 31.48 meters during the day and 49.90 meters at night.

VK3LR, 9580 kc., Melbourne, Australia, has changed its call letters to VLR and revised its operating schedule.

VK9MI, 6010 kc., M. V. Kanimbla, Sydney, Australia, signs off mornings at 7:35 a.m.

JZJ, 11800 kc., and JZI, 9535 kc., are still carrying the Japanese Overseas programs. JZJ continues to put out a fairly good signal but JZI is not getting out on the 31 band and is meeting with considerable interference.

JFO, 9630, Taihoku, Taiwan, may possibly be the call of the station heard mornings on that frequency. Berne frequency lists show a station under construction at that location but no call assigned. Some listeners still continue to report the call as JFAK, although it would seem to be a long-wave call.

JVH, 14600 kc., Nazaki, Japan, is still being heard in evening but broadcasts appear to be in Japanese.

VUD4, 15290 kc., VUE3, 15160 kc., VUD3, 11870 kc., VUD2, 9575 kc. and VUE, 6085 kc., are calls and frequencies for new Delhi, India, stations and VUB2, 9565 kc., new Bombay station, which may be heard on the air at any time, as they are completed or nearing completion according to authentic information. It may be that the 11870 frequency has been recently heard.

TAQ, Ankara, Turkey, will be the call and location of the new Turkish station when it comes on the air on 15195 kc.

Veri from ZRK, Klipheuvel, South Africa. Green printing on yellow background, and therefore difficult to reproduce. But a nice card.

LAST-MINUTE FLASHES

VP3BG, 6130 kc., Georgetown, British Guiana, is off the air weekdays at 7:45 p.m., and 6:15 p.m. on Sundays.

XEXS, 6200 kc., Mexico City, reported out of service and displaced by XEXA, 6170 kc. in list, which owners advise is on 6132 kc.

OAX1A, 6335 kc., Chiclayo, Peru, changed back to 6150 kc.

CSW2, Lisbon, Portugal, back on the air with new transmitters on 11040 kc.

TGWA, 15170 kc., Guatemala City, Guatemala, on the air on Sundays from 10:30 a.m. to 3:30 p.m.; Mondays, 7:50-9 a.m. and 12:45-3:45 p.m. TGWA, 11760 kc., Monday to Friday 7:30 p.m. to 12 a.m.; Saturday 7:30 p.m. to 1 a.m.; Sunday 3:30-5:30 p.m. and 7 p.m. to 12 a.m. TGWA, 9685 kc. and 17800 kc., irregular.

2RO, Rome, Italy, heard simultaneously on 9635 and about 9800 kc. and on other frequencies, indicating new facilities are being put into use.

EAR, 9480 kc., Madrid, Spain, on air daily at 7:30 p.m.; Monday, Tuesday and Thursday at 9:30 p.m. with broadcasts in English and Saturday evenings in German. EAQ, 9860 kc., appears to be silent.

OLR2B, 6030 kc., Prague, Czechoslovakia, said to be broadcasting Monday, Wednesday and Friday from 8 to 10:35 p.m., which would indicate frequencies changed in late schedule not received.

"Radio Martinique" works on 9700 kc. according to late advice from station.

Japanese dropped English news on January 1st from 4:30 to 5:30 p.m. Overseas Broadcasts. Now broadcast such news on JZJ 11800 kc., 6 to 6:30 p.m. daily.

TI4NRH, Heredia, Costa Rica, on air with improved transmitter at about 9698 kc., from 11 p.m. to 12 a.m.

SPW, 13635 kc., and SPD, 11535 kc., Warsaw, Poland, now on the air Monday to Friday, 6 to 8 p.m., and Saturday and Sunday 6 to 9 p.m.

RV59, Moscow, U.S.S.R., heard on certain days in week between 4 and 5 p.m. on about 6004 kc.

HC2RL, 6668 kc., Guayaquil, Ecuador, now on air Sunday 5:45 to 7:45 p.m. and Tuesdays 9:15 to 11:45 p.m.

ZRD, 6150 kc., Durban, South Africa, is a 10-watt station working locally on practically the same schedule as ZRH, ZRJ and ZRK.

South Africans

ZRK is the call of Klipheuvel, South Africa, on 9606 and 6097.5 kc.

From information received from Johannesburg it appears that there are three transmitters and three frequencies, and from time schedules received the three stations are on the air practically the same time with a little variation. These schedules are shown in lists complete as received.

The advice is that ZRJ, 6097.5 kc., at Johannesburg, is a 200-watt transmitter and was put on the air to satisfy a local requirement only. ZRK, 9606 kc., at Klipheuvel, is a 5-kw. transmitter and is of more national and international importance.

The transmitter ZRH, at Roberts Heights, on 9523 kc. (which is the one now being heard simultaneously with ZRK on 9606 kc.) is also 5 kw. and is to be brought into regular service.

The time schedule for ZRJ, Johannesburg, indicates 200 watts power for

all time except that from 9 a.m. to 11:30 a.m. on week days, when 5 kw. is used. But the fact that we are hearing this transmitter with strong signal between 11:45 p.m. and 12:45 a.m. when the power is shown as 200 watts, would lead us to believe that probably 5 kw. or more is being used on all three transmitters the entire time. As stated previously, reports were that 22 kw. power was used on these transmissions and the power of 5 kw. may be in error. This point may be cleared up later.

The address of all three stations is P.O. Box 4559, Johannesburg, South Africa, as shown in station list under ZRJ, 6097.5 kc. and is in agreement with that shown on veri card received by the writer covering reception of ZRK, 9606 kc.

Europeans

Radio Nacionales, Salamanca, Spain, uses plenty of English but gives little information in answer to reports. From listening and reports received, the writer is of the belief that this station is a long-wave station only, has no call letters, and that the programs heard are relays of the long-wave station. Radio Nacionales has been reported as heard by listeners on 6700 kc., 7390 kc., and 9625 kc., as well as over the frequencies of EAJ43 and EA9AH.

Judging from the urgent requests for reports from listeners they would seem to be interested in knowing how they are being heard. If such is the case it would also seem that reports should be answered promptly and information given so that correct data might be set up for the listener.

"Radio Milano" is apparently another station of a similar character and reported heard by many, the frequencies on which heard varying from 10700 to 10850 kc. Station works often from 5 to 6 p.m. and 9 to 10 p.m. Requests made in Italian for reports but no address or call letters given.

Special photo veri from "Polskie Radio," Warsaw, Poland.

On account of the unsatisfactory conditions in connection with these "war stations" we have about come to the conclusion that it might be best to refrain from listing them in the station lists, but merely outline the information in this section as available.

GSA, 6050 kc., Daventry, is again being used on afternoon broadcasts of the British Broadcasting Corporation.

CSW, Lisbon, Portugal, broadcasts as opening and closing theme song twelve notes from the National Anthem, "A Portuguesa." In other words, it is an abbreviation of the National Anthem. No interval signal has as yet been selected.

OLR5A, 15230 kc., OLR4A, 11840 kc. and OLR3A, 9550 kc., Prague, are carrying the Czechoslovakia programs and the listings shown are from the latest program schedules received.

HAT4, 9125 kc., Budapest, Hungary, has been making 5- to 10-minute tests after their regular programs, using two antennas, the old one and a new directional for North and South America and requesting comparative reports from listeners.

SPW, 13635 kc., and SPD, 11535 kc., Warsaw, Poland, are not always heard with the best signal strength or quality which is due to code interference on both frequencies. This comment is made in answer to some listeners who are inquiring if the stations are heard.

PCJ, 9590 kc., Hilversum, Holland, now hroadcasts two evening programs each week, one on Wednesday and one on Thursday, as per time shown in list.

South Americans

PRA8, Pernamhuco, Brazil, is back on the air on 6010 kc., according to advice from the Brazilian Government, although reports indicate it is being heard near 6015 kc. With PRA8, CJCX, COCO and VK9MI all transmitting on this same frequency, it would seem to the writer that some shifting would be necessary unless split time schedules were arranged hy those interested.

PRA8 is again being operated by the Pernambuco Radio Club which operated the old station. The new installation consists of two new studios in addition to the old one, an auditorium. These are situated near the center of town, while the antennas are at a distance of 6 kilometers. The installation made by Radio Cinephon Brasiliera, S. A. consists of material manufactured in Brazil. The long-wave band is 416.6 meters (720 kc.) and the power 25 kw. The short-wave power is 5 kw. The old 5-kw. German apparatus, installed in 1931, is to be kept for emergency purposes.

PSH, 10220 kc., Rio de Janeiro, Brazil, which broadcasts from 7 to 9 p.m. daily has been heard on several occasions relaying the Brazilian Hour from 4:45 to 5:45 p.m., which is transmitted by PRF5 on 9501 kc. and shown in station lists.

The Department of Propaganda of Brazil advises that the 75-kw. station to be operated by the government will be ready for the air some time this year and states that as soon as the date for operation is settled they will be glad to inform us. This installation was mentioned in this section in August 1937 but the statement was then made that the station was to transmit with 50 kw. power which apparently was in error.

Radio Nacional, Lima, Peru, heard by several when broadcasting special test programs on 15170 kc. between 1 and 3:45 p.m. Frequent announcements in English and requests made for reports, but no call letters of station given. It is assumed that this is another frequency of OAX4Z, 6082 kc. and OAX4T, 9562 kc. Station will be carried in the non-authenticated hlock until call is learned.

OAX1A, 6150 kc., Chiclayo, Peru, said to have been heard on 6325 kc.

CB1170, 11700 kc., Santiago, Chile, sends letter verification covering reception reports filed by the writer. Station called "Radio Otto Becker," and relays the programs of CB89 with 1000 watts power and its present schedule is listed in this issue. It is the successor to "Radio Service," whose station, CB615, 12300 kc., has been closed down permanently. CB1170 broadcasts an Anglo-American hour three times each week on Tuesdays, Thursdays and Saturdays from 6 to 6:45 p.m. All announcements in English on these transmissions.

Compania Internacional de Radio, Santiago, Chile, has been authorized to use a frequency of 15045 kc., and Cia de Telephones de Chile, a branch of the above mentioned company has been authorized to use a frequency of 13845 kc. at its station CED in Antofagasta, Chile. The service in which these transmitters will work is not now known.

HJ1ABE, 4860 kc., Cartagena, Colombia, is still working around 9500 kc. the old frequency, regardless of assignment. It is transmitting between 9490 and 9495 kc. and apparently holding to no set schedule.

HJ4ABP, assigned to 4880 kc., is working around 6028 kc. As there appears to be a hitch in the arrangements we are changing HJ1ABE to 9495 kc. and HJ4ABP to 6028 kc. and will await further developments.

HJ3ABX, 6122 kc., Bogota, Colombia, reported heard near 6013 kc.

HJ7ABB, 4820 kc., Bucaramanga,

Colombia, shown in non-authenticated block has been reported heard by one listener. Station has been added to lists.

PZF, 17650 kc., Paramaribo, Surinam, (Dutch Guiana), is still shown in non-authenticated section as no details have been received from Government Radio Service. PZH, 6788 kc., is evidently operated by the same service. Both stations are no doubt low-powered as neither are heard with good signal strength.

YV3RD, Barquisimeto, Venezuela, reported heard first time on the air on December 12th on 6465 kc. and asking for reports. Announced as "Radio Barquisimeto." We now have listed two stations located there, YV3RB, 9565 kc. and YV3RA, 5880 kc. which are operated by the same company.

YV3RB, 9565 kc., although listed for several months has not been reported heard. There is a possibility of a changed frequency and the wrong call heard.

Dominican Stations

HI4V, 6450 kc., San Francisco de Macoris, Dom. Rep., operates with 250 watts power on changed schedule as shown on list. Station plays the Dominican National Anthem at opening and closing. Address: Mella No. 25. Owner and Director, Luis Raul Betances Ricart.

HI1D, 9505 kc., Ciudad Trujillo, Dom. Rep., last heard around 9290 and no advice yet received from station.

HIL, 6500 kc., Ciudad Trujillo, Dom. Rep., has a new veri card with white background and call in large red letters. Station now on the air daily from 12:10 to 1:40 p.m. and from 5:40 to 7:40 p.m.

HI8Q, 6206 kc., Ciudad Trujillo, Dom. Rep., is only transmitting on Sundays at present from 5:40 to 9:40 p.m. Sr. Julio A. Garcia Alardo, Proprietor, advises he is at present receiving considerable interference from the plant of the Dominican Telephone Company some 300 meters away, but hopes to overcome the trouble and shortly again be on a daily schedule as heretofore. Sr. Alardo also advises they are having a new veri card printed, bearing views of the city of Trujillo.

Cubans

COCA, 9700 kc., Havana, Cuba, in non-authenticated block in January issue, has been transferred to 9110 kc. in station list near which last heard. Station relays the programs of long-wave station CMCA on 1350 kc., whose address was shown as Avenue de Italis No. 102, Havana, Cuba, in the last list of stations furnished by the Director General of Radio.

COCU, Havana, Cuba, carried in the non-authenticated block, has not yet been reported as heard.

COCO, Havana, Cuba, is being heard on its original frequency of 6010 and also near 12010 kc. If the latter is a harmonic—which would be 12020—it is peculiar as station is not heard on this frequency during all of the time scheduled and heard on 6010 kc. When heard on 12010 kc., however, the signal strength and quality are good—in fact, better than the 6010 frequency at times.

COCQ, Havana, Cuba, is again back near its old frequency at 9750 kc. COKG, 8930 kc., Santiago, Cuba, is said to have sent a listener a veri card which gave frequency as 8920 kc. The assigned frequency is also 8920 kc. and change is being made in list, although COKG was close to 9000 kc. at last accounts.

COBC, 9350 kc., Havana, Cuba, has been changed to 9930 kc. as it was working near the latter frequency when last heard. No advice has been received from the station since the shift was made.

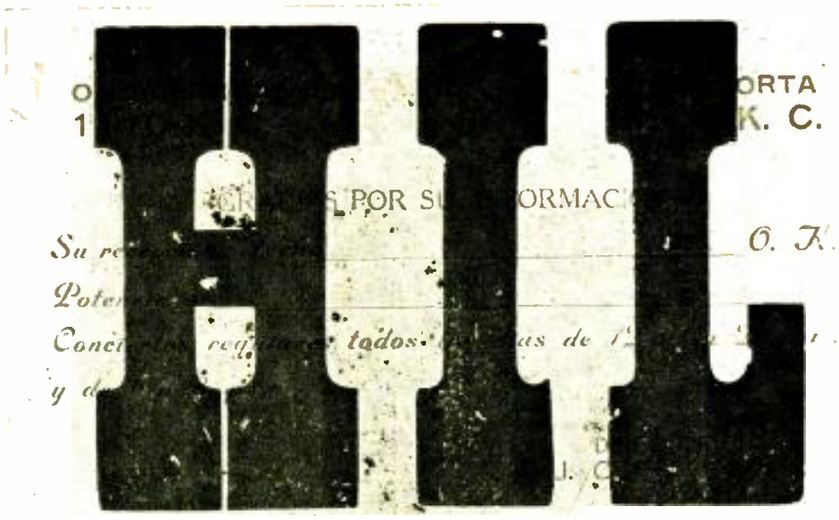
COCM, 9840 kc., Havana, Cuba, has been changed in list to 9833 kc. as it is found that the latter frequency is that assigned to station.

Central Americans

HRP1, 6351 kc., San Pedro Sula, Honduras, is now operated by Diaz Zelaya y Cia, Senor Joaquin Mendoza being the new Director. Transmissions are opened with the March, "Boy Scouts" by Prof. Francisco R. Diaz and closed with the National Anthem of Honduras. No interval signal is used but gongs are employed before the announcements which are in Spanish.

YSM, 11710 kc., and YSH, 9520 kc., San Salvador, El Salvador, will not be used regularly for the present—at least in the broadcast of programs. YSD, 7894 kc., will be heard on regular programs in evenings. The station may be

(Continued on page 111)



Easy-to-read veri from HIL, Santo Domingo. Red letters on white card.

FEBRUARY ACE REPORTERS

H. L. Batchelder, Chicago, Illinois
G. T. Beyer, W9IIH55, Chicago, Illinois
William Bell, Monroe, La.
Theodore Bottema, Bethlehem, Pa.
Wm. A. Byrn, Jr., Nashville, Tenn.
H. C. Chesnut, Plattsburg, New York
L. M. Clark, Snyder, New York
Li Chi Chiang, VE1CL, St. Johns, Quebec, Canada
Pat Crichton, W31K2, Carmel-By-The-Sea, Calif.
Edward H. Davis, W4IH151, Brooklyn, N. Y.
J. A. Downs, Jr., W4IH63, Westfield, N. J.
J. L. Everett, V37F3, Toronto, Ontario, Canada
Wm. R. Goetz, W4IH161, Brooklyn, N. Y.
J. E. Gill, Dorchester, Mass.
George J. Glasspool, Southampton, England
E. C. Games, Trenton, N. J.
E. G. Granger, W5F2, Syracuse, N. Y.
Jack Holterman, W4IH148, Flushing, N. Y.
L. H. Harris, ZL1, Lower Hutt, New Zealand
C. D. Jaffe, W5L2, Norfolk, Va.
Ian A. Jamieson, Manchester, England
Robert Jones, W8J1, Coshocton, Ohio
C. F. Keirstead, W3F5, Framington, Mass.
M. E. Leshner, W3F32, Lawrence, Mass.
Earl McDonald, W3E6, Portland, Maine
Lyle M. Nelson, Eugene, Oregon
H. W. Newell, W3F26, Lowell, Mass.
R. B. Oxrieder, W6H5, State College, Pa.
Alvin W. Oliver, Houston, Texas
Anthony L. Okolish, Barberton, Ohio
F. M. Pow, VE24A1, South Edmonton, Alberta, Canada
Roy E. Pichette, W14F15, Northampton, Mass.
J. R. Pruett, Roanoke, Va.
J. F. Pichler, W22N4, Santa Fe, New Mexico
Richard Rodgers, Westwood, Mass.
H. A. Rinker, Springfield, Ohio
Earl R. Roberts, Indianapolis, Ind.
Robert Stein, W4IH109, Brooklyn, N. Y.
I. V. Saxton, W4IH48, New York, N. Y.
Walter Schwab, W24H170, New York, N. Y.
Theodore C. Smith, W5F8, Ogdensburg, New York
T. D. Smith, W17R1, Burnet, Texas
George Swanson, W4IH99, Englewood, N. J.
Byron Sylvius, Van Nuys, Calif.
Alan B. Shaw, W4IH32, Jackson Heights, N. Y.
F. W. Stockbridge, Westboro, Mass.
Joseph A. Slezak, W11H26, Chicago, Ill.
I. F. Satterthwaite, W9H11, Toledo, Ohio
John Szlucha, Owego, N. Y.
Ernest Sandquist, Downey, Calif.
Shiko Tahara, Compton, Calif.
Alfonso Velasco, Mexico City, Mexico
LeRoy Waite, W4F11, Ballston Spa, N. Y.
Kendall Walker, W30D1, Yamhill, Oregon
Carleton L. Whittaker, Presque Isle, Maine
R. E. Weikal, W17L1, Pratt, Kansas
C. M. Whelan, Memphis, Tenn.
Howard Wilson, Jr., Ithaca, N. Y.

THE RACO UNIVERSAL CLIPPER

A PROVING-POST REVIEW

THE Universal Clipper, a product of the Radio Constructors Laboratories, is a newly developed model of the original Haynes R-S-R Clipper and retains its features.

The Universal Clipper employs five tubes in an a.c.-d.c. circuit and consists of a stage of untuned radio-frequency amplification, a regenerative-super-regenerative detector, an intermediate a.f. amplifier stage and beam-power output.

Tuning Ranges

The tuning range is from 3 to 550 meters. Bandswitch control is provided for the four low-frequency ranges, the first switch position covering the range of 555 to 1450 kc., the second position 1300 to 3300 kc., the third position 2700 to 7500 kc. and the fourth position 7000 to 21,000 kc. The three remaining ranges, providing coverage of the ultra-high-frequency bands, are reached by means of small, air-wound plug-in coils. Super-regeneration is used in these bands and the action is brought about by turning to a fifth position on the bandswitch.

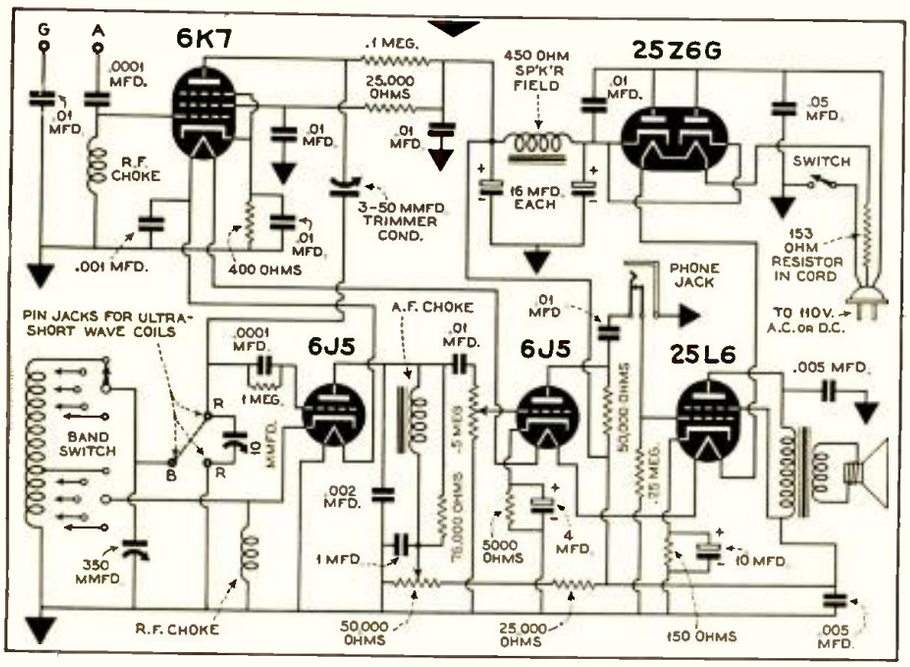
A front view of the receiver is shown in the accompanying illustration. The airplane dial, with double scale and pointer, calibrated in degrees, is actuated by the tuning knob directly below it. This is the main tuning control and is used on all but the ultra-high-frequency bands. To the right of the dial is the grille masking the cone of the electro-dynamic speaker. The on-off switch knob is directly below this.

The control at the extreme left of the panel provides electrical bandspread. This is a 10-mmfd. variable condenser in shunt with the main, 350-mmfd. tuning condenser. The bandspread is available at any frequency covered by the first four positions of the bandswitch. In the three ultra-high-frequency bands, this condenser is used as the main tuning control. The 350-mmfd. variable condenser is automatically cut out of circuit.

To the right of the bandspread control is the bandswitch. As mentioned previously, this control has five positions—four for band changing and the fifth for introducing super-regenerative action when using any one of the three ultra-high-frequency plug-in coils.

The headphone jack is located in the center of the panel. This permits the connection of phones in the output circuit of the first a.f. tube. When phones are plugged-in the loudspeaker is automatically silenced.

The volume control is just to the right of the phone jack. Following this is the variable regeneration control which also adjusts the degree of super-regeneration when the plug-in coils are in use. All three controls have calibrated scales reading from zero to 100 degrees.



Complete schematic diagram of the Raco Universal Clipper. The lower arm on the band switch was left out by error. It should have been shown on the upper contact, thus completing the 6J5 cathode circuit through the coil.

The Circuit

The schematic diagram of the Universal Clipper is shown herewith. The untuned r.f. stage, employing a 6K7, is active on all seven ranges covered by the receiver. This stage is capacity-coupled to the 6J5 electron-coupled regenerative

(Continued on page 101)

Channel Echoes

By ZEH BOUCK

OT's CONTEST . . . THE FOREIGN DOVE . . . STINKASTING . . . IS MAE WEST DATED?

THAT COLLIERS HOUR teaser was too easy! So here's a harder one for this month. McMurdo Silver sends us the photographs of Figs. 1 and 2, and the free subscription goes to the best identification or description of them both. The gadget to the right in Fig. 2 is one of Mac's latest products which after much argument he was induced to pose—reluctantly—just as a matter of contrast. Not many readers will be able to identify these relics by the manufacturer's names. So we shall not limit the contest to those old timers to whom Grebe, Paragon, E. I. Co., William B. Duck, Murdock, Arnold Tuska, Nichols and Adams Morgan were bywords of a bygone day. While the actual trade names may help, the best general description will win. Time element has nothing to do with it, and all contributions arriving before the 25th of February will have an equal chance.

◆

THE CATCH IN the Colliers Hour photograph was, of course, the clock. The hands point to 12:33, and the program was on the air from 8:15 to 9:15 in the evenings. The photo is therefore one of a rehearsal. The most detailed report was received from Bernard L. Ahman, Jr., of Baltimore, Md., who recalled the program very well, and sent along a list of stations which carried it. However, the free subscription goes to Carson Bodily, 1016 No. 19th Street, Boise, Idaho (here's hoping there are no bard feelings, Mr. Ahman, and the rest of the forty some readers who got it right!) who gave a very complete and logical analysis despite the fact that he had never heard the program. Several other readers whose introduction to radio came subsequent to Colliers Hour demise did likewise—but not quite so well as Mr. Bodily.

The runners up were: Paul J. Barter (who also identified the "Mystery Listener" in our October 1937 issue, through some very clever sleuthing among some old copies of other magazines), R. O. McNamara, Kermit Geary, Francis E. McAllan, W. J. Thomas III, F. O. Kugel, Hen Lyman, F. H. Sumpton, E. D. Wells, Walter C. Hunter, Murray W. Boblmann, H. M. Coshun, Robert J. Chisler, Edmund H. Davenport, James C. Eddy, Harold D. Goldberg, Herman Harjes, M. Starkopf, Orval L. Ryan, John Zieger, Russell Hanson, Robert Suhede, Rodney White, Robert Mittelman, Nicholas T. Young (of Hatry and Young), Moe Joffe, Harry Kehlenbeck, Lyndsay Wolfe, William Johnson, Herbert C. Scott, Samuel Brodsky, A. Spence Hogan, Ron. G. Bullock, H. M. Vann, Jr., G. B. Publow, Earl Bloxham, Joseph A. Piechuta, Roger C. Amundsen.

Honorable mention to you all—and thanks for the nice letters and cards!

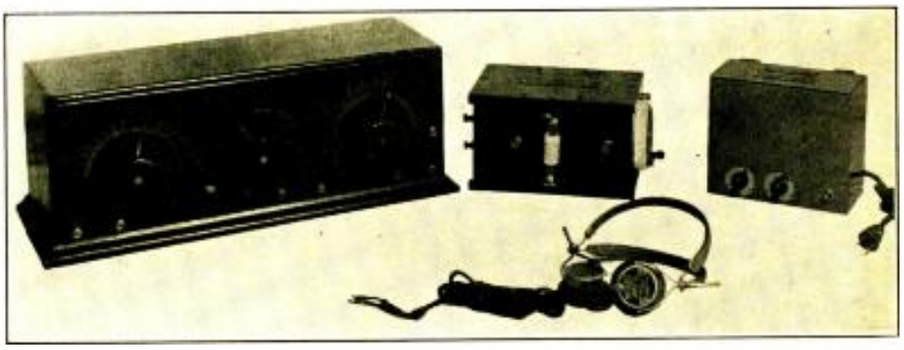


Fig. 2. More old timers from Silver's collection. The unit at the right is modern—included in the photo to provide contrast.

◆

KERMIT GEARY (runner upper) tells us that the Spanish-speaking station on 18,630 kc. is a harmonic of a 9-mc. Cuban. We don't doubt it—harmonics to them are like lottery numbers, the more the merrier. Geary does not agree with us that accurate logging can be accomplished by calibrating a receiver between known spot frequencies. It can be done, however, particularly if a *rate-of-frequency-variation* curve is plotted. More about this next month.

◆

WE HAVE IN THE past interpreted the plethora of foreign short-wave broadcasts in terms of a war scare. Perhaps we were all wrong. In recent listening, London sent us "Over The Hills Came Love," and struck the most sinister note in "Sprites and Goblins." Tokyo proclaims her gentle spirit with "Children's Music," selections on a Japanese harp, and "Japanese Bamboo Flute Solos." Where is the mailed fist of Fascism? Surely not in "Readings from Italian

(Continued on page 103)

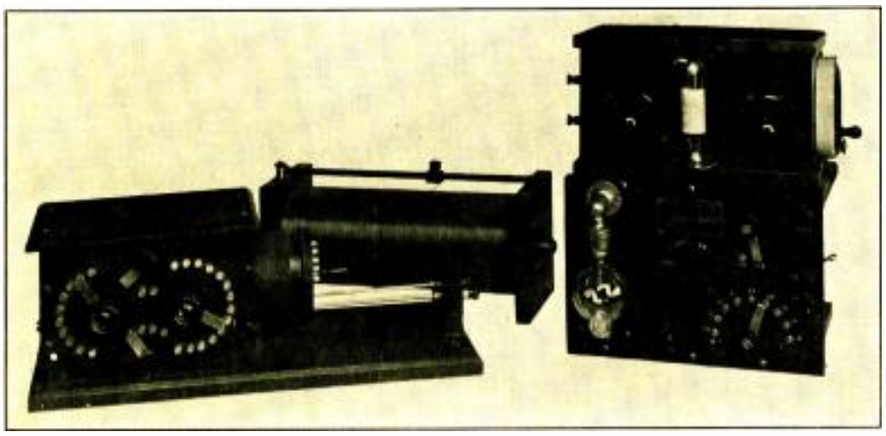


Fig. 1. From McMurdo Silver's collection of radio antiques. Can you identify them? Were those the days, or were those the days?

THE McMURDO SILVER "15-17" SUPER

By McMURDO SILVER
Chief Engineer, McMurdo Silver Corp.

THOSE who have owned and operated superheterodynes of the 1931-1932 vintage, practically all of which usually employed a low intermediate frequency of approximately 175 kc., will remember that lack of selectivity was never a charge of which they were guilty. Practically all were excessively sharp in tuning, and gave such very good 10-kc. selectivity, that they seriously impaired tone quality. But whatever the tonal imperfections of these older 175-kc. i.f. receivers, they never fell down on selectivity.

I. F. Selectivity

When the all-wave superheterodyne began to replace the older strictly 200- to 550-meter broadcast-band receivers, extreme selectivity once more became almost as elusive and hard to obtain as it had been with the even earlier t.r.f. receivers. This was because a high i.f. had to be used for short-wave reception in order to avoid serious image, or "repeat spot," interference from signals twice the i.f. away from desired signals. In the main, the averaged i.f. of all-wave receivers from 1932 on is about 465 kc. It is much harder at this frequency to wind coils for tuned i.f. transformers of the comparably good merit or Q which is essential in order to obtain the same order of selectivity that is easily had at 175 kc. The result is that the average radio receiver today will actually separate stations spaced 10 kc. apart only under most favorable conditions, as where desired and undesired stations are of not greatly differing strength.

The writer knows of only three 1938 American all-wave receivers giving really good selectivity—meaning the ability to consistently receive weak distant stations on the channels immediately adjacent to locals. This statement neglects the crystal filter selectivity of amateur receivers, which is of no value in high quality broadcast reception. Each of these three known selective receivers employs from eight to ten tuned i.f. circuits in three or four stages of i.f. amplification.

Each of these three receivers is quite expensive, their cost being well beyond the reach of thousands of operators, who, unable to afford them, must be content with the far from clean 10 kc. selectivity of practically all other radios. The situation for the amateur phone operator is equally bad, for unless he employs a crystal filter on voice, he must be content with amateur receiver selectivity in the main no better than that of the run of broadcast receivers.

The whole selectivity situation is about what it was five years ago, and despite extensive experimenting and research in radio makers' laboratories, about the best numerical coil Q today obtainable in coils capable of practical production is 130. Eight such circuits are needed in a three-stage i.f. amplifier at 465 kc. to give really good selectivity.

The new "15-17" all-wave receiver herein described ushers in what the writer confidently believes will prove to be a new era in terms of selectivity now possible to all-wave superheterodynes of reasonable cost. It provides not only selectivity actually better than that of the older 175-kc. i.f. amplifier receivers but variable selectivity as well. This today is essential if one and the same receiver is to give both extreme selectivity for the DX fan and operating amateur, and also the fine high-fidelity reception being offered through the better broadcast stations. This it does through new developments in i.f. transformer coils, and an i.f. amplifier system which as a whole is likewise new.

The Jensen A-15, fifteen-inch electrodynamic speaker which is an integral part of the "15-17" receiver. Chassis and speaker are connected by a cable and plug.

The receiver illustrated and described herewith is known as the McMurdo Silver "15-17" because, while it uses but fifteen tubes (which may be either glass or metal), these fifteen tubes perform seventeen functions. It tunes without gap or skip continuously from 565 to 9.4 meters, a total frequency range of 530 to 32,000 kc. This range is covered in four wavebands, using quite low values of gang tuning condenser in order to provide the high L/C tuning ratios necessary to maximum r.f. amplification.

Details of Receiver

Its fifteen tubes are used in a straightforward circuit. One 6K7 is *a stabilized regenerative* tuned r.f. amplifier, which through its permanently laboratory-adjusted regeneration, operates to equalize amplification and selectivity on short waves to equal that obtainable from previous two-stage tuned r.f. amplifiers. Next is a 6L7 first detector-mixer, a 6J7 electron-coupled voltage and temperature stabilized oscillator, two 6K7 i.f. amplifiers in the new "Tri-band" i.f. amplifier, 6K7 a.v.c. amplifier and 6H6 a.v.c. rectifier (these last two tubes also providing the sixteenth and seventeenth tube functions, in operating the 6G5 "magic eye" tuning meter tube. There follows a 6J5 infinite-impedance second detector, 6J5 audio beat oscillator, 6J5 Clough system tuned audio driver stage, two 6L6 beam power tubes in the 20-watt power output amplifier, and two 5Z3 rectifiers. A new 15-inch Jensen-Silver speaker and the audio system of the Masterpiece V and Masterpiece VI give the "15-17" the same fine tone of the two larger sets. More need not, and cannot be said, for this tone is available not only in long- and short-wave radio reception, but for phonograph record playing as well.

The circuit is simple and straightforward. Individual and separate r.f. transformers housed in large, low-loss shields at the right of the chassis are switched into circuit by tuning only the "Wave Band" knob, which actuates through a common grounded shaft seven separate and shielded "silver-to-silver" contact switches of the types found in all good American receivers. A total of twelve r.f. transformers in four groups of three, cover 565 to 181 meters, 185 to 54.5 meters, 56.6 to 24 meters, and 25 to 9.4 meters, a continuous range of 530 to 32,000 kc.

The R.F. Circuits

The antenna r.f. coupling transformers each have separate high-impedance primaries which avoid different sized antennae upsetting circuit tracking, with primary terminals permitting most advantageous use of single wire, doublet or commercial noise-reducing antennae. The tuned r.f. transformer coupling the 6K7 r.f. simplifier to the 6L7 first detector is essentially similar, and "tracks" extraordinarily closely with the t.r.f. and oscillator circuits. Its high-impedance primary presents to the 6K7 r.f. amplifier circuit the high impedance necessary to obtain the stabilized regenerative amplification which must increase with signal frequency if it is to operate to equalize gain and selectivity throughout the range of 530 to 32,000 kc. This results from the increase in effective regenerative coupling through the slightly augmented grid-plate capacity of the 6K7 tuned r.f. amplifier which increases with signal frequency. Measurement indicates that at 13 meters where, for example, r.f. amplification is extremely hard to obtain to even 10% of the amount realizable to 500 meters, as much is had as in the 200- to 550- meter band. The net result is actually better r.f. gain and selectivity than is had from conventional two-stage r.f. amplifiers on short waves.

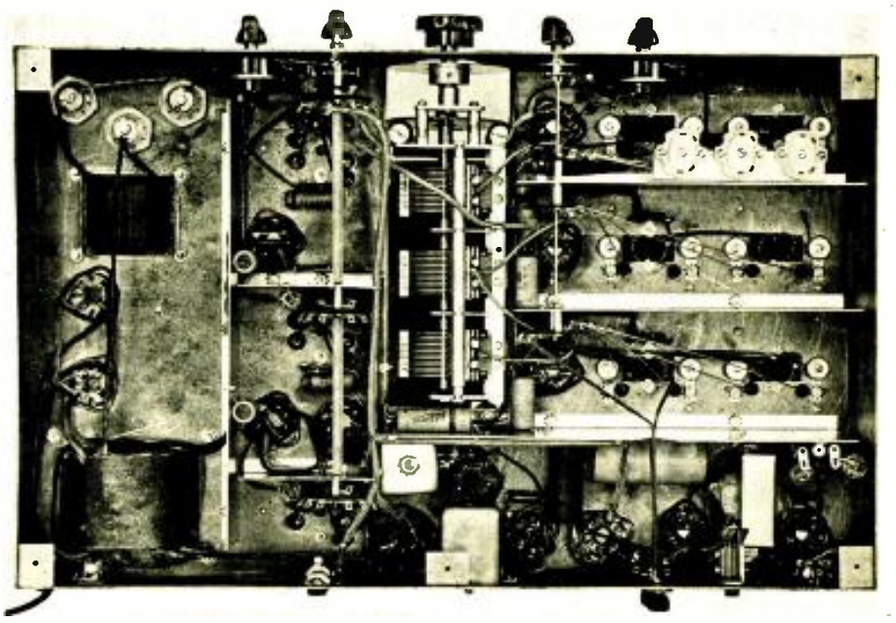
The I. F. Amplifier

There is nothing new about the first detector and oscillator, they being the circuits used in the Masterpiece V and VI. The "Tri-band" i.f. amplifier is something else again, for in it most of the variable and super selectivity of the "15-17" is obtained.

Since it was a foregone conclusion that the best conventional i.f. coil Q of 130 average would not give the desired selectivity in a simple, straightforward and economical amplifier system, intensive research had been going on for many months to develop and perfect something better. Finally success was obtained in new Litz coils measuring Q = 205 when wound upon newly developed high-permeability powdered r.f. iron cores. Six such coils in the three-dual-tuned transformers necessary to a two-stage i.f. amplifier gave several times more amplification than could possibly be used. With suitable shielding the i.f.-a.f. sensitivity could be run up to 2 microvolts absolute with no signs of instability, while at the considerably lower level actually desired, stability was accompanied with complete freedom from any trace of the excessive noise usually found in receivers employing high i.f. and low r.f. gain. Selectivity was really extraordinary. When measured, the three transformers in the two-stage amplifier gave a selectivity curve 3 kc. broad on its intelligence-carrying "nose," falling off rapidly and steeply to a total width of only 15 kc. at 10,000 times resonant input. At 20 kc. bandwidth, the measure of rejection for unwanted stations but 10 kc. away from resonance, was 1,000 times. Such selectivity, particularly showing this excellent ratio of admitted modulation tone band to 10,000 times rejection of 4¾:1, is the ideal super-selectivity which not even the sharpest-tuning of the old 175 kc. i.f. amplifiers ever gave. For broadcast reception, for amateur telephone reception, it is everything that can ever be asked.

Tone with such selectivity is obviously merely good intelligible speech—far from high quality musical reproduction. Under today's conditions, a fine receiver must have better than just extreme selectivity, hard as that has been to obtain in all-wave receivers.. The user will also have to have available the considerably broader selectivity needed for true high-fidelity music reproduction before any system may qualify as perfect. The

(Continued on page 105)



Under-chassis view of the McMurdo Silver "15-17". Note partition shielding and chassis supports. This view also shows the variable air trimmers used on the r.f. transformers.

Ultra-High

By PERRY FERRELL, Jr.

U.H.F. CONDITIONS . . . CALCULATING "OPTICAL" COVERAGE . . . NEW IN THE BANDS

SO FAR conditions on the ultra-high frequencies this season have been very erratic, with no two successive days supplying the same results. But when taken as a whole it shows that we have already piled up quite an imposing list of stations. As spring comes on conditions will again improve and many of our east-coast friends will have a better chance to catch a "J."

By the way, rotable beam antennas are becoming the rage on ten meters because of their small size, etc. Besides, when a beam is used in receiving it not only builds up the signal but materially affects the number of days and the time of day DX signals are heard. The antenna the author uses is a doublet, cut for 28.5 mc., with a half-wave reflector, one-quarter wave behind. Simple as it seems it is really very effective.

Broadcast Stations

During the last three months many new stations were added to our lists from various sources, but as it is our policy not to publish data on any station before definite information is obtained, many had to be omitted. In December most of the ten-meter broadcasters were sent one of our survey cards, asking certain questions about their stations. The information thus obtained forms the basis of the following notes.

W3XES, 35.6 mc., Baltimore, Md. Word received from Martin L. Jones, chief engineer, states that they expect to change the frequency to 38.6 mc. on May 1st. They use 300 watts into a half-wave vertical 165 feet above ground. Schedule 6 p.m. to 12 midnight. This quasi-optical (?) station has received reports from four countries—quite a record on that frequency. All correct reports are verified by letter. Address: Monumental Radio Co.

W3XEY, 31.6 mc., the other Baltimore broadcaster, informs us that they operate from 9 a.m. to 5 p.m. daily and 4 p.m. to 12 midnight on alternate months. Their power is only 100 watts which is fed into a half-wave dipole 244 feet above ground. Their reported list now totals eight countries. They expect to change both frequency and schedule in the near future. All reports verified by either card or letter. Address: Baltimore Radio Show, Inc.

A NEW DEPARTMENT

THE one-time sparsely settled ultra-high-frequency bands are filling up with such rapidity that they no longer can be considered happy hunting grounds for researchers alone. From ten meters down, these bands are today crammed with heterogeneous services, such as straight broadcasting, television, police radio, amateur phones, etc. It is high time that these frequencies be given special consideration.

Listeners who have overlooked these bands have missed a great deal. Aside from excellent high-fidelity broadcast transmissions that can be picked up from local stations, there are opportunities for super-dx reception open to all. Modern receivers cover these ultra-high frequencies, and old receivers can be accommodated to the bands through the use of a simple ultra-high-frequency converter.

Because of the increasing number of stations appearing on these bands, and the growing interest in u.h.f. reception, we are instituting a department to be devoted exclusively to the bands from 10 meters down. It will be a monthly feature hereafter.

Perry Ferrell, Jr., whose excellent article, "Ultra-High" appeared in the December issue of ALL-WAVE RADIO, will conduct the department. We welcome him to our staff of contributors.

—Editor.

W1XEQ, 31.6 mc., New Bedford, Mass., Chief engineer Clyde G. Pierce corrects the schedule printed in the December issue to 2:00 to 6:00 p.m. daily. Their power is 100 watts which is fed into a single wire fed antenna that is one-half wave long. All reports verified by letter. Address: E. Anthony & Sons, Inc.

W1XER, 41.0 mc., has moved its transmitter to the summit of Mount Washington. But at present they are only using it for experimental purposes so no schedule is available. As soon as weather conditions permit a "sky-wave killer" turnstile antenna will be installed. As the elevation of Mount Washington is over 6,000 feet, the quasi-optical range of this station will cover parts of Massachusetts, Vermont, Maine, Quebec, and all of New Hampshire. The power will be 500 watts. Address: Yankee Networks, 21 Brookline Ave., Boston, Mass.

W9XJL, 26.1 mc. Well, the palm for consistent performance certainly goes to this station. Besides being the "best hearder," this station verifies all correct reports with one of the best cards we have ever seen. Unfortunately a schedule could not be obtained. Address: Head of the Lakes Brdcstg. Co., Superior, Wisconsin.

W8XH, 41.0 mc., Buffalo, N. Y., sends further information on the turnstile antenna mentioned in the last article. It is totally non-directional and is an effective sky-wave "killer." W8XH is on the air daily from 1 to 5 p.m. and from 5:45 to 9 p.m. It is also worthy of note to those who can hear this station, that special programs of interest to SWLs are often broadcast. For example, three times a week a class in learning the Continental code is conducted. W8XH's short-wave technician, E. H. Roy, tells us that this station was the first to broadcast a schedule program on such a low wave; in fact, the first composite transmitter attracted such nationwide interest, that it is now on display in the Smithsonian Institution. Address: WBEN, Inc., Hotel Statler.

W2XQO, Flushing, N. Y., a new station which has been granted a permit to operate on 26.550 mc. By the time you read this construction will have been completed. More data later. Address: Knickerbocker Brdcstg. Co., Inc., 1697 Broadway, New York, N. Y.

W2XHG, 41.0 mc., New York, N. Y., was heard here at 4:00 p.m. with an R7, Q5, F6 signal. They acknowledge reports with the usual N.B.C. card. Schedule: 9 a.m. to 12 midnight. Address: N.B.C., 30 Rockefeller Plaza.

W3XIR, the new WCAU relay station, will begin testing on about February 1st. The power as mentioned in the December issue is 100 watts, which will be fed into an antenna 350 feet above ground. All correct reports will be verified by special card. Address: WCAU Brdcstg. Co., Philadelphia, Pa.

W3XKA, 31.6 mc., Philadelphia, is operating from 10:00 a.m. to 11:00 p.m. daily. Their power is 50 watts which is

fed into a half-wave vertical 350 feet above ground. All correct reports verified by card. Address: Westinghouse Electric Co.

W3XEX, 26.05 mc., Norfolk, Va., has just finished rebuilding and moving. Their frequency was 36.1 mc. The antenna to be used is another half-wave vertical 200 feet above ground. The power is 50 watts. All correct reports will be verified by card. Address: c/o WTAR Radio Corp.

W1XEH, 63.5 mc., Hartford, Conn. This station is operated in conjunction with Dr. Mimno of the Cruft Laboratories for experimental purposes. Dr. Mimno is studying the effects of various weather conditions on u.h.f. transmission. Information obtained from J. C. Randall, WTIC, did not include schedule. Address: c/o Travelers Brdcstg. Svc.

W9XER, 31.6 mc., Kansas City, Mo. Word from The Midland Broadcasting Co. informs us that this station is used only intermittently, determined by special pickups, rebroadcasts, and experiment. Although they have received reports from all over U. S. A. they will not verify them.

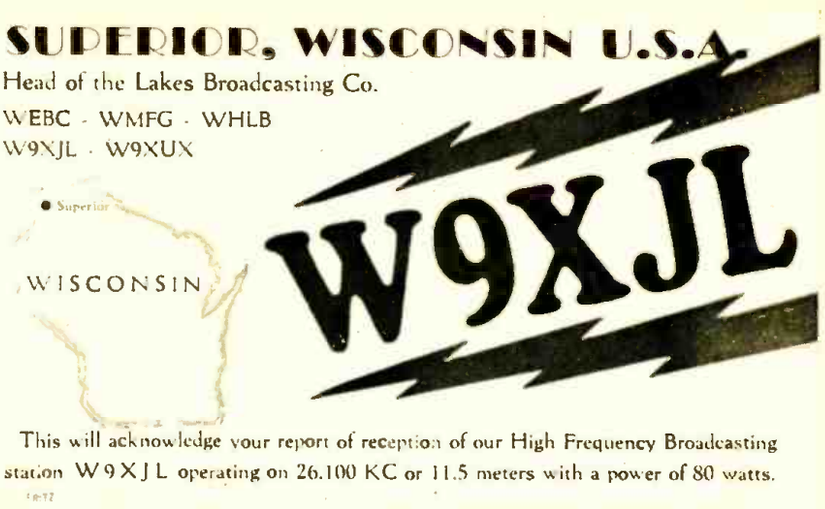
W6XAS, San Francisco, Calif. Their card was promptly returned with the note, "non-existent."

W9XPD 31.6 mc., St. Louis, Mo. Definite information from R. L. Coe, chief engineer, asserts that they rebroadcast KSD from 9 to 1 a.m. daily. The voice from their half-wave vertical, which is 246 feet above ground, has been heard in six countries. All reports verified. Address: Pulitzer Publishing Co.

W5XAU, 31.6 mc., Oklahoma City, Okla., sends word of a program of interest to all servicemen. Every Tuesday from 8:30 to 9:30 p.m. a weekly meeting is held. They also transmit the programs of WKY from 12:00 to 2:00 p.m. 6:00 to 7:00 p.m. and 11:30 p.m. to 12:30 a.m. daily. The radiated 100 watts is fed into a horizontal half-wave doublet 175 feet above ground. Reports are requested and all correct ones are verifier by letter. Address: WKY Radiophone Co.

Calculating "Optical" Coverage

Before we go any further, we suppose you are wondering why we also give the height of the antenna above ground. This is for you fellows who live in the vicinity of the station and are not sure whether you can intercept the ground wave or not. This possibility may be calculated by adding the height of the transmitting antenna above ground and the height of your own antenna above ground and then taking the square root of it and multiplying that by 1.34. The answer will then be in miles. If you live within that range increased by 10% you will be able to hear the particular station by the ground wave. This increases slightly after dark and is subject to directional qualities of the station's, and your own antenna.



An ultra-high-frequency veri for the subterranean listener. This card is very colorful.

W9XHW, 31.6 mc., Minneapolis, Minn. Mr. Hugh S. McCartney, chief engineer, informs us that the schedule is 9:00 to 12:30 a.m. daily. The power is still 50 watts, fed into a vertical antenna 180 feet above ground. Reports have been received from three counties. Reports are verified by either card or letter. Address: Nicollet Hotel.

W9XOK, St. Louis, Mo., has settled down to 35.6 mc. They have no schedule. They transmit only as required for the assembling of data on the u.h.f. In this line, they have filed with the F. C. C. an elaborate book of worksheets covering the tests mentioned in December All-Wave Radio. Their 100 watts is fed into a half-wave vertical 385 feet above ground. All reports verified when addressed to R. V. Hamilton, St. Louis Star Times.

W9XBS, Chicago, Ill., is another of the new ones. Chief engineer H. C. Luttgens notifies us that they are operating on 41.0 mc., with a variable schedule. Their antenna is another vertical, this time 600 feet above ground. The power has been listed as 2,500 watts but it is only 50 watts. All reports verified by card. Address; N.B.C., Merchandise Mart.

W4XCA, 31.6 mc., Memphis, Tenn., may do a little changing next spring. At present they operate from 10:00 a.m. to 10:00 p.m. daily. It puts 250 watts into a horizontal half-wave doublet 110 feet above ground. All reports verified by card. Address: Memphis Commercial Appeal.

W1XEV is another station operated in conjunction with The Travelers Brdcstg. Svc. Corp. It has been doing some development work with the Connecticut State College on frequencies over 100 mc. They have transmitted numerous programs with marked fidelity over a distance of 28 miles. Naturally directive arrays were used.

W9XAZ, 26.4 mc., Milwaukee, Wisc., still uses its 500 watts from 1:00 p.m. to 12:00 a.m. Address: The Journal Co.

This concludes data on broadcasters for this month. Of course, all the u.h.f. broadcasters have not been included in this listing.

Other stations operating are: W1XKA, W1XKB, W2XDG, W2XDV, W4XBW, W8XAI, W8XKA, W8XWJ, and W9XUP. A few others are licensed but we do not know what they are doing.

W10XDA, 27.1 mc., S.S. Effie Morrissey. This station has been allotted this frequency as one of its commercial ones. We have not heard this station yet and we know no one who has, but just in case you should, the address is W2OJ, 8214 11th Ave., Brooklyn, N. Y.

Experimental Stations

W3XDW, W3XDX, W3XDY, W3XDZ, W3XEA, W3XEB, W3XEC, 35.6 mc., owned and operated by the Pennsylvania Bureau of Forest Protection, use the power of 1 watt each! The first four are portable and the latter three belong to fire towers; Lykens, Harrisburg, and Stony Mt. respectively. Their purpose is the same as of the N. J. Forest Fire Service featured in our December article.

W3XAY, W3XAZ, W3XDE, W3XDF, W3XDG, W3XDH, W3XDK, W3XDL, 38.6 mc. These stations are part of the coastal harbor radio-telephone service operated by the Atlantic Communications Corp., of Philadelphia, Pa. The service is operated on a 20-hour basis, and is ready to receive or transmit calls handed it from the marine equipment or from the land lines of the Bell System at any time. The power of the shore transmitter, W3XAY, is 50 watts; the power of the other transmitters aboard marine craft vary greatly. We have heard several of their stations with

(Continued on page 108)

Night-Owl Hoots

By RAY LA ROCQUE

FIRST DX CONTEST SCORES . . . WLAW DEBUT . . . FREQUENCY CHECKS . . . WOWO AND KYW . . . WHAM GO "WHAM's" TOWERS . . . WGAN IN NEW DRESS . . . JAPS

NOT unlike a bunch of thoroughbreds leaping from the post at the crack of the starter's gun was the opening spurt of the contestants in this season's ALL-WAVE RADIO Championship DX Contest. Western DXer's, apparently taking advantage of the fact that TP's were at their height at the beginning, leaped into a commanding lead, but as these stations started to go into their customary mid-winter slump toward the end of the first four weeks of competition, the boys this side of the "Father of Waters" began to close in on them with good reports on TA's and SA's!

Contest Scores

So below are the first scores (averages) which at this early stage of the contest can be no forecast as to the finish of the event:

Anthony C. Tarr (1), Seattle, Washington	74.2
H. Orlaw (1), Vancouver, British Columbia	72.2
Robert C. Wilson (2), Portland, Maine	60.6
Carroll H. Weyrich (4), Baltimore, Md.	56.0
Jack McKelvey (1),* Los Angeles, Calif.	55.6
Joseph T. Lippincott (2), Tufts College, Mass.	53.8
Albert Bartholomew (6), Bradford, N. Y.	47.0
Richard Holland (2), Gonic, N. H.	46.7
Ralph G. Hughes (3), Ireland Island, Bermuda	42.1
Harry Honda (1), Los Angeles, Calif.	41.6

Veri from 4PM, Papua, received by Isaac Davis, Elkhart, Texas. A nice catch.

STATION CHANGES, U.S.A.

New Stations

KTMS	Santa Barbara, Calif.	1220 kc.	500 w.

Call Letters Assigned

KPBM	to Poplar Bluffs, Mo.	1310 kc.
WHAI	to Greenfield, Mass.	1210 kc.

STATION CHANGES, FOREIGN

New Stations

Call	*Location*	*Kc.*	*Watts*
———	Radio Alcala, Spain	1500	200
———	Florence No. 2, Italy	1258	1000
———	Genoa No. 2, Italy	1350	5000
———	Hilversum, Holland	722	———
———	Kaiserslautern, Ger.	1429	500
———	Kiel, Germany	1330	2000
———	Owens Sound, Ontario	———	———
———	Rome, Italy	1222	60000
———	Salamanca, Spain	1095	———
———	Samara, U.S.S.R.	625	———
———	Santiago, Spain	1492	100
CHLN	Three Rivers, P. Q.	1420	———
CJBR	Rimouski, P. Q.	1030	———
EAJ-8	Bilbao, Spain	1258	1000
ZED	Bulawayo, So. Rhod.	619	570
ZGK	Nanking, China	660	———
ZNS	Nassau, Bahama Is.	540	400

Frequency Changes

CMBC	630- 950 kc.	Radio Agen, Paris	860- 832 kc.
CMBL	710- 750 kc.	Binche, Belgium	1492-1487 kc.
CMCD	950- 630 kc.	Christianssand, Nor.	620- 609 kc.
CMCW	750-1140 kc.	Isle de France, Paris	968-1366 kc.
CMCX	1030-1380 kc.	Karlskrona, Sweden	1515-1530 kc.
CMKG	1160-1135 kc.	Madona, Latvia	1104- 583 kc.
CMQ	880- 600 kc.	Nice PTT, France	1186-1185 kc.
CMW	600- 880 kc.	Prague, Czechoslovakia	630- 638 kc.
I-1BO	1222- 986 kc.	Rome No. 3, Italy	1250-1357 kc.
I-1GE	986-1140 kc.	Stara Zagora, Yugosl.	1285-1402 kc.
I-1MI	813- 814 kc.	Sortavala, Sweden	749- 776 kc.
HCJB	1200- 974 kc.	Tampere, Finland	1351-1348 kc.
OAX5B	1280-1200 kc.	Tartu, Estonia	517- 518 kc.
PRD-2	780-1060 kc.	Uddevalla, Sweden	1402-1411 kc.
RW86	1003-1013 kc.		
SBA	700- 704 kc.		
YLZ	583-1258 kc.		
ZTB	809- 790 kc.		
6CK	1240-1235 kc.		

Power Changes

CMBC	(950)	150- 5000	w.
CNR	(601)	2500- 25000	w.
EAJ-7	(1095)	10000- 5000	w.
HCJB	(974)	30- 50	w.
I-1NA	(1104)	1500- 10000	w.
LKP	(850)	——— 1000	w.
LKS	(859)	1000- 10000	w.
OAX4A	(854)	1500- 10000	w.
OAX5B	(1200)	——— 150	w.
PRD-2	(1060)	1000- 10000	w.
RW57	(1068)	4000- 10000	w.
SBQ	(1384)	200- 500	w.
ZTB	(790)	500- 10000	w.
ZTP	(952)	50- 500	w.
Belgrade, Yugosl.	(686)	2800- 20000	w.
Bordeaux, France	(968)	3000- 30000	w.
Eiffel Tower, Paris	(1456)	20000- 7000	w.
Hilversum, Holland	(995)	120000- 60000	w.
Juan les Pins, Fr.	(1726)	500- 27000	w.
Klagenfurt, Ger.	(1294)	6000- 5000	w.
Kuldiga, Latvia	(1104)	50000- 10000	w.
Lyons, France	(648)	90000-100000	w.
London, Gr. B.	(877)	50000- 70000	w.
Limoges, France	(895)	100000- 1500	w.
Normandie, France	(1113)	5000- 13000	w.
Nemes France	(1492)	200- 700	w.
Rome, Italy	(713)	120000- 50000	w.
Strasbourg, France	(859)	35000-100000	w.
Saarbrucken, Ger.	(1231)	5000- 17000	w.
Toulouse PTT, Fr.	(913)	100000- 60000	w.
Varalburg, Austria	(1294)	6000- 5000	w.
Vass Vassa, Finland	(1420)	500- 10000	w.

Call Letters

OXQ to Copenhagen, Denmark (1176)
SBQ to Halsinghorg, Sweden (1384)
ZEC to Salisbury, So. Rhodesia (682)
ZTE (790) change to ZTB
ZTJ (645) change to ZTV
ZUG (560) change to ZTU

Delete

OAX4F	(1080)	Helsinki	(884)
XGOA	(660)	Cassel	(1195)
	Moritzburg (750)		

Location

CT-1GL (1030) Lisbon to Parede, Portugal
——— (1104) Madona to Kuldiga, Latvia

Isaac T. Davis (x), Elkhart, Texas	41.3
Bob Rice (x), Muskogee, Okla.	39.5
Charles Hesterman (3), Saskatoon, Sask.	38.7
Stanley Brus (5), No. Braddock, Penna.	34.8
Bill Stone (6), Toronto, Ontario	34.2
William Vornkahl, Jr. (6), Westport, Conn.	30.9
Richard Wright (7), Chicago, Ill.	30.7
Ray Sahlback (7), St. Louis, Mo.	30.0
Richard H. Cooper (5), Kittaning, Penna.	29.4
Vincent Stasen (5), Philadelphia, Penna.	28.2
Edward H. Urban (6), Cleveland Heights, Ohio	25.7
Robert Skyten (8), East Brookfield, Mass.	24.9
Curtis Keirstead (8), Framingham, Mass.	23.0
Earl Lever (8), Worcester, Mass.	22.5
George L. Brode (x), Philadelphia, Penna.	15.5
Kendall Walker (3), Yamhill, Oreg.	12.4
Joseph Piechuta (9), Meriden, Conn.	10.6
Elmer Klein (4), Baltimore, Md.	10.4
Mike Goidos (9), East Chicago, Ind.	9.8
Chester L. Wheeler (2), Milford, N. H.	8.7
Walter Bishop (10), Rensselaer, N. Y.	8.7
G. V. Nixon (9), Worcester, Mass.	8.7
John F. Hazen (7), Marion, Ohio	6.6
Leroy F. Nice (5), Souderton, Penna.	5.3
Walter J. Gyngell (10), Saratoga, N. Y.	5.2
Harry Snyder (10), Trenton, N. J.	2.4
Alan B. Shaw (x), Jackson Heights, N. Y.	1.5
Joseph J. Smith, Hicksville, N. Y.	1.0

Notes: Numbers in parenthesis show the team (see numbers in team standings) with which the contestant is associated. (x) means the contestant is participating independently. (*) signifies contestant entered late and has not participated in as many competitions as others.

Team Standings:

	Won	*Lost*
(1) R.S.S.L. Pacific Phantoms	7	0
(2) R.S.S.L. New Englanders	5	2
(3) R.S.S.L. Internationals	5	2
(4) Baltimore N.N.R.C. Boosters	5	3
(5) R.S.S.L. Keystone Owls	4	3
(6) N.N.R.C. Canadian-Americans	4	4
(7) R.S.S.L. Midwesterners	3	4
(8) R.S.S.L. Bay Staters	2	5
(9) R.S.S.L. Independents	1	6
(10) R.S.S.L. Northeasterners	0	7

Records: The highest total scored by a contestant in one period of competition was by "Bob" Wilson in the period from Nov. 28 to 30. His score was 1000, or an average of 100 points per station, which means that he hit bullseyes with each of his ten reports. This record will be difficult to equal and twice as diffi-

LAST-MINUTE FLASHES

Here's an opportunity for DXers to log a new country on the broadcast band. A special "Program of the Week" arranged by the International DXer's Alliance from station YSS, in San Salvador, Republic of Salvador, will be broadcast on February 13, 1938. YSS will transmit on a frequency of 640 kc. between the hour from 1 to 2 a.m. EST. The program will also be transmitted by YSD on short waves—7894 kc.

Another addition to the Time Table: KGMB (1320 kc.) Honolulu, Hawaii, on February 19 from 4:30-5:30 for the Universal DX Club.

CMW is being heard on 865 kc. seriously heterodyning WABC's signal. Whether this is a definite change or just a bit of Cuban frequency drift is not known. We prefer to believe the former, since from 880 to 865 is quite a bit of drifting.

cult to beat. In fact the only way to score a higher total in one period would be for someone to score all bullseyes and have one or more of them "Time Table" or "Bonus" stations. The Phantoms hold the record for highest team score in one period—2751 points. Our personal nomination for the best catch of the month—"Tony" Tarr's report on ZJV in Suva, Fiji Islands. Much to our sorrow it's an impossibility to give a more detailed account of the scoring here, but a letter addressed to the chief enclosing a 3c stamp will bring you any further information.

With the Night Owls

A few of the choicest excerpts from the monthly mailbag: *Matthew E. Leshner,* W3F32, Lawrence, Mass.: "Station WLAW officially began broadcasting on December 19 at 12 noon. The station is owned and operated by the Hildreth & Rogers Company, publishers of the Lawrence *Daily Eagle* and the Evening *Tribune,* using 1000 watts power. Just previous to this, on December 1, WLLH, of Lowell, opened a synchronized transmitter in Lawrence. The latter transmitter operates on 1370 kc. with 10 to 100 watts."

Albert Bartholomew, Bradford, N. Y.: "Station ZNS in Nassau, Bahamas, is on daily from 8:30-9 p.m. E.S.T." (Al was the first Night Owl to identify and report this new one—*Chief*)

Meredith M. Stroh, Kitchener, Ont.: "The Canadian Broadcasting Corporation's 50,000-watt station at Hornby was officially opened by Hon. C. D. Howe, minister of transport at 10 o'clock, Christmas morning, December 25. CRCY has changed frequency to 960 kc. from 1420."

Henry Ward, Jr., Sherbrook, Quebec: "I can confirm Bill Stone's statement that CRCT does verify as I received a veri card from them after sending them a report and enclosing a 3c stamp."

Joseph T. Lippincott, Tufts College, Mass.: "I have heard that LS-11's new transmitter operates on 1310 instead of 1440 kc."

Other information used in making up this month's Night Owl Hoots contributed by the following listeners: Robert Skyten, W. Gyngell, Robert Wilson, and Matthew Leshner all report changes in the frequencies of Cubans CMQ and CMBC; Wilson contributes the bulk of changes in Europeans, and W. E. Blanchard (W3EI) of Bangor, with Earl McDonald (W3E6) of Portland, report information on the construction of the new WGAN in Portland, Me.

Frequency Checks

The following frequency monitoring programs take place on the second Friday and Saturday mornings of each month. Starting at the time mentioned the programs are of 20 minutes duration:

Every Second Fri.			*Every Second Sat.*		
2:00	WGNY	1210 kc.	2:00	WMFR	1200 kc.
2:10	WCNW	1500 kc.	2:10	WMFO	1370 kc.
2:20	WGBB	1210 kc.	2:20	WSOC	1210 kc.
2:30	WABY	1370 kc.	2:30	WTJS	1310 kc.
2:50	WSYB	1500 kc.	2:40	WSIX	1210 kc.
3:00	WABI	1200 kc.	2:50	WROL	1310 kc.
3:20	WIBX	1200 kc.	3:00	KOTN	1500 kc.
3:30	KASA	1210 kc.		WBLY	1210 kc.
	WAGM	1420 kc.		WQAM	560 kc.
3:40	KWOS	1310 kc.	3:10	KWYO	1370 kc.
	WNBZ	1290 kc.		WPRP	1420 kc.
3:50	WJBK	1500 kc.	3:20	KGCU	1240 kc.
	WMBH	1420 kc.		WIBU	1210 kc.
	WRDO	1370 kc.		WNEL	1290 kc.
4:00	KIUL	1210 kc.	3:30	KXYZ	1440 kc.
	WTHT	1200 kc.		WAML	1310 kc.
4:10	KICA	1370 kc.		WKBV	1500 kc.
	WCAZ	1070 kc.	3:40	KRGV	1260 kc.
	WNLC	1500 kc.		WFOR	1370 kc.
4:20	WMFG	1210 kc.	3:50	KNEL	1500 kc.
4:30	KIUP	1370 kc.		WEED	1420 kc.
	WPAD	1420 kc.		WGBF	630 kc.
4:40	KNOW	1500 kc.	4:00	KVSO	1210 kc.
	WEMP	1310 kc.		WFDF	1310 kc.
4:50	WEW	760 kc.		WFTC	1200 kc.
	WGRC	1370 kc.	4:10	KFQD	780 kc.
5:00	KIUN	1420 kc.		KONO	1370 kc.
	WEBQ	1210 kc.		WKBZ	1500 kc.
5:10	KGEK	1200 kc.	4:20	KRLC	1390 kc.
	WCMI	1310 kc.		KTSM	1310 kc.
5:20	KMAC	1370 kc.		WBHP	1200 kc.
	WJW	1210 kc.	4:30	KOCA	1210 kc.
5:30	WIL	1200 kc.		KUJ	1370 kc.
	WLBC	1310 kc.	4:40	KCMC	1420 kc.
5:40	KTOK	1370 kc.		KRNR	1500 kc.
	WKBB	1500 kc.		WGTM	1310 kc.
5:50	KANS	1210 kc.	4:50	KEEN	1370 kc.
	WIBY	1200 kc.		KWTN	1210 kc.
6:00	WACO	1420 kc.	5:00	KGFF	1420 kc.
6:10	WIBL	1200 kc.		KIT	1310 kc.
6:20	KROA	1310 kc.	5:10	KBTM	1200 kc.
	WHDF	1370 kc.		KRKO	1370 kc.
6:30	KGDE	1200 kc.	5:20	KFRO	1370 kc.
				KGEZ	1310 kc.
			5:30	KBIX	1500 kc.
				KFXD	1200 kc.
			5:40	KFJM	1410 kc.
				KXRO	1310 kc.
			5:50	KGY	1210 kc.
			6:00	KINY	1310 kc.
			6:10	KMED	1410 kc.
			6:20	KVOS	1200 kc.

Kilocycling Around

Some manufacturer could make a million with a gadget attached to the dial which would automatically follow the Cuban stations from one frequency to another week after week. During the past month, the stations have been exchanging frequencies with one another much in the manner of two stamp collectors exchanging stamps. When last reported CMQ was holding its own on 600 kc. CMW formerly on 600 kc. has completed the bargain by taking over CMQ's old post—880 kc. . . . Then there's CMBC—they moved to 950 kc., but we've yet to ascertain whether CMCD, who were formerly on that frequency, are on 630 kc. The latter has yet to be located—calling all cars! . . . Oh, and we shouldn't forget CMBL—they've shifted only 40 kilocycles from 710 to 750 kc. Where CMCW (formerly 750 kc.) is now doing business our crystal filter has been unable to decipher thus far! We do not know how fre-

ALL-WAVE RADIO'S
Time Table of DX Programs
(All schedules in E. S. T.)

Specials

TUESDAY MORNING, FEB. 1

WPAY	Portsmouth, Ohio	1370 kc. 4:00-4:30
WRR	Dallas, Texas	1280 kc. 1:00-1:30
WTOC	Savannah, Georgia	1260 kc. 3:00-4:00
KLAH	Carlsbad, New Mexico	1210 kc. 5:00-5:30
KBIX	Muskogee, Okla.	1500 kc. 5:30-6:00

WEDNESDAY MORNING, FEB. 2

WSUI	Sioux City, Iowa	880 kc. 1:30-2:30
KWOS	Jefferson City, Mo.	1310 kc. 2:00-2:30
KWBG	Hutchinson, Kans.	1420 kc. 6:30-7:00

FRIDAY MORNING, FEB 4

KNOW	Austin, Texas	1500 kc. 1:45-2:15
WACO	Waco, Texas	1420 kc. 1:45-2:15

SATURDAY MORNING, FEB. 5

KSAL	Salinas, Kansas	1500 kc. 2:30-3:00

SUNDAY MORNING, FEB. 6

KTSA	San Antonio, Texas	550 kc. 1:00-1:15
WJBO	Baton Rouge, La.	1120 kc. 2:00-4:00
KWYO	Sheriden, Wyoming (IDA)	3:00-4:00
WGRC	New Albany, Ind.	1370 kc. 3:30-4:00

MONDAY MORNING, FEB. 7

KVGB	Great Bend, Kansas	1370 kc. 3:00-3:30
WPAD	Paducah, Kentucky	1420 kc. 3:00-3:30

THURSDAY MORNING, FEB. 10

WLLH	Lowell, Mass.	1370 kc. 1:45-2:00
WHIS	Bluefield, West Va.	1410 kc. 2:30-3:30

FRIDAY MORNING, FEB. 11

WJAG	Norfolk, Nebr.	1060 kc. 1:30-2:00
KPOF	Denver, Colo.	880 kc. 2:15-2:45

TUESDAY MORNING, FEB. 15

WRR	Dallas, Texas	1280 kc. 1:00-1:30
KBIX	Muskogee, Okla.	1500 kc. 6:30-6:00
KGFW	Kearney, Nebr.	1310 kc. 6:00-6:30

TUESDAY MORNING, FEB. 22

KBIX	Muskogee, Okla.	1500 kc. 5:30-6:00

FRIDAY MORNING, FEB. 25

WLLH	Lowell, Mass.	1370 kc. 1:00-1:15
KADA	Ada, Oklahoma	1200 kc. 2:45-3:15

SUNDAY MORNING, FEB. 27

WJBO	Baton Rouge, La.	1120 kc. 2:00-4:00
KGU	Honolulu, Hawaii (IDA)	750 kc. 3:30-4:00

Regulars

EVERY SUNDAY MORNING

WDAE	Tampa, Florida	1220 kc. 12:00-3:00
WTMJ	Milwaukee, Wis.	620 kc. 12:00-4:00
KVOO	Tulsa, Oklahoma	1140 kc. 12:00-6:00
LR3	Buenos Aires, Arg.	950 kc. 12:30-1:30
KMTR	Los Angeles, Calif.	570 kc. 3:00-3:30
KMPC	Beverly Hills, Calif.	710 kc. 3:00-4:00

quencies are assigned down in the "Pearl of the Antilles," but it's our impression that each week a lottery is conducted and each station draws a channel out of a hat or something.

Westinghouse has applied for 50 kilowatts for two of its stations—WOWO and KYW . . . A windstorm recently toppled the 225 foot antenna towers at WHAM converting them into a mass of tangled wreckage. The station had been planning to topple them anyhow as a publicity stunt to make way for the new 450-foot vertical radiator, but Mother Nature beat them to it. When falling, the lofty towers just missed the new tower, the transmitter building, and five parked cars . . . Through the courtesy of Herbert Tucker, 1DA Programs of the Week Director, we are able to offer you a revision of these programs in this month's Time Table . . . XGOA has been rendered useless by bombs from Japanese planes and broadcasting in Nanking is being resumed over ZGK, a station maintained by Ginling College, on 660 kc. . . . Portland's new WGAN will take the air! Just two days before the deadline set by the FCC on November 20, construction was started by the Portland Broadcasting System. In order to live up to the agreement the station must be completed by May 22. Plans call for nearly 10 miles of copper wire for use as a ground. WGAN will have two 350 feet antenna towers placed 430 feet apart.

In anticipation of the economic development of North China by Japan, the Manchukuo T. & T. Co. is planning to establish radio broadcasting stations in Peking and Tientsin. No particulars regarding the stations were given except that they will cost approximately 1,500,000 Yen—which is a lot of Yen in any country! . . . According to the Dept. of Commerce releases, there are now two stations operating in those cities: XI3K. a 5 kilowatter, in Tientsin, and XGOP in Peking . . . We do not usually offer program criticism in this department so forgive us if the following few lines are not strictly DX news. "Brave New World" a CBS feature every Monday at 10:30 is, in the Chief's opinion, tops in dramatic entertainment as well as educational value. Featuring an episode in the history of our fellow Americans to the south each week the program is very well written and acted. And what's more there are no commercial plugs! You've studied the history of other countries in school; here's a means of learning more about the countries you so often hear on the dials of your super—the republics of Latin America . . .

Carroll Weyrich offers a solution to one of our Cuban mysteries. "CMCD is on 630 kc.," says he—which is what we suspected. Now, will some kind friend give us the lowdown on CMCW. They're not on 710 which is the spot vacated by CMBL. The Cuban on 720 is CMK. Whether this is a change from 730 or the station is just wandering, is hard to tell. After solving one of our mysteries, Carroll asks to have a few of his solved. Here they are: "Who is the Mexican on 775 kc., the Spanish-speaking stations on 1185 and 985 kc., and the Cuban on 1190 kc.?" . . . Curtis Keirstead offers the news that WEEU will DX on the first Sunday morning in February from 2:30-5:00 a.m. E.S.T.

Three cheers for DX conditions for South American reception this season. Three Jeers for DX conditions for Trans-Atlantic reception this season. Shortly and sweetly endeth our "chjeers."

A card file index listing every broadcasting station in the world is maintained and kept up-to-date by the Chief Night Owl. On these cards are listed useful information helpful at times in identifying distant stations. A letter stating your problem and enclosing a 3c stamp for reply will bring you any information you desire—providing we have it. Address all broadcast band correspondence to Ray La Rocque, 28 Aetna St., Worcester, Mass.

ALL-WAVE RADIO'S DX FORECAST FOR FEBRUARY

EASTERN NORTH AMERICA

General Forecast: *This is the last call for the TA's. They'll be weaker this month, but still audible. Next month's forecast will find them gone, so get 'em now! A little early for TP's, but some of the more powerful ones may be heard as the month draws to a close. Latin Americans should maintain their usual high standard throughout the month.*

Specific Forecast

T.A.	1st-20th, 12-3 a.m., and 5-7 p.m., R6. Try all the bands where high-powered TA's are listed. Rennes (1040), Bordeaux (1077), and Normandie (1113) are the Big Three.
LR3 950 kc.	1st-28th, 6 p.m. to midnight, R8. LR3 seems to be the most consistent Argentine now. They broadcast till 1:30 a.m. on Sunday mornings. Other Argentinans heard easily are: LR1 (1070), LR4 (990), LR5 (830), LR6 (870), LS2 (1190), and LR4 (750).
YV5RA 960 kc.	1st-28th, sunset till 10 p.m., R7. Best before XEAW commences broadcasting.
YV5RQ 882 kc.	1st-31st, sunset till 10 p.m., R5. Early in evening this station seems to break through CBO and CMW occasionally.
CMCK 1030 kc.	1st-28th, sunset till midnight, R8. This station dislodges CMQ and king of the Cubans as CMQ is not heard as well on 600 kc. Try for Cubans as follows but do not be too critical if they're not on the frequencies listed when you read this—they shift too often! CMQ (600), CMCD (630), CMBL (750), CMCM (850), CMW (880), CMX (920), CMCF (815), CMBY (970), CMCJ (1110), CMBC (950), CMC (1260), CMCQ (1410), and CMCW now on 1140 kc.
XEW 890 kc.	1st-28th. 12-2 a.m., R8. XEW is the most reliable. Try for the following among others: XEMO (860), XEBG (820), XET (690), XEP (1150), XEAC (980), XEK (990), and XEJ (1020).
XEFO 935 kc.	1st-28th, 1-2 a.m., R8. Daily program in English with prizes for best and most distant reports!
ZNS 540 kc.	1st-28th, 8:30-9 or 9:30 p.m., R6. A new one in Nassau, Bahama Islands. Signs off with "God Save the King." Power 400 watts.
OAX4A 854 kc.	1st-28th, 7-11:30 p.m., R7. You will not find this one an easy task, but they are in the soup caused by the intermingling of WWL, CMCM and OAX4A. However, our Peruvian being a little higher in frequency can be separated from the others, especially on receivers with crystal filters!
TG-1 1510 kc.	1st-28th, 7-12 p.m., R7. TG-1 can often be heard well by those who can remember that there are a few clear channels on the high-frequency end of the band.
CX-16 850 kc.	1st-28th, 12-1:30 a.m., R4. Another one in the soup on 850. This one will be our long shot for this month. They sometimes relay LR3 on their late dance program Saturday nights and that is when to try for them! Good luck to you!
KGU 750 kc.	1st-28th, 3-4 a.m., R5. KGU is now being heard rather well on the east coast at regular intervals.

WESTERN NORTH AMERICA

General Forecast: *Only a slight rise in signals from down under is predicted for February, with a slight drop expected in Jap and other Oriental signals. No change expected in Latin American reception. It should remain good!*

Specific Forecast

4YA 790 kc.	1st-28th, 4-6:30 a.m., R7. Other Zedders heard easily are: 1YA (650), 3YA (720), 2YC (840), 2YA (570).
JOAK-2 870 kc.	1st-28th, 5-7 a.m., R6. The following should also be easy: JOIK (810), JOHK (770), JOAK-1 (590), JOBK-2 (940), JOHG (1050). When these come in good try for all the others listed in our station list.
4QN 600 kc.	1st-28th, 5-6:30 a.m. unless otherwise stated, R6. Other Aussies which should be heard are listed below in order of their signal strength: 2CO (670), 4BH (1380), 2NR (770), 2BL (740), 4QG (800), 3GI (830), 2GZ (990) (till 6), 2KY (1040), 4AK (1220), 2CR (550), 3KZ (1180), 2CH (1190), 4BU (1480), 3BA (1320) (on at 5:30), 3DB (1030), 2GB (870), 5CL (730), 7NT (710) (on at 6), 2WL (1430) (on at 5:30), 3LK (1000), 3LO (770), and 5CK (640).
KGU 750 kc.	1st-28th, 3-5 a.m., R6. Other Hawaiians: KHBC (1400), 3-4:30 a.m., R7-8, and KGMB (1320 kc) 4-5:30, R7-8.
YV5RA 960 kc.	1st-28th. R6. Just before XEAW begins broadcasting daily.
PRE8 980 kc.	1st-28th, R6, 7-9 p.m. Only in Southwest.
WKAQ 1290 kc.	9th only, 2:40-3 a.m., R8. (Weaker in Northwest.)
WNEL 1290 kc.	12th only, 3:20-3:40 a.m., R8. (Weaker in Northwest.)
RW54 540 kc.	1st-28th, 5-7 a.m., R7. Very widely reported throughout West.
XEC 1150 kc.	1st-28th. 12-1 a.m., R6. Announcements in Spanish. Mention is often made of Mickey Mouse—personally Donald Duck is our favorite.
XEAF 990 kc.	1st-28th, 11 p.m. to 1 a.m., R7. Heard also earlier in evening on coast. Other Mexicans heard are XEAC (980), XEBG (820), XFOK (760), and practically all of those listed in Eastern forecast.
ZJV 920 kc.	1st-28th, 3-4 a.m., R3. You'll have to lose a lot of sleep if you want to get this one. Our long shot for this month on the west coast. Sign off at 4 a.m. with "God Save the King." Credit Tony Tarr with this catch.

Hamfest

By W8QMR ex-2PI • LU4S

QSL-EGANT . . . SPEAKING OF OPERATIONS . . . THE MYSTERY CHEF . . . EAST IS WEST

AS we sit down before the mill this morning, it is the day before Christmas. So we take this opportunity to wish you all a very Merry Christmas. Yes . . . we appreciate the fact that this is the February issue and that the magazine won't reach you until the end of January—but that's about the time most of these "Xmas greetings by radio" messages will come to rest anyway.

◆

BACK TWO ISSUES ago we asked for original QSL cards and several magna opera (which may or may not be the plural of magnus opus) have come through. We stressed several points—originality, art and appropriateness—and we have examples of all three. W6PCA sends through a card with the emphasis on the first quality—and we reproduce it in Fig. 1 on page 110. The printing is black on a green card. PCA (prevention cruelty to animals—on fone) made the drawing himself and another ham, W6CL, did the printing.

For art we check up one to the Wholesale Radio Service Company which prints the card shown in Fig. 2 for the ham members of its staff. Just to what advantage this card will show up in the half-tone, we can only guess. However, the background is a very light pastel brown, with sepia trimmings and type work in black.

For the most appropriate card we are indebted to W2IOP. Located in the heart of Manhattan, Larry LeKashman uses an airplane shot of lower New York City on one side of the card, with a super-imprint of his call in red and an additional legend including "WAC, WAS, WBE, RCC, AIOP, OBS, AEC." (By the time he gets his PhD., W2IOP will be sending his QSLs in strip form.) We are not reproducing this card because a half-tone of a half-tone looks like raw a.c. sounds sent through a chopper. On the reverse side there is room for the address and the usual dope. However, we're glad to show a picture of W2IOP himself and the rig. Writes IOP—

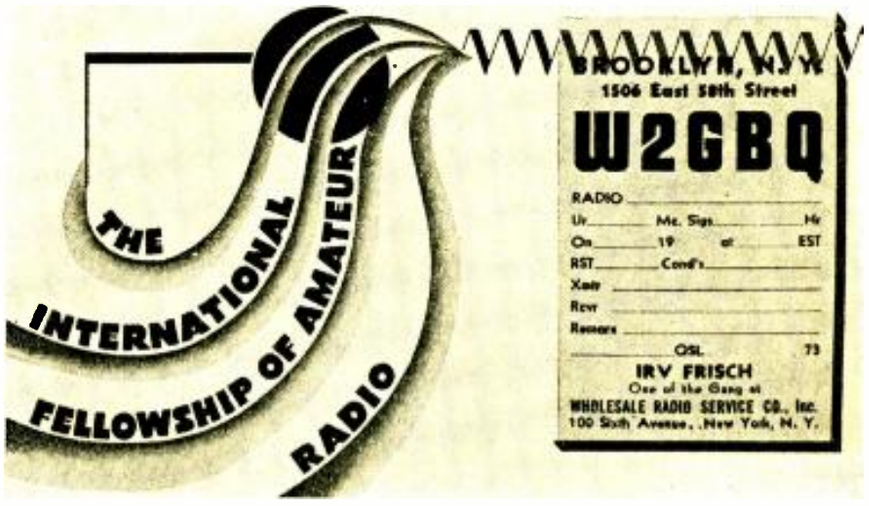


Fig. 2. And here we have a bit of art—an aristocratic touch to the usually stereotyped QSL card.

"The rig in the rack and panel is a 6L6, RK-39 with push-pull HF-100s. It's all home-made including the rack. The rig in my shadow harbors a 6L6, an RK-39 and a T-55. Just below it, but unseen, is an automatic code sender. The receiver is a National NC-101X. The apartment is d.c., but with the aid of a fellow ham, I got a.c. installed. Skywires are really off the ground . . . and that doesn't mean the roof-top . . . 350 feet with 300-foot feeders. I use two 66-foot flat tops and am now fooling around with a 20-meter Johnson Q. Tried fone for ten days and worked everything but Asia. Then the BCLs got after me, and I'm off fone until spring!"

Fig. 3. The rig and operator at W2IOP—with the latter holding his radio magazine so that the above picture can be published in any of 'em!

◆

A. SPENCE HOGAN, of Jersey City, drops us a line to QSP along to W2AD. He suggests that Andy Sannella look at his meters while tuning up his one kilowatt rig! (See page 639 in ALL-WAVE RADIO for December 1937.) *(Not when there's a birdie to look at.—Ed.)*

◆

AT THE RISK OF harping on a subject, we again bring up the matter of operating technique. As we see it, AWR goes to a lot of embryo hams and lads with the ink still wet on their tickets, and this

(Continued on page 110)

RADIO SIGNAL SURVEY LEAGUE NEWS

MAC GREGOR ARCTIC EXPEDITION SIGNAL SURVEY . . . DX RECEPTION CITATIONS NEW SIGNAL REPORTING SYSTEM . . . CLASS A MONITORING STATIONS . . . CHAPTERS

ONE of the chief problems in efficient operation of the R.S.S.L. during the past has been the prompt handling of League correspondence from the thousands of members throughout the world. Since its organization, the various state and foreign Section Managers have attempted to carry on this work and in many cases have performed exceptionally meritorious service.

However, a careful study of League operation reveals the fact that in many instances, League correspondence and service has been unavoidably delayed through such causes as: (1) New members being unacquainted with the name or location of their Section Manager; (2) Section Managers changing their addresses; (3) Section Managers leaving town on business, vacation, etc.

From the point of view of the Section Managers, also, there was need for some change to relieve them of the constantly increasing postage expense and the vast amount of time and clerical work involved in handling the many letters and reports received. Section Managers could hardly be expected to devote too large a share of their time to this work without recompense, and the non-profit operation of the R.S.S.L. provides no fees or dues from which to remunerate these men. It was therefore necessary to devise some means whereby league affairs could be speeded up to the degree required for maximum efficiency.

Future Reporting

Therefore, at the last meeting of the Board of Directors, after most careful consideration of all factors, it was resolved that hereafter all League correspondence, reports, etc., from R.S.S.L. members in the *United States* and *Canada* be sent directly to R.S.S.L. Headquarters (16 East 43rd St., New York, N. Y.).

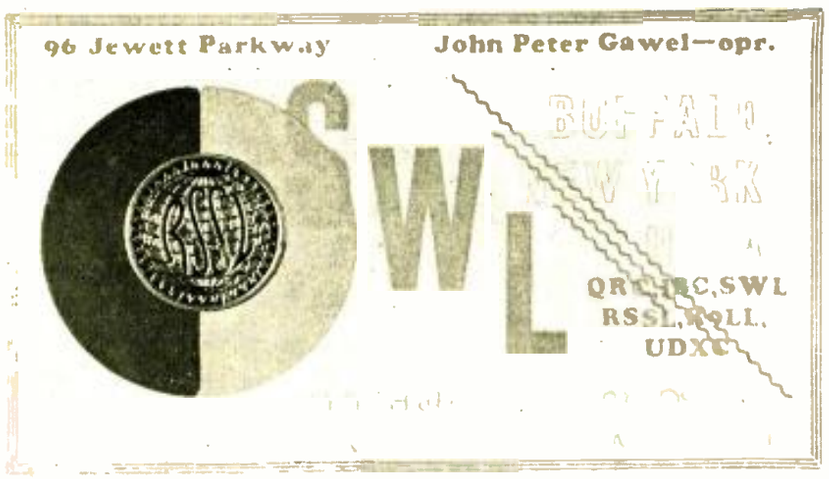
This new procedure will assure prompt delivery and reply and relieve the Section Managers of the burden of a steadily increasing drain on their time and pocketbooks. The Section Managers will thus be in a position to devote more of their time to the important work of signal surveys as originally intended. Their increased activity will unquestionably be of value and assistance to the League in carrying on its program. With the above change in procedure, the office of Section Manager will no longer be required in the United States and Canada.

In fitting recognition of their past work and in appreciation of the prominent part they have played in the development of the R.S.S.L. to its present size and importance, the Board of Directors unanimously voted to award all Section Managers the title of "Class A Monitoring Station," thus making them the first to receive this reward for outstanding service.

Class A Ratings

Following the trail already blazed by the former Section Managers, *all* R.S.S.L. members who distinguish themselves by service in connection with League activities may now achieve this rating. The "Class A" title now takes its place as the designation for outstanding service in R.S.S.L. activities.

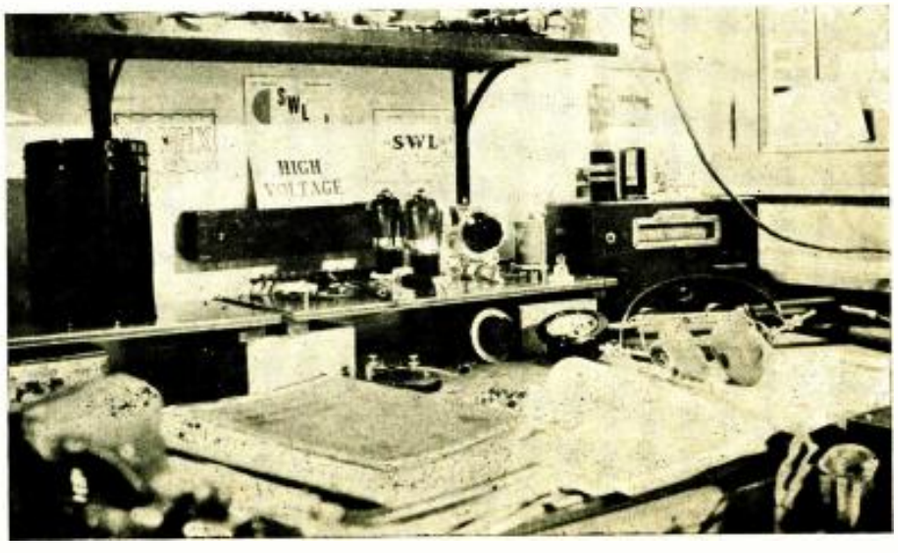
The award of the title "Class A Monitoring Station" is judged on a merit rating basis governed by the following set rules adopted at the Board of Directors' meeting:



R.S.S.L. MONITORING STATION W7G8

Owned by J. P. Gawel, Buffalo, N.Y.

To the right is a view of Mr. Gawel's shack which, though it does not show the 9-tube Zenith receiver mounted in a rack and used for signal monitoring, does show a future ham station in the making. It's a 50-watt c.w. transmitter using a pair of 6L6G tubes in push-pull. The black can at the left is a transmitter monitor. At the right is a 3-tube s.w. receiver. Mr. Gawel's SWL card is shown above. The printing is in blue, and the R.S.S.L. seal is centered in a medallion which is half yellow and half silver.



1. All R.S.S.L. members are eligible to apply for the rating of "Class A Monitoring Station" after they have earned a total of 100 merit points computed on the following basis:

*(a) Reports on Official R.S.S.L. Signal Surveys .....10 points.

(b) Voluntary survey reports. 5 points. These reports may be on any of the following groups:
(1) Station interference
(2) Changes in frequency, schedule, etc., of known stations
(3) New stations, their frequencies, calls, etc.
(4) Harmonics of broadcast station signals.

(c) Double and special credit for unusually important surveys as announced in "R.S.S.L. News."

2. A formal application must be made by the member desiring the "Class A" designation, stating date of reports and credit due in each case. A file of credits for each member will be kept at Headquarters which in all questions will be considered final.

3. Members awarded the title of "Class A Monitoring Station" will be issued a special membership card designating their status and may use the title "Class A Monitoring Station" on their letterheads, QSL cards, etc., and in all correspondence.

4. The Directors reserve the right to bestow honorary titles of "Class A Monitoring Station" on members who perform outstanding service for the League.

*_Important_: Equal credit will be given for Official Survey Reports where no signals are received. These are equally important in determining dead spots or skip effects.
The credit system adopted was specifically formulated by the Directors so as not to penalize those R.S.S.L. members who, through business, travel, or other circumstances find it necessary to interrupt their monitoring work. By sending in 10 monitoring reports of Official R.S.S.L. surveys, or 20 voluntary reports, or any combination totalling 100 points, any member qualifies for "Class A" recognition.

Noise Survey Division Discontinued

It was also resolved by the Board of Directors that effective at once, the Noise Survey Division of the R.S.S.L. would be discontinued. The problem of noise elimination has proven to be a purely local matter that can best be handled by local Chapters of the R.S.S.L. Headquarters will always be ready to supply Chapters or individuals with any information or assistance possible in solving noise problems.

Foreign R.S.S.L. Set-Up

Foreign members (outside of U.S.A. and Canada) will continue sending survey reports direct to their respective Sectional and Territorial Managers as heretofore. The continuance of Section and Territorial Managers in foreign countries was deemed advisable by the Directors in view of the time element and ease in handling reports and other League correspondence. To date the present system is functioning most efficiently and should continue to prove entirely satisfactory.

Inter-Station Interference

Reports on inter-station interference are urgently desired—especially from foreign members. Short-wave broadcast stations on approximately the same wavelength often come in well locally, but at times are subject to interference from beam transmissions, which interfere with the foreign reception unknown to the stations concerned. Numerous confirming reports on such interference are of value. Have you noted any such cases? If so, send in reports at once with full details. (Remember, each of these reports receives a credit of 5 points toward your "Class A" title.)

R.S.S.L. OFFICIAL SURVEY NO. 5

MacGregor Arctic Expedition Stations OX2QY-W1OXAB-WAWG

The MacGregor Arctic Expedition has as its purpose the study of weather conditions in the vicinity of the North Pole, with a view to employing the collected data for long-range weather forecasting in the Northern Hemisphere. Considerable importance is attached to the propagation of radio waves as well, and for this reason a compilation of data on the world-wide signal patterns from the various Expedition stations may prove of great scientific value.

The special operating frequencies allocated to W1OXAB and WAWG are: 2398 kc., 3492.5 kc., 6425 kc., 8655 kc., 12,862.5 kc., 17,310 kc., 31,100 kc., 34,600 kc., 37,600 kc., 40,600 kc., and in the band from 86 to 400 megacycles.

Most of the present transmissions are from OX2QY, on a frequency of 14,368 kc., (high-frequency end of 20-meter amateur band) each evening from 7:40 Eastern Standard Time, but R.S.S.L. members should keep a lookout for transmissions on the other frequencies as well.

Transmissions are both phone and c.w. Reports are desired on both classes of emission where possible. This survey will continue indefinitely.

Because of the importance of this survey, an additional 10 points (or a total of 20 points) will be credited for all monitoring reports sent to Headquarters on any of the Expedition transmissions.

The card sent out by Sayre, radio operator of the MacGregor Arctic Expedition, as an acknowledgement of the receipt of QSL cards.

DX RECEPTION CITATIONS

Standard Broadcast Band

First Degree

J. Herbert Hyde,
P. O. Box 82,
Elmwood, Conn.

Short-Wave Broadcast Bands

Second Degree

Eric A. Bristow,
5627 Winthrop Ave.,
Chicago, Ill.

First Degree

J. Herbert Hyde,
P. O. Box 82,
Elmwood, Conn.

P. F. Atkinson, G2
102 Prenton Road East,
Birkenhead, Cheshire,
England

Mr. & Mrs. Ralph E. Weikal,
W17L1,
510 N. Thompson St.,
Pratt, Kan.

Amateur Phone Bands

First Degree

Denzel D. Murphy,
P. O. Box 137,
Fairmont, W. Va.

1938 Membership Cards

If you returned your old card as requested in the letter recently sent all R.S.S.L. members, you have probably received your 1938 card by now. If you have not done so, send in your 1937 card at once, and mention any changes in address, additional equipment, or amateur call if you now have one; and your 1938 card will be forwarded at once.

Chapter News

The year 1938 has started off with activity in local R.S.S.L. circles. A number of chapters have already been chartered and additional chapter applications are pending and will appear in the next

NEW R.S.S.L. MEMBERS

CALIFORNIA
Robert Meister, Colton—W29M35
Jack McKelvey, Los Angeles—W29M34
William C. Wise III, San Mateo—W31J1°

FLORIDA
Robert A. Harris, Miami—W6U2

ILLINOIS
John J. Furcich, Argo—W11H66
Matthew Grzesak, Chicago—W11H65
Emily L. Slezak, Chicago—W11H64
Herman C. Koehler, Chicago—W11H69
R. A. Kelley, Chicago—W11H67

INDIANA
M. E. Packman, Jr., Valparaiso—W11H68

KENTUCKY
Howard Pauley, Ashland—W8K3

MASSACHUSETTS
Ralph Sanford Peace, Ashfield—W4F'6
Robert Ramey, E. Longmeadow—W3G36
William A. Fiske, E. Mansfield—W3F72
Edmund Howarth Wood, Lawrence—W3F75
Clive Barr, Springfield—W3G35
Harold L. Rogers, Springfield—W3G34
Robert W. Lieson, Springfield—W3G32
Richard Briggs, Watertown—W3F73
Albert Pickering Jr., West Medway—W3F74

MICHIGAN
Blaine E. Engle, Detroit—W9G19
Frank Sekach, Detroit—W9G18
Steve Sokolowicz, Detroit—W9G17
Edward Leo Smith, Jackson—W10H18
David Brown, Ypsilanti—W9H10

MINNESOTA
Raymond J. Roehl, St. Paul—W14F2

MISSOURI
Harold B. Carter, Kansas City—W15K7

NEBRASKA
Harold J. Miller, Omaha—W16J6

NEW JERSEY
Laurance A. Weber, East Orange—W4H195
Irving Sporn, Fort Monmouth—W4H196
Harold Kaplan, Jr., Maplewood—W4H191

NEW YORK
Meyer Feinberg, Bronx—W4H192
Charles William Cooper, Elmira—W6G3
Philip Siskind, New Rochelle—W4H189
Steven Klump, New York—W4H185
Morton Lipow, New York—W4H187
Stanley Koenig, New York—W4H188

OHIO
John R. Flood, Springfield—W9J22
Donald Busdicker, Toledo—W9H9
Floyd W. Powell, Toronto—W8J4

OREGON
Gordon Esterberg, Salem—W30D9
Bob B. Smith, Salem—W30D8
Murray Dow, Salem—W30D10

PENNSYLVANIA
Calder (Speed) Murlatt, Jr., Harrisburg — W5H14
Richard H. Cooper, Kittanning—W7H3
Joe Brown, McKeesport—W7J17
Joseph Edward Riplinger, Philadelphia—W4H-190
Walter Mosiondz, Philadelphia—W4H184
Robert W. Botzum, Reading—W4H194
James Arp, Williamsport—W4H193

TENNESSEE
Roy E. Gregg, Cleveland—W9N1
Horace Cerruti, Nashville—W11M2

WASHINGTON
Harry A. Harber, Seattle—W29B12

WEST VIRGINIA
John Joseph Largent, Gary—W7L3

WISCONSIN
Ralph Edward Olson, Milwaukee—W12G19

NEW FOREIGN MEMBERS

CANADA
Joseph Pope, Ottawa, Ontario—VE6E1
David Robertson Jack, Ottawa, Ontario—VE-6E2

DENMARK
Alf G. Lauridsen, Lillering—OZ1

ENGLAND
Norman Heppell, West Hartlepool, Durham—G65
John Batey, Newcastle-on-Tyne, Northumberland—G66
Clifford Colin Drakeley, Mansfield, Notts—G67
Newby Whyvel, Darlington, Durham—G68
Peter A. Arnold, Ealing, London W5—G69
Denys Albert Tagg, Chesterfield, Derbyshire G70
Roy F. Stevens, Romford, Essex—G71
George Edward Shackle, Bolton, Lancashire—G72
John Evans, Bolton, Lancashire—G73
George John Glasspool, Southampton, Hampshire—G74
Wilfred George Dando, Bristol—G76

SCOTLAND
Arnold Lester Berger, Edinburgh—G75
Lester C. Brown, Edinburgh—G77

issue. Among the first group of truly charter chapters are: JACKSON RADIO SIGNAL SURVEY LEAGUE, Jackson, Michigan. The charter just granted recognizes as Supervisor, Troy Welper; Secretary, Anthony Caldironi; and Messrs. Carl Sibson, Roy E. Chisholm, John De Wolfe, Raynor Jones, and Ted Farrand as those constituting the original membership of this chapter. Mr. Roy E. Chisholm has done some fine work in arousing interest and the local newspaper has featured a picture of this chapter in connection with their noise-suppression work. Meetings are held Tuesday evenings in IOOF Building of the School of Commerce, at Jackson, Mich. Interested radio fans are invited to attend.

A charter has just been granted to the CHICAGO WORLD WIDE DIAL CHAPTER OF THE R.S.S.L., with Robert E. Irwin President, and Messrs. Frank Anzalone, Edward Kulwitz, Eric A. Bristow, Carl Mues, Charles Trezise, and Edward Schenk as charter members. Mr. Schenk is Survey Supervisor and Mr. Trezise is Secretary. Meetings are held at the Central Y.M.C.A., Chicago, Ill. 19 So. La Salle St.) at 8 p.m. on the second Wednesday of each month.

Still another recently formed R.S.S.L. chapter is the PORT WASHINGTON RADIO SIGNAL SURVEY LEAGUE CHAPTER NO. 1, of Port Washington, Wis. The Survey Supervisor is Wilburt Klopp; the Secretary Clarence O. Schwengel, and the charter members are Helmut Giese, Ralph C. Klopp and Melvin Werking. Meetings 1st and 3rd Tuesdays each month. Write Mr. C. O. Schwengel, 811 Oakland Ave., Port Washington, Wis., for information of meeting place if you live near this city.

On the west coast, the SALEM RADIO SIGNAL SURVEY LEAGUE, of Salem, Oregon, has just organized, with Don Smith as Survey Supervisor; Tom Todd, Secretary, and Messrs. Ralph Smith, William Bentson and Carlos Kenney as members. Meetings are held every Tuesday at 656 Terry Street.

Just as we go to press comes word of an organization meeting on January 8th of the MOHAWK CHAPTER OF THE R.S.S.L., located at Worcester, Mass., and meeting at the home of Ray La Rocque, Chief Night Owl, 28 Aetna Street, on the 2nd Saturday of each month. The Survey Supervisor is G. Victor Nixon and the Secretary, Curtiss F. Keirstead, while the other charter members of this chapter are: Earl H. Lever, James Kneeland, C. D. Jennison, John E. Vermeiren (W1DUZ); Bob Skyten, Ray La Rocque. Any R.S.S.L. member in Massachusetts may join this chapter if his application is approved. R.S.S.L. members from north, east and west of Worcester journeyed many miles to attend this meeting and the wide experience of Ray La Rocque in DX reception and of W1DUZ in amateur radio, guarantees that the MOHAWK CHAPTER will do big things this winter.

Forming A Chapter

If you want to form a Chapter and have five or more local R.S.S.L. members as a nucleus, write at once to Headquarters for complete details. Contact with other radio members in one's vicinity will be of immense interest and help to all, to say nothing of the fraternal enjoyments derived from Chapter activities. It is only through the efforts of such local Chapters that sectional problems can receive proper attention. Be sure to follow the "Chapter News" in ALL-WAVE RADIO, telling of the formation of other chapters, perhaps in your own locality.

FREQUENCY COUNTER CHECKS MUSICAL PITCH

PROVIDING a rare degree of accuracy, the new frequency counter or pitch standard recently installed in the Allen B. DuMont Labs., Upper Montclair, N. J., promises to have a far-reaching effect on the musical art.

Master tuning forks employed in this precision equipment are checked at frequent intervals against the 440-cycle tone signal transmitted daily by the Bureau of Standards through station WWV. The tuning forks are electrically driven and their respective frequencies picked up electrically, amplified and made available for any circuit. In the case of the frequency counter, the given standard frequency from the master tuning fork is caused to beat against the unknown frequency of a tuning fork or musical instrument under test. The beat note difference causes the dial of an electromagnetic counter to indicate the number of cycles of difference between standard and tested tones in any given interval of time.

Meanwhile, a cathode-ray oscillograph provides a visual indication of the beat note, and shows whether the tested tone is sharp or flat with regard to the standard. If the wave pattern drifts to the right, the tested tone is sharp, if to the left, it is flat. The rate of drift indicates the degree of pitch difference.

The tested tone is picked up electromagnetically in the case of a tuning fork, or by means of a microphone in the case of the musical instrument. The present equipment can count down to one cycle difference per minute. When it is borne in mind that the best the human ear can detect is one cycle per second, it becomes apparent that the new method is 60 times more critical then the most critical human ear.

Queries

ANTENNA COUPLER . . . OSCILLATOR COIL . . . DIAL READINGS . . . NOISE CHECK

THE primary purpose of the Queries Department is to solve the technical and semi-technical problems of our readers who feel they require such assistance. However, questions, so long as they are related to radio, need not be of a technical nature. ¶Every question will be answered personally, by mail. A self-addressed and stamped envelope should be included. ¶In questions concerning specific apparatus, it will be of considerable assistance to our technicians if the inquiry is accompanied with a wiring diagram, original operating instructions, and all relevant literature. While it is the desire of this department to be of assistance in all possible instances, it should be borne in mind that the manufacturer will occasionally be in a position to give better advice concerning his own product, and usually maintains a technical department at the service of those who purchase his equipment.

QUERY NO. 52: I bought an aerial coupler from a local store. No directions came with it, and no one seems to know very much about how it should be connected to the twisted pair lead-in and the receiver. There are four binding posts numbered 1, 2, 3 and 4 and a small switch. The unit is so constructed that I'm afraid that taking it apart for inspection would ruin it. I have tried to investigate the matter by measuring resistance across the various terminals, but am afraid I haven't discovered very much. The resistance across 1 and 2 is two ohms, and across 3 and 4 it is eight ohms. There is no connection between 1 and 3, 1 and 4, 2 and 3, 2 and 4 when the switch is in one position. In the other position the resistance between 1 and 3 is one ohm and between 1 and 4 it is nine ohms; between 2 and 3 it is one ohm and between 2 and 4 it is nine ohms again. Can you help me at all?—*E. R., West Point, N. Y.*

Answer: This is sort of a simple Circuitwist which some of our readers might be interested in solving without the benefit of the circuit shown in Fig. 1. Usually terminal 3 should be connected to the antenna post of the receiver and terminal 4 to the ground post. The transmission line connects to terminals 1 and 2. As a general rule, the switch is open for short-wave reception and closed on the low-frequency broadcast band. However, different arrangements may give better reception on different bands along with superior noise reduction. Every possible connection should be tried, depending upon the flexibility of the receiver input circuit, as follows:

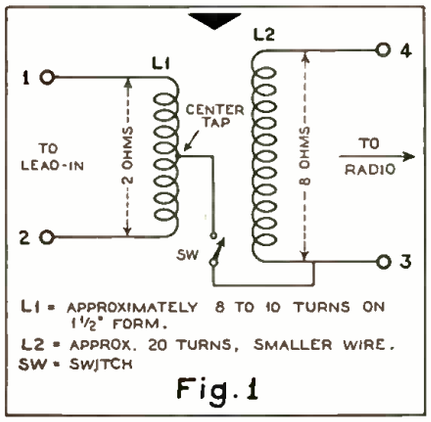


Fig. 1

The antenna coupler circuit as analyzed for E. R. This can be readily duplicated by anyone, and it works out very nicely.

Chassis connected to ground post (as is the case with a receiver having the "Gnd" post mounted on the chassis without insulation, or those with a jumper from chassis to ground post): No ground to receiver. Try terminals 3 and 4 to "Ant" and "Gnd" and reversed. Try the same thing with a good ground connected to the "Gnd" post. Try the same connections to "Ant" and "Gnd" with the chassis floating (not connected to the ground post) and with no ground connected to the receiver. Try it with a ground to the "Gnd" post. Try it with a ground connected to the chassis. Each test should be made with the switch in each position.

The coupler should be mounted as close as possible to the antenna and ground posts on the receiver. If possible, the leads from the coupler to "Ant" and "Gnd" should not be more than an inch or so long for best noise reduction.

◆

Query No. 53: I wish to build an oscillator coil to cover from 550 kc. to 1500 kc. The set is an all-wave job that works fine on the short waves, but the oscillator coil covering the broadcast band is missing. The condensers have fifteen plates and are of the large size usually found in broadcast receivers. The coil form has an outside diameter of 1¼ inches. I would use a 35 mmfd. condenser for trimmer. One end of the coil goes to ground through a .0021 mfd. mica condenser. The i.f. is 115 kc.—*W. P. K., Garden City, L. I., N. Y.*

Answer: This is a problem that we cannot solve directly because there are too many unknown factors—the type of oscillator, the capacity of the condenser, the curve of the plates, data on padding condensers, etc. etc. Also, we are inclined to doubt that W. P. K. has the intermediate frequency correct. This frequency is very low, and though it has been used occasionally by Edison-Bell, Echophone and a few others, one rarely runs across such receivers.

W. P. K.'s best bet is to go through the files of ALL-WAVE RADIO and examine constructional articles on superheterodynes and find an oscillating circuit with constants and connections resembling those of his receiver on the short-wave bands. Then wind the long-wave oscillator coil in accordance with the instructions given. The next best thing, and more simple, is to take the coil for the band just below the broadcast band as a model, and wind the broadcast coil with slightly more than twice the number of turns. From then on it is a cut and try procedure with trimmer, padding condenser (if used) and adding or subtracting turns.

◆

Query No. 54: I have a Westinghouse All-Wave No. 23 receiver, and do not quite understand the dial and wave readings. Could you help me a little? What are the waves and figures? On the short-wave bands the dial reads from 8.0 to 20.; 3.0 to 9.0; and 1.5 to 4.0. On the standard broadcast band the dial reads from .60 to 1.50. I don't seem to be able to reconcile these figures with wavelengths or the kilocycle figures in the newspaper program sheets.—*H. E. S. (W4G12), Trenton, N. J.*

Answer: This department has had several such inquiries. Usually the dial readings are explained very clearly in the instruction sheets accompanying the re-

(Continued on page 107)

SHORT-WAVE BROADCAST STATION LIST

BOLD NUMERALS: MEGACYCLES. LIGHT NUMERALS: METERS. DOT (●): STATION DOES NOT VERIFY. DIAMOND (◆): STATION NOT IN USE.

Abbreviations: O—Opening; C—Closing; I—Interval; S—Signal; I.R.C.—International Reply Coupon. Schedules in E.S.T.

41.000 W2XHG — National Broadcasting Co., 30 Rockefeller Plaza, New York, N. Y. Daily 9 a.m.-12 midnight.
7.32

41.000 W2XOY — Albany, New York. Address: General Electric Co., 1 River Road, Schenectady, N. Y. Irregular.
7.32

38.650 W2XDG — New York, N. Y. (see 41.000 mc.) Daily 9 a.m.-12 midnight.
7.76

31.800 W1XKA — Boston, Mass. (see W1XK 9.570 mc.) Daily 7 a.m.-1 a.m.
9.4 ●

31.600 W1XKB — Westinghouse Electric & Mfg. Co., Springfield, Mass. Daily 7 a.m.-1 a.m.
9.4 ●

31.560 W8XKA — Pittsburgh, Pa. (see W8XK 21.540 mc.) Daily 10 a.m.-1 a.m.
9.4 ●

31.600 W3XKA — Philadelphia, Pa. (see W3XAU 9:590 mc.) Daily 10 a.m.-11 p.m.
9.4

31.600 W8XWJ — 4465 Penobscot Bldg., Detroit, Mich. Daily exc. Sun. 10:30 a.m.-5 p.m.
9.4

31.600 W2XDV — New York, N. Y. (see 21.520 mc.) Mon. to Fri. 6-11 p.m. Sat-Sun. 1:30-6 p.m.; 7-10 p.m.
9.4

26.100 GSK — British Broadcasting Corp., Broadcasting House, London W1, England. Big Ben strikes the hour according to arrangement program. C: **God Save The King. I. Bow Bells.**
11.49 ● ◆

25.950 W6XKG — 1417 So. Figueroa St., Los Angeles, Calif. Continuously 24 hours each day.
11.56

21.550 GST — Daventry, England. (see 26.100 mc.)
13.92 ● ◆

21.540 W8XK — Grant Bldg., Pittsburgh, Pa. O-C: **Stars and Stripes Forever.** Weekdays 7-9 a.m.
13.92 ●

21.530 GSJ — Daventry, England. (see 26.100 mc.) Daily 5:45-8-55 a.m.
13.93 ●

21.520 W2XE — 485 Madison Ave., New York, N. Y. C: **Star Spangled Banner.** Mon. to Fri. 7:30-10 a.m. Sat.-Sun. 8 a.m.-1 p.m.
13.94

21.520 JZM — Overseas Section, The Broadcasting Corp. of Japan, Tokyo, Japan. O-C: **Kimigayo** National Anthem. Musical chimes follow. (see 11.800-9.535 mc.)
13.94 ◆

21.470 GSH — Daventry, England. (see 26.100 mc.) Daily 5:45 a.m.-12 noon.
13.97 ●

21.460 W1XAL — World Wide Broadcasting Corp., University Club, Boston, Mass. O: **News. Blaze Away.** C: **Star Spangled Banner.** Irregular.
13.98

21.450 OLR6A — Radiojournal, Praha XII, Fochova Tr. 16, Praha, (Prague) Czechoslovakia. O-C: Melody **New World Symphony** and Cathedral chimes. I: 9 note trumpet call, repeated. Irregular (see 9.550-11.840-15.230 mc.)
13.99

19.020 HS8PJ — Superintending Engineer, Post and Telegraph Dept., Technical Section, Bangkok, Siam. O: 3 chimes, English Mondays, 8:10 a.m.
15.77

17.800 TGWA — Radiodifusora Nacional, TGWA, Guatemala City, Guatemala, C.A.. O-C: Simple Melody, Marimba, repeated three times. (see 15.170-11.760-9.685 mc.) Week days 12:45-1:30 p.m. Sundays 12 noon-2:45 p.m. **No IRC necessary.**
16.85

17.790 GSG — Daventry, England. (see 26.100 mc.) Daily 3:15-5:25 a.m.; 5:45 a.m.-12 noon; 12:20-4 p.m.
16.86

17.785 JZL — Nazaki, Japan. (see 21.520 mc.) Irregular.
16.87

17.780 W3XAL — 30 Rockefeller Plaza, New York, N. Y. Daily 8:55 a.m.-5:45 p.m.; 6-9 p.m.
16.87

17.780 W9XAA — 666 Lake Shore Drive, Chicago, Ill. S: 3 chimes each 15 minutes. O: **Star Spangled Banner.**
16.87 ◆

17.770 PHI — Philips Radio, Hilversum, Holland. Call: Seven languages. I: Metronome 80 beats per minute. C: National Anthem. Sun. 8:25-10:30 a.m. Mon. to Sat. ex Wed. 8:25-10 a.m.
16.88

17.760 DJE — German Short Wave Station, Broadcasting House, Berlin, Germany. I: 9 musical notes. Folk Song. C: **National Horst-Wessel Lied and Deutschlandlied.** Daily 12:05 midnight-10 a.m.; Sunday 11:10 a.m.-12:25 p.m.
16.89

17.760 W2XE — Wayne, N. J. (see 21.520 mc.) Daily 6:30 p.m.-12 a.m.
16.89

17.755 ZBW-5 — Hong Kong, China. (see 9.525 mc.)
16.90

15.530 HS8PJ — Bangkok, Siam. (see 19.020 mc.) Occasional Mondays 8-10 a.m.
19.32

15.440 XEBM — P. O. Box 50, Mazatlan, Mexico. Daily 9-10 a.m.; 1-2 p.m., 8-10 p.m.
19.43

15.370 HAS-3 — Director Radio, Hungarian Post, Gyali St., 22, Budapest, Hungary. I: Musical Box Melody; O: Bells ringing; C: **Lord Bless the Hungarian (national anthem).** Sunday 9-10 a.m.
19.52

15.360 DZG — Zeesen, Germany (see 17.760 mc.) Irregular.
19.53

15.340 DJR — Zeesen, Germany (see 17.760 mc.) Daily 8-9 a.m.
19.56

15.330 W2XAD — General Electric Co., 1 River Rd., Schenectady, N. Y.; O: Spark Discharge. C: **Star Spangled Banner.** Daily 11 a.m.-9 p.m.
19.56

15.320 OLR5B — Prague, Czechoslovakia. (see 21.450 mc. Irregular (see 9.550-11.840-15.230 mc.)
19.58

15.310 GSP — Daventry, England (see 26.100 mc.) Daily 1:45-4 p.m.
19.60 ●

15.300 YDB — Soerabaja, Java. Daily 7:30 p.m.-2 a.m. (see 15.150 mc.)
19.61

15.290 LRU — Radio El Mundo, Maipu, 555, Buenos Aires, Argentina, S.A. O-C: Spanish only. Daily 7-9 a.m.
19.62

15.280 HI3X — J. R. Saladin, Director of Radio Communications, Ciudad Trujillo, Dominican Republic. S: Bells. Weekdays 12:10-1:10 p.m.; Sundays 7:40-10:40 a.m.
19.63

15.280 DJQ — Zeesen, Germany (see 17.760 mc.) Daily 12:05-5:45 a.m.; 6-8 a.m.; 8:10-10 a.m.; 4:50-10:45 p.m. Sunday 11:10 a.m.-12:25 p.m.
19.63

15.270 W2XE — Wayne, N. J. (see 21.520 mc.) Mon. to Fri. 1-2:15 p.m.
19.64

15.260 GSI — Daventry, England (see 26.100 mc.) Daily 12:20-4 p.m.
19.66 ●

15.250 W1XAL — Boston, Mass. (see 21.400 mc.) Sun. 10 or 11 a.m.-12 noon. Mon. to Fri. 1:30-4 p.m. Fri. 10-11 p.m. Specials: Irregular.
19.67

15.243 TPA-2 — Minister des Postes, Boulevard Haussmann, 98, Bis., Paris, France. I: Three tones **F** in Morse. O-C: **La Marseillaise;** S: chimes ¼ hours. Daily 6-11 a.m.
19.68

15.230 OLR5A — Prague, Czechoslovakia (see 21.450 mc.) Daily Ex. Sundays and Holidays 6:20-7:30 a.m. Sundays and Holidays 6-7:30 a.m.
19.70

15.220 PCJ — Philips Radio, Hilversum, Holland. Tues 3:30-5 a.m. Wed. 9 a.m.-12 noon.
19.71

15.210 W8XK — Pittsburgh, Pa. (see 21.540 mc.) Daily 9 a.m.-7 p.m.
19.72

15.200 DJB — Zeesen, Germany (see 17.760 mc.) Daily 12:05 a.m.-11 a.m.; 11:10 a.m.-12:25 p.m.; 4:50-10:45 p.m. Sunday 8-9 a.m.
19.74

15.190 ZBW-4 — Hong Kong, China (see 9.525 mc.)
19.75

15.183 RV96 — Moscow, U.S.S.R. (see RKI 15.040 mc.) Irregular.
19.76

15.180 GSO — Daventry, England (see 26.100 mc.) Daily 3:15-5:25 a.m., 5:45-8:55 a.m., 4:15-6 p.m.
19.76 ●

15.170 TGWA — Guatemala City, Guatemala (see 17.-800-11.760-9.685 mc.) Weekdays 12:45-1:30 p.m. Sunday 12 noon-2:45 p.m. **No IRC necessary.**
19.78

15.160 OLR5C — Prague, Czechoslovakia (see 21.450 mc.) Irregular (see 9:550-11.840-15.230 mc.)
19.79

15.160 XEWW — Mexico, D. F. (see 9.500 mc.) Daily 8 p.m.-12:30 a.m.
19.79

15.160 JZK — Nazaki, Japan (see 21.520 mc.) Irregular.
19.79

15.155 SM5SX — Royal Technical University, Stockholm, Sweden. Weekdays 11 a.m.-5 p.m.; Sunday 9 a.m.-5 p.m.
19.80

15.150 YDC — N.I.R.O.M., Koningsplein West 5, Batavia, Java, N.E.I. (Location-Soerabaja). Weekdays 5:30-10 a.m. (Sat. 11:30 a.m.) 6-7:30 p.m. 10:30 p.m.-2 a.m. Sunday 5:30-10 a.m. 7:30 p.m.-2 a.m.
19.80

15.140 GSF — Daventry, England (see 26.100 mc.) Daily 3:15-5:25 a.m.; 5:45 a.m.-12 noon.
19.82 ●

15.121 HVJ — Stezione Radio HVJ, Citta del Vaticano, Vatican City. I: clock ticks 5 m. S: Bells. C: (spoken) **Laudetur Jesus Christus.** Weekdays 10:30-10:45 a.m.
19.84

15.110 DJL — Zeesen, Germany (see 17.760 mc.) Daily 12-2 a.m.; 8-9 a.m.; 10:40 a.m.-4:30 p.m.; Sunday 6-8 a.m.
19.85

15.040 RKI — Radio Centre, Solianka 12, Moscow, USSR. Call: "This is Moscow Calling." O-C: **Internationale.** Irregular. **No I.R.C. required.**
19.95

14.970 LZA — Director General, Telegraphs and Telephones, Sofia, Bulgaria. O: **Racherutza-(Bulgarian Folk Dance).** C: National Anthem and **Hymn of His Majesty the King.** Weekdays 5-6:30 a.m.; 12-2:45 p.m.; Sundays 12 a.m.-4 p.m.
20.04

14.935 PSE — Rio de Janeiro, Brazil. (P) Phones LSL-WLK day irreg.; EDM-EHY 8 a.m. Broadcasts German program 4-4.10 p.m. Wednesdays (see 21.080 mc.)
20.07

14.600 JVH — Nazaki, Japan (see 21.520 mc.) 7 p.m.-1 a.m. Irregular.
20.55

14.535 HBJ — Radio Suisse, S.A., 12, Quai de la Poste, Geneva, Switzerland. No opening or closing selection (see HBO 11.402 mc.) Mon. 3:15-3:45 a.m. Australia L. of N.
20.64

14.480 DZH — Zeesen, Germany (see 17.760 mc.) **Irregular.**
20.75

13.635 SPW — Polskie Radio, 5., Mazowiecka St., Warsaw, Poland. O: I: Melody/chime The Haunted Castle; C: Polish National Anthem. Weekdays 6-7 p.m. Sundays 6-8 p.m.
22.00

13.600 ZMBJ — **TSS Awatea,** Union Line S.S., Cof Head Office, Wellington, New Zealand. Daily 1-3 a.m., Sundays 6:40-7 p.m.
22.06

12.500 HIN — Ciudad Trujillo, Dom. Rep., W. I. (see 6.243 mc.) Daily exc. Sun. 11:40 a.m.-1:40 p.m.; 7:10-9:50 p.m.
24.00

12.235 TFJ — Icelandic State Broadcasting Service, P. O. Box 547, Reykjavik, Iceland. First half English. C: Icelandic National Orchestra and chorus voices. Sundays 1:40-2:30 p.m.
24.52

12.130 DZE — Zeesen, Germany (see 17.760 mc.) Irregular.
24.73

12.000 RNE — Moscow, U.S.S.R. (see RKI, 15.040 mc.) Daily 10:15-11:15 p.m. Sun. 6-7 a.m., 10-11 a.m., 4-5 p.m.; Mon. 4-5 p.m.; Wed. 6:30-7:30 a.m.; Thurs. 5-6 p.m.; Fri. 4-5 p.m.
25.00

11.960 HI2X — Ciudad Trujillo, Dom. Rep. (see 15.280 mc.) Tues. and Fri. 8:10-10:10 p.m. Sunday 7:40-10:40 a.m.
25.08

11.900 CD1190 — Casilla 642, Valdivia, Chile, S.A. Daily 10 a.m.-1 p.m., 3-6 p.m., 7-10 p.m.
25.21

11.900 XEWI — P. O. Box 2874, Mexico, D.F. S: 2 strokes gong. O-C: **May Angels Guard Thee.** Sun. 12:30-2 p.m. Mon., Wed., Fri. 3-4 p.m.; 9 p.m.-12 a.m.; Tues., Thurs. 7:30 p.m.-12 a.m.; Sat. 9 p.m.-12 a.m. (see 6.015 mc.)
25.21

11.900 OLR4D — Prague, Czechoslovakia (see 21.450 mc. Irregular (see 9.550-11.840-15.230 mc.)
25.21

11.895 XEXR — Departmento Autonome de Propaganda y Publicidad, Mexico, D. F. Daily 6-11:30 p.m.
25.22

11.895 HP5I — Emisora HP5I, Aguadulce, Panama. English—beginning and closing. I: three notes gong, thrice (9) ea. 30 mins. O-C: **El Tambor de la Algeria.** Daily 7:30-9:30 p.m. **Veri cards free.**
25.22

11.890 TPA3 — Pontoise, France (see 15.243 mc.) Daily 2-5 a.m. 11:15 a.m.-6 p.m.)
25.24

11.880 XEUZ — F. J. Stavoli, Chief Eng'r., Radio Nacional, Mexico, D. F. (see 6.130 mc.) S: 5 bells (chimes) O-C: Marcha Dragona. Daily 10 a.m.-1 p.m.; 7 p.m.-2 a.m. Dx 1-2 a.m.
25.25

11.880 XEXA — **Secretaria de Educacion Publica,** Mexico, D. F. O-C: **March of the Toys.** Weekdays 8:30-11 a.m. 2:30-4:30 p.m.; 7 p.m.-12 a.m.; Sun. 7 p.m.-12 a.m.
25.25

11.875 OLR4C — Prague, Czechoslovakia (see 21.450 mc.) Irregular (see 9:550-11.840-15.230 mc.)
25.26

11.870 W8XK — Pittsburgh, Pa. (see 21.540 mc.) Daily 7-11 p.m.
25.26

11.860 YDB — Soerabaja, Java (see 15.150 mc.) Daily 10:30 p.m.-2 a.m.
25.29

11.860 GSE 25.29 ● ◆ Daventry, England. (See 26.100 mc.)

11.855 DJP 25.31 Zeesen, Germany (see 17.760 mc.) Irregular.

11.840 CSW4 25.34 Emissora Nacional, Rua do Quelhas No. 2, Lisbon, Portugal. (see 11.040-9.940 mc.) O-C: A Portuguesa—National Anthem. Daily 1-2:10 p.m.

11.840 OLR4A 25.34 Prague, Czechoslovakia (see 21.450 mc.) Monday 7:15-8:55 p.m. Spanish. Sun., Tues., Thurs., Sat., 5-5:15 p.m. Eng. News.

11.840 KZRM 25.34 Erlanger and Galinger, Inc., Insular Life Bldg., Manila, P. I. (see 9.570) Weekdays 5-9 a.m. Sat. to 10 a.m. 4:30-6 p.m., Sun, 4-10 a.m.

11.830 W2XE 25.36 Wayne, N. J. (see 21.520 mc.) Daily 2:30-6 p.m., 6:30-12 a.m.

11.830 W9XAA 25.36 Chicago, Ill. (see 17.780 mc.) Week days 9 a.m.-6 p.m., Sun 9-11 a.m., 1-5:30 p.m.

11.820 XEBR 25.38 Apartado 68, Hermosillo, Con. Mexico. O-C: Over The Waves. Daily 1-4 p.m.; 9 p.m.-12 a.m.

11.820 GSN 25.38 ● ◆ Daventry, England (see 26.100 mc.)

11.810 2RO-4 25.40 5 Via Mentello, Rome, Italy. O: Bells of Rome. C: Italian Royal March and Giovinezza. I: bird call—black cap bird (see 9.635 mc.) Daily 5-8:30 a.m., 10 a.m.-12:20 p.m.

11.805 OZG 25.41 Skamlebaek, Denmark (see 6.060 mc.) Irregular.

11.801 OER-3 25.42 Osterr. Radioverkehrs A.G., Johannesgasse 4b, Wien 1, Austria. Call: "Hier Radio Wien." I: Metronome—60 beats per m. Weekdays 9 a.m.-5 p.m. Sat. to 6 p.m.

11.800 JZJ 25.42 Nazaki, Japan (see 21.520 mc.) Daily 12:30-1:30 a.m. 8-9 a.m.; 3-4 p.m.; 4:30-5:30 p.m.

11.800 COGF 25.42 General Betancourt 51, (Playa) Mantanzas, Cuba. O-C: Vals Diana. Weekdays 1-4 p.m., 6-10 p.m. Sun. 9-10 p.m.

11.796 OAX5A 25.43 Avenida San Luis, Ica, Peru, S.A. O: March, "Relater". C: "Estrellita." Daily 12-4 p.m. 7-11:30 p.m.

11.795 DJC 25.44 Zeesen, Germany (see 17.760 mc.) Irregular.

11.790 WIAXL 25.45 Boston, Mass. (see 21.460 mc.) Sun. 3-6:30 p.m.; Mon to Fri 4:45-6:30 p.m.; Sat. 6-6:30 p.m. Specials—Irregular.

11.770 DJD 25.49 Zeesen, Germany (see 17.760 mc.) Daily 10:40 a.m.-4:30 p.m.; 4:50-10:45 p.m.

11.760 TGWA 25.50 Guatemala City, Guatemala, C.A. (see 17.800-15.170-9.685 mc.) Weekdays 12:45-1:30 p.m. Sundays 12 noon-2:30 p.m. Also irregular day or night. No IRC necessary.

11.760 XETA 25.50 Apartado 203, Monterey, Mexico. Daily 7-11 p.m.

11.760 OLR4B 25.50 Prague, Czechoslovakia (see 21.450 mc.) Irregular (see 9.550-11.840-15.230 mc.)

11.758 GSD 25.53 ● Daventry, England (see 26.100 mc.) Daily 3:15-5:25 a.m.; 8:55 a.m.-12 noon; 12:20-4 p.m.; 4:15-6 p.m.; 9:15-11:15 p.m.

11.748 HP5L 25.55 Apartado 139, David, Chiriqui, Panama, C. A. Daily 4-7 p.m.

11.730 XETM 25.57 Villahermosa, Mexico. Daily 6-11 p.m.

11.730 PHI 25.57 Hilversum, Holland (see 17.779 mc.) Irregular.

11.720 CJRX 25.60 Royal Alexandra Hotel, Winnipeg, Manitoba, Canada. Weekdays 6 p.m.-12 a.m. Sundays 5-10 p.m.

11.718 TPA-4 25.60 Pontoise, France (see 15.243 mc.) Daily 6:15-8:15 p.m.; 10 p.m.-1 a.m.

11.715 CR7BH 25.60 Lourenco Marques, Portuguese East Africa (see CBFAA, 6.137 mc.) Weekdays 4:30-6:30 a.m.; 9:30-11 a.m.; 12:30-4 p.m. Sundays 5-7 a.m.; 10 a.m.-12:30 p.m.; 2-4 p.m.

11.710 YSM 25.62 Director of Communicaciones, San Salvador, El Salvador, C. A. O-C: Bird singing before first and last announcement. No IRC required.

11.710 Philco 25.62 Radio 211-21XD Rue Catinat, Saigon, Indo-China. Daily 6:30-9:30 a.m. News in French 6-6:15 a.m.

11.710 XEWB 25.63 Juarez 280, Guadalajara, Mexico. Daily 7-11 p.m.

11.710 VK9MI 25.62 M.V. Kanimbla, McIlwraith and McEacharn, Bridge St., Sydney, Australia. 11 p.m.-7:35 a.m.

11.705 SBP 25.63 Chief Engineer, Motala, Sweden. Mon. to Fri. 1:20-2 a.m., 6-9 a.m., 11 a.m.-1:30 p.m., Sat. 1:20-2 a.m., 6 a.m.-1:30 p.m. Sun. 3 a.m.-1:30 p.m.

11.700 HP5A 25.64 P. O. Box 954, Panama City, Panama, C.A. O-C: "Anvil Chorus". Daily 11:45 a.m.-1 p.m., 6-10 p.m. Sundays—open at 10 a.m. Thurs., Fri., Sat.—open at 5 p.m.

11.700 OBI170 25.64 Radio Otto Becker, Casilla 706, Santiago, Chile, S.A. Daily 10 a.m.-2 p.m.; 4-11 p.m. Anglo American hour 6-6:45 p.m. Tues., Thurs., Sat.—English.

11.570 HH2T 25.93 Societe Haitienne Radiodiffusion, P.O. Box 103, Port-au-Prince, Haiti, W.I. S: 4 tones gong 1-2-2-4. English and French O-C: The Swan. Special programs, irregular.

11.535 SPD 26.01 Warsaw, Poland (see 13.635 kc.) Weekdays 6-7 p.m. Sundays 6-8 p.m.

11.435 COCX 26.23 P. O. Box 32, Havana, Cuba. S: 5 bells. English each ½ hr. O-C: Pajarillo Barranqueno. Daily 8 a.m.-1 a.m.

11.402 HBO 26.31 Geneva, Switzerland (see HBJ, 14.535 mc.) Mondays 3-3:15 a.m. Fridays 2-2:15 p.m.

11.040 CSW2 27.17 Lisbon, Portugal (see 11.840-9.940 mc.) Daily 2:10-6 p.m.

11.000 PLP 27.27 J. Sanders, Chief Engr., Java Wireless Station, Bandoeng, Java; D.E.I. Weekdays 4:30-10 a.m. (Sat. 11:30 a.m.); 6-7:30 p.m. 10:30 p.m.-2 a.m.; Sunday 4:30-10 a.m.; 7:30 p.m.-2 a.m.

10.960 JZS 27.37 Nazaki, Japan. (see 21.520 mc.) Irregular.

10.740 JVM 27.93 Nazaki, Japan (see 21.520 mc.) 4:30-7:30 a.m. Irregular.

10.670 CEC 28.12 Cia Internacional de Radio, Casilla 16-D, Santiago, Chile. Daily exc. Sat. and Sun. 7-7:30 p.m. (see CED, 10.330 mc.)

10.660 JVN 28.14 Nazaki, Japan (see 21:520 mc.) Daily 1:40-2:30 a.m., 4-7:45 a.m.

10.600 ZIK2 28.30 Government Radio Station ZIK2, Wireless Branch, Post Office, Belize, British Honduras, C.A. Tues. Thurs., Sat. 7:30-7:45 p.m.

10.370 28.93 Radio Nacionales, Salamanca, Spain. Daily 9-9:45 p.m.

10.370 EAJ43 28.93 Radio Club Tenerife, Apartado 225, Santa Cruz, Tenerife, C.I. Daily 2:15-3:30 p.m.; 6-7 p.m.; 7:10-9:30 p.m.

10.370 EHZ 28.93 Tablero, Tenerife, C. I. Daily 3-4 p.m.; 6-8:15 p.m.

10.350 LSX 28.93 Transradio Internacional, San Martin, 329, Buenos Aires, Argentina, S.A. C: San Lorenzo March. Irregular 5-8 p.m.

10.330 ORK 29.04 Director de Communications, Bruxelles, Belgium. I: Carrillion. O: Towards The Future. C: Brabanconne. Daily 1:30-3 p.m.

10.290 DZC 29.15 Zeesen, Germany (see 17.760 mc.) Irregular.

10.260 PMN 29.24 Bandoeng, Java, D.E.I. (see PLP, 11.000 mc.) Weekdays 5:30-11 a.m. (Sat. 11:30 a.m.); 6-7:30 p.m.; 10:30 p.m.-2 a.m.; Sundays 5:30-11 a.m.; 7:30 p.m.-2 a.m.

10.250 CED 29.33 Antofagasta, Chile (see CEC 10.670 mc.) Sat. and Sun. 7-7:30 p.m.

10.220 PSH 29.35 Cia Radio International do Brazil, Caixa Postal 709, Rio de Janeiro, Brazil. Daily 7-9 p.m.

10.185 CQN 29.60 Chief of Radio Station CQN, Post Office Bldg., Macao (Portuguese) China. O: Maria de Fonte. C: National—A Portuguesa. Mon. and Fri. 7-8:30 a.m.

10.042 DZB 29.87 Zeesen, Germany (see 17.760 mc.) Irregular.

9.940 CSW3 30.18 Lisbon, Portugal (see 11.840-11.040 mc.) Daily 6-8 p.m.

9.930 COBC 30.21 Apartado 132, Havana, Cuba. Daily 7 a.m.-12:30 a.m.

9.925 JDY 30.23 Dairen, Manchukuo, Japan. Daily 5:30-8 a.m.

9.860 EAQ 30.43 P. O. Box 951, Madrid, Spain. O: La Verbena de la Paloma. C: Himno de Riego or Good Night Melody. Sat. 1-8:30 p.m. Daily 5:15-9:30 p.m.

9.833 COCM 30.51 Apartado 33, Havana, Cuba. Daily 8 a.m.-12 midnight.

9.750 COCQ 30.77 Calle 25, No. 445, Havana, Cuba. Weekdays 6:55 a.m.-1 a.m.; Sundays 6:55 a.m.-12:01 a.m.

9.685 TGWA 30.98 Guatemala City, Guatemala, C. A. (see 17.800-15.170-11.760 mc.) Sunday 7:15-10 p.m., Mon., Tues., Thurs. 9-11 p.m., Wed. 9:30-10:15 p.m. Friday silent, Sat. 10 p.m.-1 a.m. No IRC necessary.

9.685 30.98 Radio Martinique, P. O. Box 136, Fort de France, Martinique, F.W.I. O-C: "La Marseillaise". Daily 6:30-7:50 p.m.

9.675 DZA 31.00 Zeesen, Germany (see 17.760 mc.) Irregular.

9.670 TI4NRH 31.02 Apartado 40, Heredia, Costa Rica, C.A. Daily 9-10 p.m.; 11:30 p.m.-12 a.m.; Sat. to 2 a.m.

9.666 CR6AA 31.04 Caixa Postal 103, Lobito, Angola, Portuguese West Africa. I: 3 notes on piano; A-C-B. Portuguese, French and English. Wed. and Sat. 2:45-4:30 p.m.

9.660 LRX 31.06 Buenos Aires, Argentina, S. A. (see LRU, 15.290 mc.) Daily 9:30 a.m.-11:30 p.m.

9.650 CS2WA 31.09 Antonio Augusto de Aguair, 144 Lisbon, Portugal. I: Cookoo, 3 times. C:A Portuguesa (national anthem.) Tues., Thurs., Sat. 4-7 p.m.

9.645 HH3W 31.10 P. O. Box A117, Port-au-Prince, Haiti, W.I. S: 4 chime notes and siren each 15 min. before announcements. Daily exc. Sunday 1-2 p.m.; 7-8:30 p.m.

9.640 CXA8 31.12 Director, Colonia, Uruguay, S.A. Daily 6 p.m.-11 p.m.

9.635 2RO-3 31.13 Rome, Italy. Daily 12:30-6 p.m. So. Am. 6-7:30 p.m. No. Am. 7:30-9 p.m. (see 11.810 mc.)

9.630 HJ7ABD 31.15 Bucaramanga, Colombia, S.A. Daily 12-1 p.m., 6-11 p.m.

9.616 HJ1ABP 31.20 P. O. Box 37, Cartagena, Colombia, S. A. O-C: Under The Double Eagle. Daily 7-9 a.m.; 11 a.m.-1:20 p.m.; 6-11 p.m.

9.606 ZRK 31.23 Klipheuvel, South Africa (see 6.097.5 mc.) Weekdays 11:45 p.m.-12:45 a.m.; 3:20-7:20 a.m.; 9-11:45 a.m. Sundays 3:30-4:30 a.m. or 4-5 a.m.; 8-11:40 a.m.

9.600 RAN 31.25 Moscow, U.S.S.R. (see RKI, 15.040 mc.) Daily 7-9:15 p.m.

9.600 XEYU 31.25 Universidad Nacional, Mexico, D.F. Daily 7-10 p.m.

9.600 CB960 31.25 Casilla 1342, Santiago, Chile, S.A. O: Babes in Toyland. C: Somewhere a Voice is Calling (organ). Daily 11:30 a.m.-2 p.m.; 9:30 p.m.-12 a.m. Very Slow.

9.595 HBL 31.27 Geneva, Switzerland (see HBJ, 9.345 mc.) Irregular.

9.595 YNLF 31.27 Calle, 15 de Set No. 206, Managua, Nicaragua, C.A. Daily 6-9 a.m.; 1-3 p.m.; 6:30-10:30 p.m. Veri—5c U. S. postage.

9.590 VK6ME 31.28 Amalgamated Wireless Ltd., Perth, West Australia. (Address 47 York St., Sydney, Australia). Daily exc. Sun. 6-8 a.m.

9.590 W2XE 31.28 ◆ Wayne, N. J. (see 21.520 mc.)

9.590 W3XAU 31.28 1622 Chestnut St., Philadelphia, Pa. Daily 12 noon-8 p.m.

9.590 VK2ME 31.28 Amalgamated Wireless, Ltd. 47 York St., Sydney, Australia. Clock strikes at hour, chimes ½ hr. I: Kookaburra bird call. C: God Save The King. Sunday 1-3 a.m.; 5-9 a.m.; 9-11 a.m.

9.590 HP5J 31.28 Apartado 867, Panama City, Panama, C. A. News 6:30 p.m. O: Blackhorse Troop March. C: Disciplina Honor and Abregacion. Weekdays 12-2 p.m.; 5-10:30 p.m. Sundays 10:30 a.m.-2 p.m.; 8-10 p.m.

9.590 PCJ 31.28 Hilversum, Holland. (see 15.290 mc.) Sun. 7-8:30 p.m.; Tues. 5-8 a.m.-2-2:30 p.m.; Wed. 7-9:30 p.m.; Thurs. 7-8:30 p.m., 9-10:30 p.m.

9.580 GSC 31.32 ● Daventry, England (see 26.100 mc.) Daily 4:15-6 p.m., 6:20-8:30 p.m., 9:15-11:15 p.m.

9.580 VLR 31.32 ● Australian Broadcasting Commission, G.P.O. Box 1686, Melbourne, Australia. O: Recording, song, Australian Lyre Bird. C: God Save The King. S—3 notes, gong; time signals and P.O. chimes. Sun 3-7:30 a.m. Weekdays 9:35 p.m.-2 to 2:30 a.m.; 3:30-8:30 a.m.; Sat. to 9 a.m.

9.580 OAX5C 31.32 Radio Universal, Avenida San Luis, Ica, Peru, S.A. Weekdays 11:30 a.m.-4 p.m.; 7-11:30 p.m.

9.570 WIXK 31.33 ● Westinghouse Electric and Mfg. Co., Boston, Mass. O-C: Stars and Stripes Forever. Weekdays 6 a.m.-1 a.m. Sunday 8 a.m.-1 a.m.

9.570 KZRM 31.33 Manila, P. I. (see 11.840 mc.) Weekdays 5-9 a.m. Sat. to 10 a.m., 4:30-6 p.m. Sun. 4-10 a.m.

9.565 YV3RB 31.36 Sr. Arturo Ramos Maggi, Prop., Barquisimeto, Venezuela. Daily 11:30 a.m.-12:30 p.m.; 5:30-9:30 p.m.

9.562 OAX4T 31.38 Radio Nacional, Peruvian Government, Av. Petiti Thouars 447, Lima, Peru. Daily 11:30 a.m.-1:30 p.m.

9.560 DJA 31.38 Zeesen, Germany (see 17.760 mc.) Daily 12:05 a.m.-11 a.m.; 4:50-10:45 p.m.

9.550 XEFT 31.41 Av. Independencia 28, Veracruz, Mexico. S: Chimes, bugle calls or cookoo horn. English at closing. O-C:. Vals Poetico. Weekdays 10:30 a.m.-4:30 p.m.; 7:30 p.m.-12:30 a.m.; Sundays 9 p.m.-12:30 a.m.

9.550 YDB 31.41 Soerabaja, Java N.E.I. (see 15.150 mc.) Weekdays 5:30-10 a.m. (Sat. 11:30 a.m.) 6-7:30 p.m., 10:30 p.m.-2 a.m. Sun. 5:30-10 a.m. 7:30 p.m.-2 a.m.

9.550 HI5E 31.41 Sr. H. Chavez, Ciudad Trujillo, Dom. Rep., W. I: Irregular.

9.550 OLR3A 31.41 Prague, Czechoslovakia (see 21.450 mc.) Mon., Wed., Fri. 8-10:35 p.m. (Eng. News 9:45 p.m.) Daily 12:15-4:40 p.m. Europe Daily ex. Sun. and holidays 9:25-10:10 a.m.

9.545 HH2R
31.44
Port-au-Prince, Haiti, W.I. (see HH2T, 11.570 mc.) Special programs irregular.

9.540 VPD-2
31.45
Amalgamated Wireless, Ltd., Suva, Fiji Islands. C: God Save the King. Daily 5:30-7:00 a.m. No signals.

9.540 DJN
31.45
Zeesen, Germany (see 17.760 mc.) Daily 12:05 a.m.-10 a.m.; 4:50-10:45 p.m.

9.535 JZI
31.46
Nazaki, Japan (see 21.520 mc.) Daily 3-4 p.m.; 4:30-5:30 p.m.

9.530 W2XAF
31.48
Schenectady, N. Y. (see (W2XAD 15.330 mc.) Sun.-Fri. 4 p.m.-12 a.m.; Fri. 1 p.m.-12 a.m.; Sat. 12 p.m.-12 a.m.

9.530 LKJ-1
31.48
Ministers du Commerce, Administrator des Telegraphes, Oslo, Norway. I: Piano motif Grieg's Sigurd Jorsalfar, C: National—Yes, We Love This Country. Daily 5-8 a. m.; 11 a.m.-5 p.m.

9.525 ZBW-3
31.49
Hong Kong Broadcasting Committee, P.O. Box 200, Hong Kong, China. I-O-C: none. Weekdays 11:30 p.m.-1:15 a.m., Mon.-Thurs. 4-10 a.m., Tues., Wed., Fri., 3-10 a.m., Sat., 3-11 a.m., Sun. 9 p.m.-1:30 a.m., 3-9:30 a.m.

9.524 FIQA
31.50
Tananarive, Madagascar (see 6.000 mc.) Daily 12:30-12:45 a.m.; 3:30-4:30 a.m.; 10-11 a.m. simultaneously on 6.000 mc.

9.523 ZRH
31.50
Roberts Heights, South Africa (see 6.097.5 mc.) Weekdays 11:45 p.m.-12:45 a.m., 5-7:30 a.m., 10 a.m.-4 p.m. Sunday 3:30-4:30 a.m. or 4-5 a.m.; 10 a.m.-12 noon; 12:15-3 p.m.

9.520 OZF
31.51
Copenhagen, Denmark (see OXY 6.060 mc. Daily 2-6 p.m.

9.516.6 HJ6ABH
31.52
Armenia, Colombia, S.A. O-C: The Spanish Soldiers. S: Blows on Marimba. News 7-10 p.m. Weekdays 8-11 a.m.; 6-10 p.m. Sundays 7-10 p.m.

9.520 YSH
31.51
San Salvador, El Salvador, C.A. (see 11.710 mc.) Irregular.

9.520 XEDQ
31.51
Apartado 107, Guadalajara, Jalisco, Mexico. O-C: Mexican Dance—Jarabe Tapatio. Daily 12-4 p.m. 8 p.m.-12 a.m. Occasional DX Sunday 2-4 a.m.

9.510 GSB
31.55 ●
Daventry, England (see 26.100 mc.) Daily 3:15-5:25 a.m., 12:20-4 p.m., 4:15-6 p.m.; 6:20-8:30 p.m.; 9:15-11:15 p.m.

9.510 HJU
31.55
Buenaventura, Colombia, S.A. O-C: Palmira, English each 5 mins. Mon., Wed., Fri. 12-2 p.m.; 8-11 p.m.

9.510 HS8PJ
31.55
Bangkok, Siam (see 9.350-19.020 mc.) Mon. and Thurs. 8-10 a.m.

9.510 VK3ME
31.55
Amalgamated Wireless Ltd., 167-9 Queen St., Melbourne, Australia. S: chimes and striking on hour. C: God Save the King. Daily exc. Sun. 4-7 a.m.

9.505 HIO
31.56
Director, Ciudad Trujillo, Dom. Rep., W.I. Daily 5:40 to 7:40 or 8:40 p.m.

9.504 OLR3B
31.57
Prague, Czechoslovakia. (see 21.450 mc. Irregular (see 9.550-11.840-15.230 mc.)

9.501 PRF5
31.58
P.O. Box 709, Rio de Janeiro, Brazil, S.A. I: three-note gong. C: Brazilian National Anthem. (see PSE 14.935 mc.) Daily exc. Sun. 4:45-5:45 p.m.

9.500 HI5G
31.58
La Vega, Dominican Republic, W.I. Daily 6:40-8:40 a.m.; 10:40 a.m.-2:40 p.m.; 4:40-8:40 p.m.

9.500 XEWW
31.58
Apartado 2516, Mexico, D.F. Daily 9 a.m.-12M.

9.495 HJIABE
31.59
Apartado 31, Cartagena, Colombia, S. A. O: Organ—Song of the Islands. English each hour—clock strikes the hour. C: Aloha Oe. Weekdays 11 a.m.-1 p.m., 6-10:30 p.m., Sunday 9 a.m.-3 p.m.

9.480 EAR
31.65
P. O. Box 951, Madrid, Spain. Daily 7:30-8 p.m. Tues., Thurs., Sat. 9:30-10 p.m.

9.450 "Radio Fort de France"
31.75
Edouard Boullanger Fils, Fort de France, Martinique. Daily 11:30 a.m.-12:30 p.m.; 6:15-7:15 p.m.; 8-9 p.m.

9.440 HCODA
31.78
Guayaquil, Ecuador, S.A. Daily exc. Sunday 8-11 p.m. Veri—5c U.S. postage.

9.428 COCH
31.81
P.O. Box 41, Havana, Cuba. English each 15 mins. S: chimes 15 m. 2 blows gong adv. O-C: Organ: Maria My Own. Daily 8 a.m.-12 a.m.

9.350 HS8PJ
32.09
Bangkok, Siam (see 19.020 mc.) Thursdays 8-10 a.m.

9.345 HBL
32.10
Information Section, League of Nations, Geneva, Switzerland. Fridays 2:30-2:45 p.m.; 7:30-7:45 p.m.; 8-8:15 p.m. Sat. 6:45-8 p.m. Swiss Program.

9.340 OAX4J
32.12
Radio Internacional, Casilla 1166 Lima, Peru. C: Organ: Good Night Sweetheart. Daily 12.3 p.m.; 5 p.m.-1 a.m.

9.300 YNGU
32.27
Apartado 295, Managua, Nicaragua, C.A. Weekdays 12-2 p.m.; 5-6 p.m. Sun. 11 a.m.-12 noon. Veri—5c U. S. Postage.

9.200 COBX
32.61
San Miguel #194, Havana, Cuba. Daily 8 a.m.-11:30 p.m.

9.125 HAT-4
32.88
Budapest, Hungary (see HAS-3. 15.370 mc.) Sun. and Wed. 7-8 p.m.; Sat. 6-7 p.m.

9.030 COBZ
33.32
P.O. Box 866, Havana, Cuba. S-4 chimes. O-C: Record, "Popular Melodies" 7:45 a.m.-12:30 a.m. Sat. to 2 a.m.

9.110 COCA
32.93
Ave. de Italia #102, Havana, Cuba. Daily 6 p.m.-12 a.m.

8.920 COKG
33.63
Apartado 137, Santiago, Cuba. Daily 5-6 p.m.; 9:30-10:30 p.m. Sunday 12:01-1 a.m.

8.840 ZMBJ
33.94
Wellington, N. Z. (see 13.600 mc.) Sun. 6:40-7 p.m.; daily 1-3 a.m.

8.831 HCJBI
33.97
Casilla 691, Quito, Ecuador, S.A. O: March Patria I: 4 blows on gong. C: Ecuadorian National Anthem. Daily exc. Mon. 7:30-8:45 a.m. 11:30 a.m.-2:30 p.m. 5-10 p.m. (to 7 p.m. on 4.107 mc.; after 7 p.m. on 4.107 and 8.831 mc.) Veri—5c U. S. Postage.

8.795 HKV
34.13
Ministerio de Guerra, Military Service, Bogota, Colombia, S.A. Mon. and Thurs. news 7-7:30 p.m.

8.665 COJK
34.62
Finlay No. 3, Altos, Camaguey, Cuba. S—3 tone gong, each ¼ hr. English Ann. Each ½ hr. O: "Allegiance March" C—None. Week days 10:30 a.m.-12:30 p.m. 7-10:30 p.m., Sat. 11 p.m., Sun. 10 a.m.-12:30 p.m.

8.580 YNIPR
34.97
A Mejewsky, Gerente, Managua, Nicaragua, C.A. Daily 1-2:30 p.m.; 7:30-10:30 p.m. Veri—5c U. S. postage.

8.404 HC2CW
35.70
Casilla 1166, Guayaquil, Ecuador, S.A. O-C: Sangre Equatoriana. Weekdays 11:30 a.m.-12:30 p.m.; 7-11 p.m. Sun. 3-5 p.m. Veri—5c U. S. postage.

8.110 ZPIO
37.00
Radio Prieto ZP10, Asuncion, Paraguay, S.A. Daily 8-10 p.m.

7.894 YSD
38.00
San Salvador, El Salvador, C. A. (see 11.710 mc.) Daily 9-11 p.m.

7.854 HC2JSB
38.19
P.O. Box 805, Guayaquil, Ecuador, S.A. S: Gong. O-C: El Corcovado (Carioca fox). Daily 11 a.m.-2 p.m.; 4:30-11 p.m. Veri—5c U. S. postage.

7.797 HBP
38.49
Geneva, Switzerland (see 9.345 mc.) Sat. 6:45-8 p.m. Swiss program

7.750 TI8WS
39.74
Apartado 75, Puntarenas, Costa Rica, C.A. Weekdays 5-7 p.m.; 8:30-10 p.m. Sun. 4-5 p.m.

7.520 RKI
39.89
Moscow, U.S.S.R. Daily 7-9:15 p.m. (see 15.040 mc.)

7.510 JVP
39.95
Nazaki, Japan (see 21.520 mc.) 3-7:30 a.m. Irregular.

7.411 HCICE
40.48
Apartado 485, Quito, Ecuador, S.A. Thursday 9-10 p.m. Veri—5c U. S. postage.

7.380 XECR
40.65
Departmento Autonomo de Publicidad, Mexico, D.F. Sun 7-8 p.m. No signals or O-C selection.

7.211 EA8AB
41.60
Radio Club Tenerife, Apartado 225, Santa Cruz, Tenerife, C.I. O-C: Lady of Spain. English on Saturdays only. Mon., Wed., Fri., Sat. 3:15-4:15 p.m.

7.203 EAJ-8
41.64
San Sebastian, Spain. (see 10.370 mc.) Daily 3-4 a.m., 8-10 a.m., 1:30-4 p.m., 5-7 p.m.

7.200 YNAM
41.67
A. Majewsky, Gerente, Managua, Nicaragua, C.A. Daily 7-10 p.m. Veri—5c U. S. postage.

7.177 CR6AA
41.80
Lobito, Portuguese West Africa (see 9.666 mc.) Wed. and Sat. 2:45-4:30 p.m.

7.100 FO8AA
42.25
Radio Club Oceanien, Alfred T. Poria, Pres. Papette, Tahiti. Tues. and Fri. 11 p.m.-1 a.m.

7.030 EA9AH
42.67
El Coronel Jefe de Estado, de las Mayor de las Fuerzas, Militares, Apartado 124, Tetuan, Spanish Morocco, Africa. Daily 4-4:25 p.m.; 12-2:30 a.m. irregular.

7.010 XEME
42.80
Merida, Yucatan, Mexico. Daily 6-11 p.m.

6.975 HCETC
43.01
Apartado 134, Quito, Ecuador, S.A. Sat. and Mon. 7:45-9 p.m. Veri—5c U. S. postage. Very slow.

6.900 HI2D
43.48
Associated cia Dominicana, Ciudad Trujillo, Dom. Rep., W.I. Daily 6:40-8:40 a.m.; 10:40 a.m.-2:40 p.m.; 4:40-8:40 p.m.

6.900 TI2RS
43.48
Sr. Rogelia Sotela, Prop., San Jose, Costa Rica. Daily ex. Sun. 9:30-11 p.m.

6.850 TIOW
43.80
P. O. Box 45, Port Limon, Costa Rica, C.A. Weekdays 10-11:30 p.m.; Sun. 2-3 p.m.

6.820 XGOX
43.99
Central Broadcasting Committee of Kuomintang, Nanking, China. Chinese except English 8:15 a.m. E.S.T. O-C No regular selections. Weekdays 5:30-8:30 a.m. Sun. 7-9 a.m.

6.800 HI7P
44.12
Calle Jose Reyes No. 35, Ciudad Trujillo, Dom. Rep. W. I. Weekdays 12:40-1:40 p.m.; 6:40-8:40 p.m.; Sun. 9:40-10:40 a.m.

6.788 PZH
44.20
Paramaribo (Suriname), Dutch Guiana, S.A. Weekdays 2:45-4:45, 5:45-9:45 p.m. Sun. 9:45-11:45 a.m. Veri slow.

6.780 HIH
44.25
San Pedro de Macoris, Dom. Rep., W.I. Daily 12:10-1:40 p.m.; 7:40-9 p.m. Sun. 5:10-6:40 p.m. DX 2:40-3:40 a.m.

6.750 JVT
44.44
Nazaki, Japan (see 21.520 mc.) 2-2:30 a.m.; 4:30-7:30 a.m. Irregular.

6.730 HI3C
44.58
Sr. Roberto Palli, B., La Romana, Dom. Rep., W.I. English announcements regular. Weekdays 12:10-2:10 p.m.; 6-10-11 p.m. Sun. 12:10-2:40 p.m.

6.720 PMH
44.64
Bandoeng, Java D.E.I. (see PLP. 11.000 mc.) Weekdays 5:30-11 or 11:30 a.m., Sundays 5:30-11 or 11:30 a.m., 9:30 p.m.-1:30 a.m.

6.690 TIEP
44.84
Apartado 227, San Jose, Costa Rica, C.A. Daily 7-11 p.m.

6.668 HC2RL
44.99
P. O. Box 759, Guayaquil, Ecuador, S.A. O-C: Ecuadorian National Anthem. English each 15 mins. Sunday 5:30-7:30 p.m.; Tues. 9-11 p.m. Veri—5c U. S. postage.

6.630 HIT
45.25
Apartado 1105, Ciudad Trujillo, Dom. Rep., W.I. O-C: Anchors Aweigh. English. Daily exc. Sun. 12:10-1:40 p.m.; 6:10-8:40 p.m. DX 1st Sat. 11:10 p.m.-1:10 a.m.

6.618 El Prado
45.33
Apartado 98, Riobamba, Ecuador, S.A. English ea. 15 mins. O: Bugle call. Thursday 9:15-11:15 p.m. Veri—5c U. S. postage.

6.580 "Radio Guardia Civil"
45.59
Tetuan, Spanish Morocco, Africa O: March of the Caliph. C: Spanish National Anthem. I and S: chimes. Daily 2-3 p.m.; 7-8 p.m.

6.575 HCIVT
45.63
Ambato, Ecuador, S.A. Mon., Wed., Fri. 8-10:30 p.m. Veri 5c U. S. postage.

6.550 TIRCC
45.81
Apartado 1064, San Jose, Costa Rica, C. A. S: 4 notes on gong O-C: The Lost Chord—Organ. Tues., Thurs., Sat., 6-7 p.m. Religious Sundays 10 a.m.-7 and 8 p.m.; Thurs. 8 p.m.

6.545 YV6RB
45.84
Apartado, 34, Ciudad Bolivar, Venezuela, S.A. Daily 7:10 p.m.; Sun. 3-6 p.m.

6.535 YNIGG
45.91
Managua, Nicaragua, C.A. Daily 6-10 p.m.; Veri—5c U. S. postage.

6.520 YV4RB
46.01
Valencia, Venezuela, S.A. C: Bugle call, taps and off. Daily 11 a.m.-1:30 p.m.; 5:30-9:30 p.m.

6.500 HIL
46.15
Apartado 623, Ciudad Trujillo, Dom. Rep. W.I. Daily 12:10-1:40 p.m., 5:40-7:40 p.m.

6.500 YV1RM
46.15
Maracaibo, Venezuela, S.A. Daily 6-9:30 p.m.

6.482 HI4D
46.28
Ciudad Trujillo, Dom. Rep. W.I. Mon. & Sat. 11:55 a.m.-1:40 p.m.; 4:40-7:40 p.m.

6.480 EDR-4
46.30
Radio Poste, Palma de Mallorca Balearic Islands. Daily 4:30-5:15 p.m.

6.480 HIIL
46.30
Radioemisora Nacional "El Diario," Apartado 356, Santiago de los Caballeros, Dom. Rep., W. I. 1: Xylophone note O-C: Dominican National Anthem. Weekdays 7:30 a.m., 12-2 p.m., 5:30-9:30 p.m.

6.479 HI8A
46.30
Apartado 1312, Ciudad Trujillo, Dom. Rep., W.I. English each 15 mins. O-C: March General Alvaro Obregon. S: 2 strokes of bell. Daily 8:40-10:40 a.m.; 2:40-4:40 p.m.; Sat. 9:10-10:40 p.m.

6.450 HI4V
46.51
Mella No. 25, San Francisco de Macoris, Dom. Rep. O-C: National Anthem. Daily 2:40-4:40 p.m., 7:10-9:10 p.m.

6.430 HIIS
46.66
P.O. Box 112, Santiago de los Caballeros, Dom. Rep., W.I. Daily 11:40 a.m.-1:40 p.m.; 5:40-7:40 p.m.

6.420 YV6RC
46.73
Ciudad Bolivar, Venezuela, S.A. Daily 10:30 a.m.-1:30 p.m.; 4:30-9:30 p.m.

6.410 TIPG
46.80
Apartado 225, San Jose, Costa Rica, C.A. O-C: Parade of the Wooden Soldiers. Daily 7-9:30 a.m.; 12-2 p.m.; 4-11:30 p.m.

6.400 YV5RH
46.88
Apartado 1931, Caracas, Venezuela, S. A. Weekdays 11 a.m.-1:30 p.m.; 4:30-9:30 p.m.; Sun. 9:30 a.m.-1:30 p.m.; 5-7:30 p.m.

6.375 YV5RF
47.10
Apartado 983, Caracas, Venezuela, S.A. C: Organ: Blue Danube. Daily 6:30-7:30 a.m.; 10:30 a.m.-1:30 p.m.; 4:30-10:30 p.m.

6.360 YV1RH
47.17
P. O. Box 261, Maracaibo, Venezuela, S.A. O: Jealusie. C: Er Weicht der Sonne Nicht—march Weekdays 5:45-6:45 a.m.; 10:30 a.m.-1:30 p.m.; 3:30-10:30 p.m. English 10-10:30 p.m. Sunday 8:30 a.m.-2:30 p.m.

6.361 HRP1 — 47.24
Sr. Joaquin Mendoza, Director. San Pedro Sula, Honduras. C.A. O: March—Boy Scouts. C: National Anthem Honduras. S: gongs. Daily 12-2 p.m.; 8-10 p.m. Veri—5c U. S. postage.

6.340 HIIX — 47.32
Ciudad Trujillo, Dom. Rep., W.I. (see 15.280 mc.) Weekdays 12:10-1:10 p.m.; Tues. and Fri. 8:10-10:10 p.m.; Sun. 7:40-10:40 a.m.

6.330 JZG — 47.39
Nazaki, Japan (see 21.520 mc.) Irregular.

6.330 COCW — 47.39
Apartado 130, Havana, Cuba. Daily 7 a.m.-12 midnight.

6.325 YNLG — 47.43
Sr. Benjamin J. Guerra, L, Managua, Nicaragua. Daily 8-10 a.m., 1-3 p.m., 6 p.m.-12 a.m. Veri—5c U. S. postage.

6.315 HIZ — 47.51
Apartado 1092 and 771, Ciudad, Trujillo, Dom. Rep., W.I. Weekdays 11:10 a.m.-2:10 p.m.; 4:40-9:40 p.m. Sundays 11:40 a.m.-2:40 p.m.

6.300 YV4RD — 47.62
Sr. Luis Crosquer, Prop., Maracay, Venezuela, S.A. Weekdays 11:30 a.m.-12:30 p.m.; 5:30-9:30 p.m.

6.280 COHB — 47.77
P. O. Box 85, Sancti-Spiritus, Santa Clara, Cuba. Weekdays 9-10 a.m., 12-10 p.m. Sun. 10 a.m.-10 p.m.

6.280 HIG — 47.77
Av. Jose Trujillo No. 20, Ciudad Trujillo, Dom. Rep., W.I. Daily 7:10-8:40 a.m.; 12:40-2:10 p.m.; 8:10-9:40 p.m.

6.275 OAX4G — 47 81
Avda, Abancay, 915-923, Lima, Peru, S.A. C. Good Night Sweetheart. Daily 7-11:30 p.m.

6.270 YV5RP — 47.85
P. O. Box 508, Caracas, Venezuela, S.A. Daily 6-11:45 p.m.

6.250 YV5RG — 48.00
Sr. Edmundo Suegart, Prop., P. O. Box 1908, Caracas, Venezuela, S.A. Daily 5:30-9:30 p.m.

6.243 HIN — 48.05
Calle Arzobispo Merino #97, Ciudad Trujillo, Dom. Rep., W.I. English each 15 mins. (see 12.500 mc.) Weekdays 11:40 a.m.-2:40 p.m.; 7:10-9:10 p.m. Sun. 11:10 a.m.-3:40 p.m.

6.235 HRD — 48.11
Sr. Tulio Castaneda, Director, La Ceiba, Honduras, C.A. English on the hour. O: Solo Tuyo. C: Intermezzo No. 1. Piano 10:58 p.m. Good Night Melody. No signals. Daily exc. Sun.8-11 p.m.

6.230 YV1RG — 48.15
Radio Valera, Valera, Venezuela, S.A. S: 1 bell O-C: Local March. Daily 11 a.m.-12:30 p.m.; 5:30-9:30 p.m.

6.210 YV1RI — 48.31
Radio Coro, Coro, Venezuela, S.A. S: 4 marimba notes. Spanish Ann. each 15 m. O-C: March — The Three Colors. Daily 7:30-9:30 p.m.

6.206 HI8Q — 48.34
Julio O. Garcia Alardo, Ciudad Trujillo, Dom. Rep., W.I. Sunday only 5:40-9:40 p.m. (Daily later).

6.200 XEXS — 48.39
Secretaria de la Economia Nacional, Mexico, D.F. Daily 7-11 p.m.

6.190 HI1A — 48.47
P. O. Box 423, Santiago de los Caballeros, Dom. Rep. W.I. I: Gong C: Anchors Aweigh. Daily 6:40 a.m.-4:40 p.m.; Thurs. and Sundays, 7:40-9:40 p.m. Band concerts.

6.180 TG2 — 48.54
Director General of Electrical Communications, Guatemala City, Guatemala, C.A. Irregular 3-9 p.m. No IRC Required.

6.170 XEXA — 48.62
Mexico, D. F. (see 11.880 mc.) Weekdays 8:30-11 a.m.; 2:30-4:30 p.m.; 7 p.m.-12 a.m. Sunday 7 p.m.-12 a.m.

6.160 VPB — 48.70
Radio Club of Ceylon and So. India, P. O. Box 282, Colombo, Ceylon. S: Time on hour, 6 pips. I: Bow Bells, infrequently. Daily 6:30-11:30 a.m. Saturdays 12:30 p.m.

6.158 YV5RD — 48.72
Radio Venezuela, Caracas, Venezuela, S.A. I: 5 strokes of bell. O-C: Triunfo Aereo. Weekdays 6:30-7:30 a.m.; 10:30 a.m.-1:30 p.m.; 3:30-10 p.m. Sun. 8:30 a.m.-10:30 p.m.

6.150 OAX1A — 48.78
Sr J Carlos Montjoy D., Casilla No. 9, Chiclayo, Peru, S.A. Daily ex. Sat. 8-11 p.m., Sat. 8 p.m.-12 a.m

6.150 CJRO — 48.78
Winnipeg, Manitoba, Canada (see CJRX, 11.720 mc.) Weekdays 6 p.m.-12 a.m. Sundays 5-10 p.m.

6.150 HI5N — 48.78
Moca, Dom. Rep., W.I. Daily 6:40-8:40 a.m.; 10:40 a.m.-2:40 p.m. 4:40-8:40 p.m.

6.145 HJ4ABE — 48.82
Medellin, Colombia, S.A. I: Morse-letter "M" S: 4 chimes. Daily 9:30 a.m.-1 p.m.; 5-11:30 p.m.

6.140 W8XK — 48.86
Pittsburgh, Pa. (see 21.540 mc.) Daily 11 p.m.-1 a.m.

6.140 ZEB — 48.86
Bulawayo, Rhodesia, South Africa (see ZEC, 5.800 mc. for address). Sun. 3-5 a.m.; Tues. and Thurs. 1:15-3:15 p.m.

6.138 HJ4ABD — 48.88
Sr. Luis Emiro Mejia, Gerente, Medellin, Colombia, S.A. O-C: Part 4a William Tell (see 5.900-5.780 mc.) Weekdays 10 a.m.-2 p.m.; 4-11 p.m. Sun. 11 a.m.-3 p.m.; 7-11 pm. Veri slow.

6.137 CR7AA — 48.88
P.O. Box 594, Lourenco Marques, Portuguese East Africa. O: A Maria de Fonta. C: A Portuguesa. Weekdays 12:15-1 a.m.; 4:30-6:30 a.m.; 9:30-11 a.m.; 12:30-4 p.m. Sundays 5-7 a.m.; 10 a.m.-12:30 p.m.; 2-4 p.m.

6.130 VP3BG — 48.94
Crystal Broadcasting Co., Philharmonic Bldgs., Georgetown, British Guiana, S.A. O: Serenade. C: Good Night My Love and God Save The King. Week-days 10:15-11:15 a.m. 3-7:45 p.m. Sundays 6:45-8:45 a.m.; 4:45-6:45 p.m. Veri slow.

6.130 XEUZ — 48.94
Mexico D. F. (see 11.880 mc.) Daily 10 a.m.-1 p.m.; 7 p.m.-2 a.m. Dx 1-2 a.m.

6.130 ZGE — 48.94
Kuala Lumpur, Malaya States, S.S. Sun., Tues., Fri. 6:40-8:40 a.m.

6.130 LKJI — 48.94
Jeloy, Norway (see 9:530 mc.) Daily 11 a.m.-5 p.m.

6.130 COCD — 48.94
P.O. Box 2294, Havana, Cuba. English each 15 mins. O: In a Clock Store: C: Good Night. Weekdays 9 a.m.-1 a.m. Sundays 10 a.m.-8 p.m. (DX 1-3 a.m.)

6.130 VE9HX — 48.94
P.O. Box 998, Halifax, N.S., Canada. O-C: Oh Canada. Chimes 15 min. periods. Sun. 12 noon-11 p.m. Mon. to Fri. 7 a.m.-11p.m. Sat. 11 a.m.-11 p.m.

6.125 CXA4 — 48.98
Mercedes 823, Montevideo, Uruguay, S.A. Daily 8 a.m.-12 noon: 2-10 p.m.

6.122 OAX6A — 49.00
Munoz Najar 141, Casilla 293, Arequipa, Peru, S. A.
O-La Marcha de los Marino C—Nacional del Peru. Daily 7-11 p.m.

6.122 HP5H — 49.00
Voice of the People, Panama City, Panama, C. A. Daily 7-10 p.m.

6.122 HJ3ABX — 49.00
Apartado 26-65, Bogota, Colombia, S.A. Weekdays 10:30 a.m.-2 p.m.; 5:30-11:30 p.m. Sundays 12-1:30 p.m.; 6-11 p.m.

6.120 XEFT — 49.02 ◆
Veracruz, Mexico (see 9.550 mc.)

6.120 W2XE — 49.02 ◆
Wayne, N. J. (see 21.520 mc.)

6.115 OLR2C — 49.06
Prague, Czechoslovakia (see 21.450 mc.) S: Bells. Irregular (see 9.550-11.840-15.230 mc.)

6.110 GSL — 49.10 ●
Daventry, England (see 26.100 mc.) Daily 6:20-8:30 p.m.; 9:15-11:15 p.m.

6.110 XEGW — 49.10
Enrique Arzamendi, Gen'l. Mgr., Mexico, D.F. O-C: Vail a dolid Aztec—march. Daily exc. Mondays 11 a.m.-4 p.m.; 7 p.m.-12 a.m. Mondays 9 a.m.-4 p.m.

6.109 VUC — 49.10
1 Garstin Place, Calcutta, India. S: none. C: God Save The King. Daily 8 a.m.-12:30 p.m. 11 p.m.-12:30 a.m.

6.105.1 HJ6ABB — 49.14
Apartado 175, Manizales, Colombia, S.A. Daily 11 a.m.-1 p.m.; 5-8 p.m. Veri slow.

6.100 YUA — 49.18
Director, Bureau Central de Presse, Belgrade, Yugoslavia. S: Short tune on flute. O-C: National Anthem. Daily 12:45 a.m.-8:30 a.m., 1-6 p.m.

6.100 W9XF — 49.18
20 N. Wacker Drive, Chicago, Ill. O-C: Star Spangled Banner. Daily 6-9:05 p.m.-1:05-2 a.m.

6.100 W3XAL — 49.18
Bound Brook, N. J. (see 17.780 mc.) Daily 9 p.m.-1 a.m.

6.097.5 ZRJ — 49.20
African Broadcasting Co., Inc., P.O. Box 4559, Johannesburg, South Africa. Physical session. O: Bugles—Reveille. C: Cook. House. I: chimes. C: God Save The King. Weekdays 11:45 p.m.-12:45 a.m.; 3:15-7:30 a.m.; 9-11:30 a.m. 8:30-11:30 a.m. Sat.) Sunday 3:30-4:30 a.m. or 4-5 a.m., 8-11:30 a.m.

6.097.5 ZRK — 49.20
Klipheuvel, South Africa. Weekdays 12 noon-4 p.m. Sundays 12 noon-3:20 p.m.

6.095 JZH — 49.22
Nazaki, Japan (see 21.520 mc.) Irregular.

6.090 CRCX — 49.26 ●
Rural Route No. 4, Bowmansville, Ont., Canada. Weekdays 7:45 a.m.-5 p.m. Sunday. 10:45-5 p.m.

6.090 ZWB-2 — 49.26
Hong Kong, China (see 9.525 mc.)

6.090 XEBF — 49.26
Insurgentes 34, Jalapa, Mexico. Daily 7-11 p.m.

6.085.7 HJ5ABD — 49.30
Cali, Colombia, S.A. Daily 11 a.m.-2 p.m.; 6-11 p.m.

6.082 VQ7LO — 49.33
P.O. Box 777, Nairobi, Kenya, Colony, Africa. English used. C: God Save The King. Time signal 6 pips on hour. Daily exc. Sunday 5:30-6 a.m. Daily 11:15 a.m.-2:15 p.m. Tues. and Thurs. 8:15-9:15 a.m.

6.082 OAX4Z — 49.32
Lima, Peru (see DAX4T, 9.562 mc.) Daily 7-11:30 p.m.

6.080 W9XAA — 49.34
Chicago, Ill. (see 17.780 mc.) Weekdays 7-8:30 a.m., 8-11 p.m., Sun. 11 a.m.-1 p.m., 8-11 p.m.

6.080 ZHJ — 49.34
Penang Wireless Society Headquarters, 40 Perak Road, Penang, S.S. O: Chimes, Vocal song, "Land of Hope and Glory". C: "God Save the King". Weekdays 6:40-8:40 a.m.

6.080 VE9CS — 49.34
743 Davie St., Vancouver, B.C., Canada. O: O Canada: C, God Save The King. S: 3 strokes gong. Sun. 12 noon-1:30 a.m. Mon., Thurs., Sat. 9:30 a.m.-8:30 p.m. Tues., Wed., Fri. 9:30 a.m.-2:30 a.m.

6.080 HP5F — 49.34
Hotel Carlton, Colon, Panama, C.A. Weekdays 11 a.m.-1 p.m.; 7-10 p.m.; Sun. 10:45-11:30 a.m. 7-10 p.m.

6.080 XEWW — 49.34
Apartado 2516, Mexico D.F. Irregular (see 9.500 mc.)

6.079 DJM — 49.35
Zeesen, Germany (see 17.760 mc.) Irregular.

6.075 XECU — 49.38
Hidalgo 579, Guadalajara Jal., Mexico. O-C: Ojos Tapatios. I: Train in motion. Daily 9-11 a.m.; 1-4 p.m.; 8-11 p.m. or 12 a.m.

6.072 GER-2 — 49.41
Wien, Austria. (Alternates days with 11.801 kc.) Weekdays 9 a.m.-5 p.m. Sat. to 6 p.m.

6.070.5 HJ3ABF — 49.42
Apartado 317, Bogota, Colombia, S.A. C: Good Night Sweetheart. Daily 11 a.m.-2 p.m. 6-11 p.m. Veri Slow.

6.070 YV1RD — 49.42
P. O. Box 100, Maracaibo, Venezuela, S. A. Daily 8 p.m.-12 a.m.

6.070 VP3MR — 49.42
16, Robb and Hincks Sts., Georgetown, British Guiana, S.A. S: Time signals, studio clock. O: The Bond of Friendship. C: Ted Lewis' Goodnight Melody and God Save the King. Veries—I.R.C. or coin. Weekdays 4:15-8:15 p.m. Sundays 7:45-10:45 a.m.

6.070 CFRX — 49.42
37 Bloor St., West, Toronto, Ontario, Canada. Week days 7:30 a.m.-12 midnight. Sunday 10:30 a.m.-12 midnight.

6.065 XEXR — 49.46
Departmento Autonomo de Propaganda y Publicidad, Mexico, D. F. Daily 6-11:30 p.m.

6.065 SBO — 49.46
Motala, Sweden (see 11.705 mc.) Daily 1:30-5 p.m.

6.060 W8XAL — 49.50
Crosley Radio Corp., Cincinnati, Ohio. Daily 6 a.m.-8 p.m., 10 p.m.-2 a.m.

6.060 W3XAU — 49.50
Philadelphia, Pa. (see 9.590 mc.) Daily 8-11 p.m.

6.060 OXY — 49.50
Statsradiofonien, Helbergsgade 7, Copenhagen, Denmark. O: one gong stroke. C: There is a Winsome Land. Irregular.

6.054.3 HJ6ABR — 49.55
Pereira, Caldas, Colombia, S. A. No English. Official March—El Hombre Payaso. C: Overture — Chorus Voices. No signals. Daily 9:30 a.m.-12 noon; 6:15-10 p.m.

6.050 GSA — 49.59 ●
Daventry, England (see 26.100 mc.) Daily 12:20-4 p.m.

6.050 XEXF — 49.59
Secretaria de la Economia Nacional, Mexico, D. F. Daily 8 p.m.-12 a.m.

6.045 XETW — 49.62
Francisco I. Madero, 10, Tampico, Mexico. Weekdays 10:45 a.m.-10 p.m., Sundays 10:45 a.m.-4 p.m.

6.042.3 HJ1ABG — 49.65
Apartado 674, Barranquilla, Colombia S.A. S: 1 gong with chimes ea. ¼ H. O-C: National Anthem. Daily 11 a.m.-11 p.m.; Sun. 11 a.m.-9 p.m.

6.040 YDA — 49.67
Tandjong Priok, Java N. E. I. (see 15.150 mc.) Daily 7:30 p.m.-2 a.m.

6.040 W4XB — 49.67
Herald Bldg., Miami, Fla. Schedule not known.

6.040 W1XAL — 49.67
Boston, Mass. (see 21.460 mc.) Sun. 7 or 8-9 p.m.; Mon. to Fri. 7-9 p.m.; Fri. 9-10 p.m.

6.030 OLR2B — 49.75
Prague, Czechoslovakia (see 21.450 mc.) Irregular. (see 9.550-11.840-15.230 mc.)

6.030 HP5B — 49.75
P.O. Box 910, Panama City, Panama, English and Spanish. O-C: March, Panama. No signals or bells. Daily 11:30 a.m.-1 p.m.; 5-10 p.m.

6.030 VE9CA — 49.75
Toronto General Trust Bldg., Calgary, Alberta, Canada. C: Lights Out. S: None. Weekdays 9 a.m.-1 a.m. Thurs. to 2 a.m. Sun. 12 noon-12:30 a.m.

6.030 XEBQ — 49.75
Astillero 35, Mazatlan, Mexico. Daily 8-11:30 p.m.

6.028 HJ4ABP — 49.77
Emisora Claridad, Medellin, Colombia, S. A. Daily 8 a.m.-11 p.m.

6.020 OJC — 49.83
Zeesen, Germany (see 17.760 mc.) Daily 10:40 a.m.-4:30 p.m.; 4:50-10:45 p.m.

6.020 XEUW — 49.83
Av. Independencia 98, Veracruz, Mexico. S: Marimba. O: March Victoria. C: La Golondrinas. Daily 8 a.m.-12 midnight.

6.015 HI3U — 49.88
Apartado 23, Santiago de los Caballeros, Dom. Rep., W.I. O-C: Organ Maria My Own. Weekdays 7:10-8:40 a.m.; 10:40 a.m.-1:40 p.m.; 4:40-9:40 p.m. Sun. 10:40 a.m.-1:40 p.m. only.

6.015 XEWI — 49.88
Mexico, D.F. (see 11.900 mc.) Irregular.

6.010 PRA8 — 49.92
Pernambuco, Brazil, S. A. Daily 6-10 p.m.

6.010 VK9MI — 49.92
M. V. Kanimbla, Sydney, Australia (see 11.710 mc.) 11 p.m.-7:35 a.m.

6.010 COCO — 49.92
P.O. Box 98, Havana, Cuba. English and Cuban. Daily 8 a.m.-10 p.m.

6.010 49.92	CJCX	Eastern Broadcasters, Ltd., Radio Bldg., Sydney, N. S., Canada. Irregular.
6.010 49.92	OLR2A	Prague, Czechoslovakia (see 21.450 mc. Irregular (see 15.230-11.840-15.230 mc.)
6.007 49.94	ZRH	Roberts Heights, South Africa (see ZRJ 6.097.5 mc.) Weekdays 10 a.m.-4 p.m., Sat. to 4:45 p.m., Sundays 10:30 a.m.-12 noon, 12:15-3:15 p.m.
6.007 49.94	Radio Burma	Burma Independent Wireless, Rangoon, Burma C: God Save the King. Daily 9:10-9:40 a.m.
6.005 49.96	HP5K	P.O. Box 33, Colon, Panama, C.A. S: 3 chimes, ea. 15 m. O-C: Merry Widow Waltz. Daily exc. Sun. 7-9 a.m.; 11:30 a.m.-1 p.m.; 6-11 p.m. Sun. 10 a.m.-12 a.m.
6.005 49.96	CFCX	P.O. Box 1690, Montreal, Quebec, Canada. Weekdays 7:44 a.m.-1 a.m. Sundays 9 a.m.-11:15 p.m.
6.005 49.96	VE9DN	Montreal, Quebec, Canada (see CFCX, 6.005 mc.) Sat. 11 p.m.-12 a.m. Fall, winter and spring.
6.000 50.00	CXA2	Rio Negro, Montevideo, Uruguay, S.A. O: Voluntary Trumpeter. C: Good Night Melody. Daily 10:30 a.m.-10:30 p.m.
6.000 50.00	XEBT	P.O. Box 79-44 Mexico, D.F. I: 3 blasts on cookoo horn. Siren near closing. O: Las Mananitas. C: Lieberstraum. Daily 10 a.m.-12:15 a.m.
6.000 50.00	FIQA	Director of Posts and Telegraphs Tananarive, Madagascar. Daily 12:30-12:45 a.m.; 3:30-4:30 a.m.; 10-11 a.m.
6.000 50.00 ◆	RV59	Moscow, U.S.S.R. (see RKI, 15.040 mc.) No I.R.C. required.
5.977 50.19	Radio Renascenca	Rua Capelo, 5, Lisbon, Portugal, OC: Our Lady of Fatima. I: none. Daily 2:30-4:30 p.m. Sunday and Thursday 6-7 a.m.
5.970 50.25	OAX4P	Cuzco 25, Huancayo, Peru, S. A. Daily 12-1 p.m., 9 p.m.-12:30 a.m.
5.969 50.26	HVJ	Vatican City (see 15.121 mc.) 2-2:15 p.m. Sun. 5-5:30 a.m.
5.955 50.35	HJN	Minister of Education Nacional, Bogota, Colombia. Daily 11 a.m.-2 p.m.; 5-10:30 p.m.
5.940 50.51	TG2X	De la Policia Nacional, Guatemala City, Guatemala, C.A. Daily 4-6 p.m. Mon., Thurs., Sat. 10-11:30 p.m. Sundays 1-2 p.m. No I.R.C. required.
5.930 50.59	PJCI	Curacaosche Radio Vereeniging, Willemstad, Curacao, N.W.I. O: Electrical gong, 4 strokes and repeat 5 mins. O-C: National anthem. Weekdays 6:36-8:36 p.m. Sun. 10:36 a.m.-12:36 p.m.
5.930 50.59	YVIRL	P.O. 247, Maracaibo, Venezuela, S.A. Weekdays 11 a.m.-1 p.m.; 4:30-9:30 p.m. Sun. 8:30 a.m., 2:30 p.m.
5.910 50.76	YV4RH	Valencia, Venezuela, S.A. Daily 8-11:30 p.m.
5.910 50.76	HH2S	Port-au-Prince, Haiti, W.I. (see 11.570 mc.) Daily 7-10 p.m.
5.905 50.80	TILS	P.O. Box No. 3, San Jose, Costa Rica, C.A. S: none. O: Washington and Lee Swing. C: Adios Mi Chapparrita. Weekdays 12-3 p.m.; 6-11 p.m. Sundays irregular.
5.900 50.84	ZNB	Government Engineer, Mafeking, South Africa. Mon. to Fri. 1-2:30 p.m. Sun. 1:30-2:30 p.m.
5.900 50.85	HJ4ABD	Medellin, Colombia, S.A. (see 6.138-5.780 mc.) Weekdays 10 a.m.-2 p.m.; 4-11 p.m. Sun. 11 a.m.-3 p.m.; 7-11 p.m. Veri slow.
5.885 50.98	HI9B	P.O. Box 95, Santiago de los Caballeros, Dom. Rep., W.I. O-C: Piano Solo—Vals Evocation. Weekdays 7:25-8:40 a.m.; 11:55 a.m.-2:10 p.m.; 4:55-7:40 p.m. Sundays 11:40 a.m.-2:40 p.m.
5.880 51.02	YV3RA	Barquisimeto, Venezuela (see YV3RB, 9.565 mc.) Daily 11:30 a.m.-12:30 p.m.; 5:30-9:30 p.m.
5.875 51.11	HRN	Tegucigalpa Honduras, C.A. C: Good Night Melody (Ted Lewis) Daily 7-10 p.m. Veris—10c U. S. cash. Veri slow.
5.865 51.15	HI1J	Apartado 204, San Pedro de Macoris, Dom. Rep., W.I. O-C: Waltz, Sweet Remembrance. English very seldom. S: none. Daily 11:40 a.m.-1:40 p.m.; 5:40-9:40 p.m.
5.850 51.28	YVIRB	P.O. Box 37, Marcaibo, Venezuela, S.A. English and Spanish. O-C: Strike Up The Band. Daily exc. Sun. 10:45 a.m.-12:45 p.m.; 4:45-9:45 p.m. Sun. 8:45 a.m.-9:45 p.m.; Mon., Wed., Fri. 5:45-8:15 a.m. Tues., Thurs., Sat. 5:45-9:45 a.m.
5.830 51.46	TIGPH	Apartado 800, San Jose, Costa Rica, C.A. C: Good Night Melody (Ted Lewis). Weekdays 8-11 p.m.
5.813 51.61	TIGPH-2	Apartado 800, San Jose, Costa Rica, C.A. C: Good Night Melody. Daily 7-11 p.m.
5.800 51.72	YV5RC	P.O. Box 2009, Caracas, Venezuela, S.A. I: 4 chimes. O-C: Official 1BB March. Bugles, whistles before closing. Sundays 8:30-11:30 a.m., 3:30-9:30 p.m. Weekdays 7-8 a.m., 10:30 a.m.-1:30 p.m., 3:45-10 p.m. (off Mondays 9:45 p.m.)
5.800 51.72	ZEC	P.O. Box 792, Salisbury, Rhodesia, South Africa. Sun., 3-5 a.m.; Tues. and Fri. 1:15-3:15 p.m.
5.780 51.90	OAX4D	All American Cables, Ltd., Casilla 2336, Lima, Peru, S.A. Signs on and off Morse code. No signals. English and Spanish. Wed., Sat. 9-11:30 p.m.
5.780 51.90	HJ4ABD	Medellin, Colombia, S.A. (see 6.138-5.900 mc.) Weekdays 10 a.m.-2 p.m.; 4-11 p.m. Sun. 11 a.m.-3 p.m.; 7-11 p.m. Veri slow.
5.758 52.10	YNDP	Radio Bayer, Managua, Nicaragua, C.A. Weekdays 8:30-10:30 p.m. Veri—5c U. S. Postage.
5.755 52.13	YV2RA	San Cristobal, Venezuela. English occasional and at closing. S: 6 strokes gong. O-C: March, El Capitan. Weekdays 11:30 a.m.-12:30 p.m.; 5:30-9 p.m. Sun. 5:30-10 p.m.
5.725 52.40	HCIPM	P.O. Box 664, Quito, Ecuador, S.A. O-C: La Marcha de Aida. Saturdays 9-11 p.m.
5.713 52.51	TGS	Casa de Presidencial, Guatemala City, Guatemala, C.A. Sun., Wed., Fri. 6-8 p.m. No. I.R.C. necessary.
5.146 58.30	PMY	Bandoeng Radio Society, Nillmy Bldg., Bandoeng, Java, N.E.I. O: March, Le Rene Passe. C: On chimes, Good Night and National Anthem. Sun. 6:30 p.m.-1:30 a.m. 4-10:30 a.m. Mon. to Fri. 5:30 p.m.-2:30 a.m. 4-10:30 a.m. Sat. 5:30 p.m.-2 a.m. 4-11:30 a.m.
4.900 61.22	HJ3ABH	Apartado 565, Bogota, Colombia, S. A. I: 3 chime notes. Weekdays 11:30 a.m.-2 p.m. 6-11 p.m. Sunday 12-2 p.m.; 4-11 p.m.
4.841 61.97	HJ3ABD	Apartado 509, Bogota, Colombia. O: Pari Ti Rio Rita. C: Rio Rita and National Anthem. Weekdays 9 a.m.-2 p.m., 6 p.m.-12 a.m., Tues. and Thurs. to 3 p.m. Wed. and Fri. begin 5:30 p.m.
4.820 62.24	HJ7ABB	Santander Broadcasting, Bucaramangs, Colombia, S. A. 6-11 p.m.
4.810 62.37	YDE2	Solo, Java, N.E.I. (see 15.150 mc.) Daily 5:30-11 a.m.; 5:45-6:45 p.m.; 10:30 p.m.-2 a.m.
4.790 62.63	HJ2ABC	Sr. Pompilio Sanchez, Prop., Cusuta, Colombia, S.A. Daily 11 a.m-12 noon, 6:30-9 p.m.
4.780 62.76	HJ1ABB	Apartado 715 Barranquilla, Colombia, S.A. I: 3 chimes. S: 1 chime between advertisements. C: La Golondrina 7-9 a.m. 11-1 p.m., 5:30-10 p.m.
4.740 63.29	HJ6ABC	Ibague, Colombia, S.A. Daily 6-11 p.m.
4.660 64.38	HJ2ABJ	Santa Marta, Colombia, S.A. Daily 11:30 a.m.-2 p.m.; 5:30-10:30 p.m.
4.600 65.22	HC2ET	P.O. Box 824, Guayaquil, Ecuador, S.A. I: 12 chimes. Wed. and Sat. 9:15-10:45 p.m. Veri—5c U. S. postage.
4.420 67.87	ZMBJ	Wellington, N. Z. (see 13.600 mc.)
4.273 70.21	RV15	Radio Committee, Khabarovsk, U.S.S.R. English, 2 a.m., EST and at announcements. Daily exc. 6th 12-18-24-30th 3 p.m.-8 a.m. On 6-12-18-24-30th 7:10 p.m.-8 a.m. English programs start at 2 a.m. No I.R.C. necessary.
4.107 73.05	HCJB-2	Quito, Ecuador, S.A. (see 8.831 mc.)
4.002 75.00	CT2AJ	Ponta Delgada, Island of St. Michael, Azores. Wed. and Sat., 5-7 p.m.
3.040 98.68	YDA	Batavia, Java, N.E.I. (see 15.150 mc.) Weekdays 5:30-10 a.m. (Sat. 11:30 a.m.) 6-7:30 p.m., 10:30 p.m.-2 a.m. Sun. 5:30-10 a.m., 7:30 p.m.-2 a.m.

"PITC" EQUIPMENT

(Continued from page 75)

munication work. A p-m speaker is built into the cabinet and jacks are provided for employing headphones in either the first or second a.f. stages. The tubes, of the heater type, are energized from a 6-volt section of the storage-battery supply, the required plate supply of 40 ma. at 200 volts being derived from a Pioneer Genemotor. The receiver and Genemotor add another 5 amperes to the storage battery load.

Upon the completion of the transmitter it was subjected to rigorous tests in an endeavor to detect any defects that might exist. It was then put on the air under actual operating conditions at W1BES using a frequency of 14,165 kc. and several stations contacted. Using the same antenna signal reports averaged only two R's under the kilowatt rig on 14,166 kc. normally used at W1BES. Under ideal radio conditions such as exist at Pitcairn Island, and avoiding the QRM of the American phone band, PITC should have no difficulty in being heard in every quarter of the world.

The services of the Rocke International Export Corporation were enlisted, and through their cooperation the shipment of the seven cases of equipment left New York on January 8th from Pier 60 on the Panama-Pacific liner *Pennsylvania* to connect with the New Zealand Shipping Company's *Arangitiki*, which sailed December 1st from Cristobal for Auckland. If conditions permit a stop at Pitcairn on this voyage, the equipment should be in Andrew Young's hands by the first week in February.

The author desires to extend his thanks to the companies listed, for their cooperation and donations of equipment which brought the original idea to a successful conclusion: Aerovox Corp., American Lava Corp., Amperex Electronic Products, Bassett Research Corp., Bliley Electric Co., Allen D. Cardwell Mfg. Corp., Coto-Coil Co., Inc., Eby Manufacturing Co., Kenyon Transformer Co., Ohmite Manufacturing Co., Par-Metal Products Corp., Parris-Dunn Corp., Pioneer Genemotor Corp., RCA Radiotron Corp., E. M. Sargent Co., Shure Brothers, Triplett Electrical Instrument Co., Willard Storage Battery Co., Rocke International Export Corp., Panama-Pacific S. S. Co., New Zealand Shipping Co.

Last Minute Flash!

Shipment was held up for a month so that the author could accompany the equipment to the island. He will install the station and instruct Andrew Young in its operation. An ample supply of QSL cards with the amateur call VD6-A donated by the Kenyon Transformer Company will be taken to the island by the author who will attempt to contact American amateurs on either 14,346 or 7245 kc. Who will be the first to receive a QSL card from this new radio outpost?

U. H. F. SUPERHET

(Continued from page 70)

will then not be affected by the silencer action, but the auto noise will be balanced out.

The remaining features of the receiver follow standard design practice. A beat oscillator stage, using the b.f.o. transformer T3, is coupled to the diode plate through a small capacity made up of two parallel insulated wires, one to the 6H6 diode plate and the other to the 6J7 plate. They should be loosely twisted to hold their position. The length of these wires will determine their mutual capacity, and this should be adjusted for the desired coupling between the two tubes. Too great a coupling will reduce the effectiveness of the noise silencer on code signals. A lesser degree of coupling than commonly used on standard low-frequency receivers provides best results.

Two stages of audio are employed. With the audio gain control, R25, in the position shown this control will be found to be effective for both the phones and speaker. The switch, SW, serves several purposes. In its upper position it places the phones in circuit, while in its lower position the 6F6 power tube and speaker are cut in. In the center position the positive high-voltage lead to all tubes is opened. This switch therefore serves as both the phone-speaker and standby switch.

Both the phones and speaker output jacks are dead insofar as any d.c. voltages are concerned. The 2000-ohm winding of the output transformer, T4, connects to the output jack, J1, permitting the use of any magnetic speaker or dynamic speaker with high-impedance input. This transformer also contains a 10-ohm winding, which may be used for connection directly to the voice coil of a dynamic speaker.

Carrier Level Indicator

The carrier level indicator, M, is connected into a standard bridge circuit. The change in plate current of the two 6K7s in the i.f. stages, resulting from the the application of a.v.c. voltage to their grids, "upsets" the original balance of the bridge circuit. The meter is adjusted to this original zero reading by means of R32. This variable resistor is mounted on the chassis just to the rear of the meter and is adjustable from above by means of the knob shown.

Switch SW1 is a three-purpose switch, handling the a.v.c., b.f.o. and meter circuits. As the meter is only operative when the a.v.c. is on, this switch conveniently switches the meter out of circuit in the other two positions. This is desirable as the meter would go off scale in these latter two positions if not shorted out. The calibration of the meter will only hold for one certain position of the i.f. gain control R30. With SW1 in the "AVC ON" position, R30 should be placed in the maximum gain position before adjusting R32 for zero reading of the meter with no signal. If the operator does not agree with the calibration of the meter for a given signal strength, this calibration may be changed by replacing the 100,000-ohm resistor, R35, with one of another value, readjusting R32 for zero position. The smaller this resistor the greater will be the meter reading for a given signal, and vice-versa.

Tracking Adjustments

No extra padding or series condensers are used in the three high-frequency tuned circuits for tracking purposes, as their addition would reduce the amount of inductance possible in these circuits. This would be particularly detrimental on the 2.5-meter range.

Satisfactory tracking over the ham bands can be secured, however, by merely adjusting the inductance of the coils so that all three circuits can be resonated at some frequency near the center of the band being tracked when all three tuning condensers are in identical positions.

To facilitate this adjustment the coupling between the detector condenser and the PWO drive unit should be temporarily loosened so that the detector and r.f. condensers may be turned with this coupling independently of the oscillator condenser. Once the turns of the coils, and their spacing, are adjusted for identical settings of the condensers on the test frequency, this coupling may be tightened and the final adjustment made with a Tuning Wand. With the test signal turned in, the ends of the Wand should be inserted in the coils of the r.f. and detector stages. An increase in signal with the iron core end indicates the need of added inductance, which result is accomplished by squeezing the turns together. Increase of signal with the brass end inserted indicates the need of less inductance, the turns being pulled apart slightly in this case. True resonance is indicated by a reduction of signal with either end of the Wand inserted in the coil.

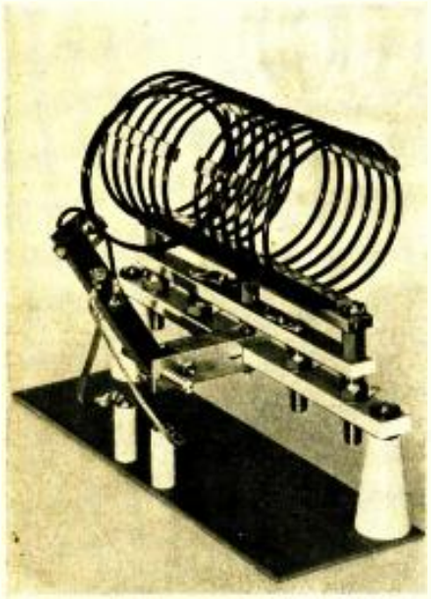
The position of the cathode tap on the detector coil, L1, determines the amount of regeneration present in this stage. This tap should be adjusted so that oscillation of the detector stage is attained with the regeneration control, R5, set at about the two-thirds position. This regeneration in the detector stage is helpful in increasing the gain, image ratio, selectivity and signal-to-noise ratio of the receiver to a marked degree.

(Continued on page 101)

ON THE MARKET

B & W SWINGING LINK

BARKER & WILLIAMSON, Ardmore, Pa., have introduced two swinging link assemblies for accurate control of loading and excitation in the final stages of a transmitter. The use of an independent link and base assembly permits front-of-panel control of coupling, making it unnecessary to resort to makeshift means of control as is necessary with integral link systems.



Type TVI. Swinging Link Assembly has a rating of 250 watts, while the Type HDVI. has a kilowatt rating. ALL-WAVE RADIO.

◆

NEW RECORD CHANGER

A NEW QUALITY Record Changer has been placed on the market by the Garrard Sales Corporation, 17 Warren St., New York, N. Y. This Record Changer will play either eight 10-inch or eight 12-inch records. Many unusual features are incorporated.

The Record Changer is available for operation from any current, and also with crystal pickup. ALL-WAVE RADIO.

TRANSDUCER BULLET MIKE

THE NEW MODEL MK-20 low-priced Bullet Microphone placed on the market by the Transducer Corporation, 30 Rockefeller Plaza, New York, N. Y., is of the dynamic type housed in a "microscope finish" black metal case.

This microphone is 3 inches long and 2 inches in diameter. The low-impedance type is approximately 200 ohms and the high-impedance type approximately 50,000 ohms. The sensitivity is said to be —55 db., and the frequency range in conformance with present-day standards. Both types are supplied with cable connector. ALL-WAVE RADIO.

◆

OHMITE RHEOSTAT DIALS

SPECIALLY DESIGNED dial plates are now available for Ohmite Vitreous Enameled Rheostats, to provide easy and accurate setting of the rheostat—a large 5½" size for Ohmite Rheostat Models N, R, and U —and a smaller 2 3/16" size for Models H, J, K, and L.

The plates are brass and etched black. The dials are calibrated numerically and read directly in percentages of resistance in the circuit. Areas instead of lines indicate the zero and the one hundred positions, enabling the dials to be used on rheostats with slightly different angles of rotation.

The large dial has two holes for mounting to the panel. The small dial is held to the panel by the same nut which holds the rheostat and is automatically aligned by means of a hole which fits over the projecting lug from the rheostat non-turn washer.

A sturdy 3¼" knob (for ⅜" shaft) of black bakelite with a brass insert is also available and may be had with a pointer for use with the 5½" dial, or without pointer when so desired.

Various knobs for ¼" shafts for use with the small dials are also available. Ohmite Manufacturing Company, Chicago Ill. ALL-WAVE RADIO.

NEW PAR-MET CATALOG

PAR-METAL Products Corporation, 35-25 41st St., Long Island City, N. Y., has available for free distribution their new 24-page catalog listing the company's complete line of Amateur and Commercial Racks, Panels, Chassis and Cabinets.

Write to the manufacturer for your copy, requesting "Catalog 38." ALL-WAVE RADIO.

◆

UNIVERSAL MOUNTING PROMOTES SAFETY

A NOTABLE ADVANCE toward increased safety in operation of high-voltage power supplies is credited to the Cornell-Dubilier Electric Corporation. Recently this capacitor manufacturer came out with a universal mounting bracket, supplied at no extra cost with each high-voltage filter capacitor, which permits either upright or inverted mounting.

Radio amateurs and other users of high-voltage power supplies will welcome this mechanical improvement applied to the C-D type TJ-U line of dykanol filter capacitors. The idea behind this innovation is to minimize the risk of "shocking"

accidents by considering safety as part of the power supply's construction, rather than the exercising of caution during the apparatus' operation. By easily mounting high-voltage filter condensers in an inverted position so that high voltage terminals are under the chassis, the grim meaning of the sign: "danger—high voltage" is softened quite a bit. ALL-WAVE RADIO.

◆

NEW KENYON SALES MANAGER

KENYON TRANSFORMER CO., Inc., 840 Barry Street, New York, announce the appointment of W. G. (Bill) Many as sales and advertising manager of that company.

Mr. Many needs no introduction in the radio parts industry, having been identified in leading sales, advertising and editorial circles for the past 23 years and is well equipped to fill his new post. Oldtimers in radio will remember him in the early days as Associate Editor of "Modern Electrics and Mechanics," Sales Manager

(Continued on page 113)

(Continued from page 99)

Results

This receiver will be found to perform as nicely on the ultra-high-frequency bands as the standard superhet on the other ham bands. The noise silencer will remove practically all auto ignition noise regardless of the strength of the signal being received. This removes the major objection to the use of the superhet type of receiver on these bands. Any noise silencer circuit is more effective on the higher i.f. frequencies than the standard 465 kc. On this particular receiver ignition noise may be entirely forgotten as far as interference to signals is concerned.

The degree of selectivity with the adjustments detailed previously is optimum for operation on all three bands, providing best reception of the majority of the stations. Greater or lesser selectivity will be desirable for exclusive operation on any one band. The maximum obtainable degree of selectivity would be desirable for 10 meters, this being accomplished by adjusting the i.f. frequency nearer 3000 kc. and reducing the coupling of the i.f. transformers.

The signal-to-noise ratio is far superior to the various types of super-regenerative receivers in use in most stations. Weak stations lost in the hiss level of this type of receiver are 100% readable on the super. Users of similar receivers report reception of distant stations on the 5-meter band never heard on super-regenerative receivers.

The receiver is finished in the new gray wrinkle finish. This finish is obtainable on special order from the dealers handling this cabinet line at a slightly increased cost. The gray finish of the dial on the National PWO drive, now standard for these units, matches the gray of the cabinet and panel very closely.

Power Supply Requirements

No previous mention has been made of the power supply. Any well-filtered unit providing 250 to 300 volts d.c. and 6.3 volts a.c. will be found satisfactory. Please note that the chassis of the receiver *cannot be directly connected to the chassis of the power supply*. This would short resistors R28 and R29, blocking the receiver through the noise-silencer diode.

UNIVERSAL CLIPPER

(Continued from page 80)

detector, the grid circuit of which is tuned. The super-regenerative action is also developed in the detector circuit. The detector is impedance-coupled to the 6J5 first audio tube which in turn is re-

sistance-coupled to a 25L6 beam-power output tube. The 25L6 feeds the dynamic speaker through the usual type of output transformer.

The power-supply rectifier is a 25Z6G. The filter in the output consists of two 16-mfd. electrolytic condensers and the 450-ohm speaker field which serves also as the filter choke.

The heaters of the five tubes are connected in series and are fed directly from the power line through a 153-ohm series resistor contained in the power cord. Regeneration and super-regeneration are controlled by means of a potentiometer in the plate circuit of the detector tube. This control alters the plate voltage on the detector. The volume control potentiometer is in the grid circuit of the first a.f. tube. The phone jack is in the output circuit of this tube. A blocking condenser is placed in series with the plate lead to the jack to keep high voltage out of the phones.

Three tip jacks—two red and one black—on the receiver chassis accommodate the ultra-high-frequency plug-in coils. Normally the black and one red jack are connected by means of a jumper, as indicated by the dotted line in the diagram. Under these conditions the main tuning inductance and the 350-mmfd. shunt tuning condenser are connected to the grid of the detector tube. This also places the 10-mmfd. bandspread condenser in shunt with the main tuning condenser. When the ultra-high-frequency plug-in coils are used the jumper is removed, thus disconnecting the low-frequency tuned circuit from the detector grid. The u.h.f. coils are plugged into the two red jacks—marked "R" in the diagram—which automatically place the coil in use in shunt with the variable bandspread condenser.

Air Tests

A conventional L-type antenna was used on all bands during the tests on the Universal Clipper. In analyzing the results obtained, it was kept in mind that the receiver is quite low in price. Opinions therefore, are based on efficiency of operation in relation to cost.

There can be no complaint regarding the controls—all are smooth-operating and positive in action. There is sufficient bandspread available to permit easy separation of crowded stations in the short-wave broadcast and amateur phone bands. The regeneration control is free from abruptness and it is no trick to ease up close to the point of oscillation without the detector circuit spilling over. Moreover, regeneration is fairly constant over wide frequency ranges. In the standard broadcast band, for instance, maximum regeneration is obtained at 50 degrees on the regeneration control scale with the receiver tuned to 1450 kc., and at 70 degrees with the receiver tuned to 555 kc. In the 2700-7500 kc. range the readings were 35 and 25 degrees respectively—a correction of only 10 degrees for the entire band.

The isolation of the tuned detector circuit from the antenna system by means of the r.f. stage effectively prevents dead spots and adds to the constancy of regeneration control. The r.f. stage also provides additional gain without circuit complications that would most assuredly boost the manufacturing cost of the receiver.

The inclusion of regeneration provides a means of not only increasing receiver sensitivity but also the selectivity of the set to weak signals. The effect is not so noticeable on strong signals but is never-

theless of value in reducing occasional side-band interference.

The receiver is, of course, free of image reception since it is not a superheterodyne. Insofar as sensitivity in the short-wave bands is concerned, it compares favorably with equivalent superheterodynes, but has not the same ease of control due to the necessity of adjusting regeneration. The selectivity is not of a degree to be found in a superheterodyne of good design, but is nevertheless sufficient to cope with interference—particularly on weak signals.

No difficulty was experienced in pulling in the usual run of local and foreign short-wave broadcasters, and a few that could be classed as real DX. With the detector circuit oscillating we had such c.w. stations as FTB, DGG, IBJ, PGA and KJH with good volume and little fading.

Many stations were also pulled in on the three-ultra-short-wave bands, using super-regeneration. The usual super-regenerative hiss is present while tuning, but clears up in most cases when a station is tuned in. The hiss is absent on strong signals, but is not completely removed by weak signals.

Many amateur stations in the 5- and 10-meter phone bands were picked up, including a few middle-west and west-coast 10-meter ham phones. A number of u.h.f. police and broadcast stations were also received in these shorter wavelength bands.

The receiver has plenty of volume and, considering the size of the dynamic speaker, holds up very well at high levels. The tone quality cannot, of course, compare with that of a large receiver, but on the whole it is satisfactory.

Considering its low price, the receiver made a good showing.

CHANNEL ECHOES

(Continued from page 81)

Prose and Poetry," "Folk Songs" or "Choral Concert."

And what martial note from the Reich? We quote: "It is very quiet, so quiet that we believe we hear a gentle footstep in the snow. Hark! Again we seem to hear a mysterious movement. It is the Christmas angels who are flying and walking through the woods and carrying peace to our hearts."

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OUR SUGGESTED "I won't laugh" boycott on the part of studio listeners is gathering momentum, and we already have several candidates for the life subscription to ALL-WAVE RADIO. Which subject logically enough brings us to the radiodors for the month.

Herman Harjes (another runner upper) nominates the Lady Esther program, expressing his opinion that "their advertising is the lowest type possible. Any type lower could run under the shadow of a snake in the grass."

RSSL member, W7T2, James Young, of dear old Tampa, Florida, takes a crack at Fred Allen for rotten smile of health and smile of beauty commercials, with as second choice the R. J. Reynolds Camel Caravan. He wonders how come they don't go bankrupt spending those millions more for costlier tobaccos.

Alvin W. Oliver tosses the wreath of garlic to KXYZ for the station announcement—to wit, or witless: "This is KXYZ in the Gulf Building, Houston, home of the south's finest bank, the National Bank of Commerce, whose travel bureau service offers free wide-world travel service—a member of the Federal Deposit Insurance Corporation."

H. M. Vann sniffs suggestively in the direction of the Lucky Strike Hit Parade, and A. Spence Hogan opens the windows during the Lux Hour on Monday nights. Robert J. Chisler objects to the Mexican stations in general, and complains that he counted 48 of them on the standard broadcast band at 7:15 in the evening—in West Terre Haute, Ind.

However, Al Jolson and his Life Buoy program merits the radio B. O. for the month, and the free subscription goes to C. J. Cowper, 1823 Comox Street, Vancouver, B. C., Canada. Comments Mr. Cowper: " . . . the way they work that program into a lather and climax it with a plug . . . " The plugging is of the doubly noxious variety—too much of it, and the way it slithers in. Al Jolson rhapsodizing on "What Life Buoy means to me"—enumerates its sales points, every one—"not its cleanliness, not the freedom from B. O. it gives me, etc., etc., etc., but the fact (Mammy voice quivering) that it brings us together every week!"

And just for a bit of variety, R. O. McNamara votes "a clean channel to 'Today's Children' as the cleanest program on the air."

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WHICH LOGICALLY enough brings us to radio's iconoclast — that rampaging breaker of images, Charlie McCarthy. First he (with the able aid of Mae West) demonstrates possible fallacies in the Biblical account of the Garden of Eden. The next week he suggests that there may not be a Santa Claus. And the stork is next in line.

If one were to judge from the papers, the entire world was aghast at the Mae West program—and stamped it as filthy, obscene and sacrilegious. However, in our own little church-going community, we were unable to locate a single critic. Of course, there was plenty of smut in

the program—Mae West isn't Shirley Temple (thank the Lord!)—but one simply had to have a smutty mind to get it, which, as psychologists will assure you, implies the pleasurable appreciation of dirt (subconsciously or otherwise) and stamps those who found the program "disgusting in the extreme" as hypocrites. There are no two ways about it.

Will Rogers once said that what the folks in this country needed were dirtier finger nails and cleaner minds.

The only disgusting thing we could see associated with the Mae West broadcast was the slithery, slimy, belly-wiping, cringing, servile, slavish and spineless apologies of the sponsor and broadcasting companies and their promises to be good and never dot it again. This is the worst indictment we have yet encountered of our present sponsored system of broadcasting—which indicates that the entire and vast cultural and educational possibilities of radio broadcasting can be influenced and curtailed by consideration of a possible minor loss in sales of a few bags of dated coffee—or tooth paste, or soap powder, or breakfast food, etc.

As for the religious angle—if a person prefers to take the Book of Genesis literally, and believe that Eve was manufactured from one of Adam's ribs, or looks aloft to the Gods on Mount Olympus, that is strictly his or her affair. However, we do not consider such persons as qualified censors, and do not believe they should be permitted to dictate radio program policies any more than they could prevent the publication of George Bernard Shaw's "Back to Methuselah" or the rising of the curtain on "The Green Pastures."

Maybe Will Rogers was right—but then, as Alexander Woollcott said, "Nothing risque, nothing gained."

(Editor's Note: To our way of thinking there is an immense difference between the crystal clear wit that serves to disinfect many a risque story or play, and the vulgarity—palmed off as wit—that hauls many an otherwise excellent story down into the gutter. There is such a thing as good taste. In the instance of the Mae West broadcast, we feel it was thrown overboard.)

SILVER "15-17"

(Continued from page 83)

usual methods of broadening selectivity by mechanically varying i.f. transformer primary-secondary coupling, or of detuning successive i.f. circuits were discarded because of their lack of symmetry in practical amplifiers. Selectivity was varied through permanently fixed i.f.

couplings. By this means, a simple turn of the "Selectivity" knob gives instantaneous choice of 3-kc., 8-kc. or 16-kc. selectivity, besides shifting the audio amplifier input to tip-jacks for pick-up connection for phonograph reproduction. These three choices give audio modulation tone ranges of 1500, 4000 and 8000 cycles for full range fidelity reception. Here is every selectivity choice needed for all modern reception conditions instantaneously available at the turn of the knob.

New I. F. Condensers

At this state of development everything was fine—except for i.f. tuning condensers. Compression mica trimmers were automatically ruled out for reasons of instability and losses so high as to seriously impair hard-bought high coil Q. The usual expensive air trimmer condensers seemed the only choice, until it was realized that, being variable, not even they were perfectly permanent, as is necessary to permanent, unvarying alignment.

Upon careful test and examination after considerable search for an absolutely fixed condenser of laboratory quality, the new Sickles "Silver Caps" were found the perfect answer. Hot or cold, damp or dry, they simply would not change by a measurable amount. Their own Q equalled that of the special large, and similarly Isolantite-insulated, precision laboratory condensers used to test them. They proved to be the answer to the long-sought permanently fixed i.f. tuning condenser problem. Using them, actual i.f. circuit alignment was effected through inductance variation. Micrometric movement of the powdered iron cores of the i.f. coils did the trick nicely, and once sealed after alignment were completely permanent in terms of heat, cold, damp, dry and vibration. The r.f. circuit trimmers were, of course, micrometrically adjusted and permanently sealed air condensers, since they had to be variable for initial alignment. But in the i.f. amplifier something was finally realized actually more permanent and better than the best air trimmer condensers would provide.

The Second Detector

Following this 462-kc. "Tri-band" i.f. amplifier, which follows the writer's usual design practice of low i.f. but high r.f. gain, is the 6J5 infinite-impedance linear second detector. Not only does it eliminate the unavoidable harmonic distortion introduced on high-percentage modulation by all practical diode detectors, but it does not put a low-resistance load, as does a diode detector, across the last i.f. transformer and so badly impair, if not actually ruin, its selectivity contribution.

Coupled to it for optimum weak signal strength is the 6J5 audio beat oscillator for c.w. code reception and easy station finding. The beat note pitch is adjustable from the chassis rear, and so selective is the entire receiver that by "off-set" tuning the beat oscillator to give a 1500 to 2000-cycle audio beat note on a properly tuned station, the audio "image" or second beat note is eliminated, providing what amount to "single-signal" reception.

The A.V.C. System

The amplifier a.v.c. system is operated from the first i.f. tube in order that the a.v.c. amplifier itself may be sufficiently broad to follow approximate r.f. selectivity curve shape. This results in a system which does not allow r.f. tube overload on the channels immediately adjacent to the strong local, and so does substantially the same job as two separate a.v.c. systems, one for volume levelling through the i.f. amplifier and one to prevent overload in the r.f. amplifier. This refinement and improvement gives to the "15-17" the same a.v.c. action that in many other receivers requires two separate a.v.c. systems. It holds received signals varying through the range of 20 to over 1,000,000 microvolts and more input at volume constant to 3 db.—less variation than the ear ordinarily can easily perceive. Such wide-range control quite obviously irons out volume variation due to signal fading to a remarkable degree. Two tubes are used in this a.v.c. system, the 6K7 amplifier and the 6H6 diode a.v.c. rectifier, the second diode of which actuates the 6G5 "magic eye" tuning meter tube free from the a.v.c. delay bias so that it may actually register down to 1-microvolt signals.

The Audio Amplifier

The audio amplifier uses two 6J5 triode driver tubes in conjunction with a Clough-system tuned push-pull audio transformer. Its tuning is variable by the "Bass Tone" knob to give anything from an ideally flat audio response from 30 cycles up, to a smoothly adjustable maximum bass "boost" of 16 db., or progressive attenuation to the 30-db. bass "droop" which is so valuable in reducing noise in weak signal reception without sacrificing signal intelligibility.

With this separate bass tone-control knob, and treble tone-selectivity knob, the cumplete control necessary to compensate for varying ear sensitivity at different volume levels, different station

programs, individual taste in tone, and most important, variations in individual home acoustics are all at the user's instant command.

The 6L6 beam power tubes in a 10% inverse feedback circuit develop 16 watts power output strictly Class A, and a maximum of 20 watts Class AB1 at less than 3% total harmonic distortion *for the entire audio amplifier.* No positive grid excursions are involved.

The new "15-17" giant loudspeaker is large enough in cone size to actually reproduce down to 30 cycles, light enough in cone and voice coil weight to go nicely up to 8,000 cycles, and so heavy in electro-mechanical structure as to average 12% efficiency in electric to audible power conversion. This is about 2½ times greater efficiency than is found in many 10" and 12" speakers.

"Bass Reflex" Cabinets

But even this speaker cannot reproduce actual sound much below 130 cycles in a reasonably sized console cabinet the back and side of which are open. So consoles are provided which incorporate the new Jensen-invented "peri-dynamic" and "bass-reflex" principles. These "Bifarian" consoles allow the giant speaker to reproduce as actual *audible* sound all tones down to 30 cycles.

The power supply uses a heavy, oversize and cool-running power transformer of the four-bolt, flat-mounted type for maximum heat radiation and ventilation, a large high-inductance filter choke, three sections of the giant speaker field, and a total of over 143 microfarads of wet and dry electrolytic and dry paper condenser capacity. Using two 5Z3 high-vacuum rectifier tubes, it is substantially a separate unit, being isolated in a separate shielded section at the left of the receiver chassis.

(A "Proving-Post Review, based on actual tests of the McMurdo Silver "15-17" receiver, will appear in the March issue of ALL-WAVE RADIO.*—Editor)*

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CORRECTIONS

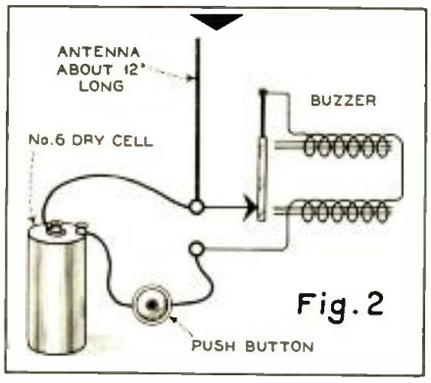
IN the article, "It Goes Out . . . There!" in the December issue of ALL-WAVE RADIO, an error appeared at the top of the second column on page 627. It was stated that a 60-wire ground requires 60° between adjacent wires. This should have read 6°.

In the parts list accompanying the article on the "AWR Automatic" in the January issue, a Yaxley type Y500MP volume control was specified. This control has a linear resistance element with the result that the action may prove to be too abrupt. For this type of circuit the Yaxley "N" control, with left-hand logarithmic taper, is preferable. The resistance value should be the same as originally specified; namely, 500,000 ohms.

QUERIES

(Continued from page 93)

ceiver. H. E. S.'s dial is calibrated in megacycles—which is the conventional calibration for short waves. On the standard broadcast band, kilocycles is the more familiar and convenient designation. However, this takes up more room on the dial and the megacycle listing is more easily read. Multiply the megacycle figures by 1000 for kilocycles. For instance, .90 on the dial is the same as 900 kilocycles, and 1.50 (megacycles) is 1500 kilocycles. (A kilocycle equals 1000 cycles and a megacycle 1,000,000 cycles or 1000 kilocycles.) To change to wavelength, divide the figure in megacycles as shown on your dial) into 300. For example, 20 megacycles is the frequency of 15 meters and 1.00 megacycle (or mc) is the frequency of 300 meters wavelength.



A simple controlled noise generator—hard on programs but good for tests. Aerial connects to buzzer contact.

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Query No. 55: I am interested in making some experiments to determine just how much noise reduction is accomplished by different antennas and lead-ins. However, I am wondering just how to generate controlled noise—noise that will be the same from one test to another. I was thinking of using an electric sewing machine. Or how would an oscillator be, located close to the receiver? The theory being that a transmission line lead-in would not pick up so much of the oscillator as a non-reduction (noise) type lead-in, or one that is supposed to cut down noise but doesn't.—*R. A. C., Meriden, Conn.*

Answer: The oscillator would work out theoretically perfect—and give you theoretically perfect results. However, that won't work for noise. Noise radiation has an entirely different characteristic, is much (very much) broader than a c.w. oscillator, and will excite an antenna system by shock excitation. The sewing machine is a good idea (and should be used as a check under normal receiving conditions against the lab. test), but here some of the noise may get through via the light lines and give an erroneous result. Your best bet is a simple buzzer worked from a single No. 6 dry cell, connected as shown in Fig. 2. The antenna should be short—about one foot will be enough—and it is connected to the stationary contact.

It is a good idea to make such tests against an L antenna as a standard. Your receiver should have an R meter (rather than depending on the ear) and the length of the transmitting antenna on the buzzer should be adjusted so that noise, with the L aerial, reads about R5 to R7 on the broadcast band. Higher noise levels than this will probably indicate little advantage in the special antenna systems, for the radiations will be sufficiently powerful to reach the aerial itself. The tests should, of course, be made on different wavebands. An automobile, always parked in the same place, with engine running, also makes a good noise generator. (If it is equipped with an automobile radio, don't forget to remove the ignition interference prevention system.)

Let us know, R. A. C., how these tests work out. We're interested!

ULTRA-HIGH

(Continued from page 85)

a general R7 report. Since much of the matter transmitted is secret and only at the disposal of the monitoring engineer, reports cannot be verified.

W1XO, W1XT, 31.1, 34.6, 37.6, 40.6 mc. These are the special broadcast pickup stations owned by The Travelers Brdcstg. Svc. W1XO, the home station, has an output of 50 watts while, W1XT, the portable unit, outputs 25 watts. All reception reports will be verified. Address: Hartford, Conn.

W3XCK, W3XCL, W3XCM, W3XCN, are the portable stations that finish the list of N. J. Forest Fire Service stations. The system is now complete with 21 fixed and five mobile stations. The four key ones output 100 watts while all others output 15. At the present rate messages are being transmitted back and forth and reception reports cannot be verified.

Undoubtedly the greatest attraction of the u.h.f. is the two amateur phone bands. Not only are they first and second in size, but they afford the most unusual and the most interesting DX that can be found anywhere.

Amateur 10-Meter Phones

DX on this band is becoming astounding and after the drop-off in December the band should be back twice as strong in the spring.

As most of you DX men go out after Africa we thought these frequencies would help: ZU6P 28325. ZT6Y 28100, ZT2Q 28070, ZS6AJ 28085, ZE1JJ 28239. ZT6AU 28180, ZS1AH 28092.

VU2CQ 28220, has been heard by several DXers in the east about 8:30 to 10:00 a.m. Also reported operating is VU2AU on about 28100.

The new arrivals to the band are U9ML 28160, LA4P 28250, I1KN 28250, FQ8A 28055, GM5KF 28200. VS1AA, representing Malaya, has been heard on the east coast about 9:30 a.m.

Except for New Zealanders ZL4MR on 28100 and ZL4DQ on 28200, the signals from down under are becoming rare. VK2GU 28120, and VK5KO 28000 are the only ones heard.

We would like to have someone tell us the correct frequency of J3FJ. He has been reported on 28050, 28160, and 28450. If you are having trouble hearing J's, listen between 4 and 8 p.m. Who will ever forget last year with J2IS, J3FK, J2CB, and J2DZ.

A few new stations reported are ZL3DJ 28210, LU7AG 28700, VK2GU 28590, TF5C 28175, FR8VX 28680. 28860, OH2NM 28300, VK2AGE 29000, SV1RX 28175 to 28200.

Last year's standby's—YL2CD 28170 and LU7AZ 28200—are still holding their own.

Our early morning ramblings among the megacycles generally nets us these standbys: SP1DC, SP1HH, F8KI, F8QD, GM6RG, G5ML, F8RR, PAOFB, PAOAZ, F3LR, and G6GO. They slowly build up till about noon when a break comes and they drop out, only to be followed by the South Africans and South Americans.

Since room does not permit listing out every station reported or heard we condense them into a familiar column below:

Country	*Calls*	*Time*
Alaska	K7PQ	6:00 p.m.
Argentine	LU3DH, LU7AZ, LU6AX, LU5AN LU3AF	12:00- 8:30 p.m.
Australia	VK2AGE, VK2GU. VK5KO	4:00- 7:30 p.m.
Barbados	VP6YB	5:20 p.m.
Bermuda	VP9R	12:00 p.m.
Brazil	PY1BR, PY3BY	3:00- 5:30 p.m.
Canal Zone	K5AG, K5AY	4:00- 7:30 p.m.
Cayman Islands	VP5GM	5:05 p.m.
Chile	CE3AB	6:10 p.m.
Colombia	HK1JB, HK4EA	4:20- 6:30 p.m.
Costa Rica	TI2RC	7:40 p.m.
Czechoslovakia	OK2MV, OK3VA	7:45-10:00 a.m.
Danzig	YM4AA	9:15 a.m.
Dominican Rep.	HI5X, HI7G, HI5R	7:30 a.m.- 6:00 p.m.
France	F3HN, F8WK, F3RR, F8QD, F3KH, F8KI, F3LR	7:45-11:00 a.m.
Germany	D4ORT, D4AOR, D4YLI, D3GDF, D4QET, D4PBN, D4FND	7:30-11:30 a.m.
Great Britain	G6LK, G8FA, G5ML, G2ZV, G5VT, G5DN, G6GS, G6KH, G2KU, G6RH, G6GO, G6BW, G6AG, G5VM, G5SA, K6PD, G6KB, G6YU, G2IT, G6DH, GM6RG, GW8HI, GW5BX, GW2UL, GM6RV, GM5KF	7:00 a.m.-12:45 p.m.
Greece	SV1RX, SV1WM	8:45-10:30 a.m.
Hawaii	K6OQE, K6MUL, K6MVV, K6LCV, K6KNV, K6MHY, K6OCI, K6PIR, K6OBH, K6PGS, K6KMB	12:00- 7:30 p.m.
Honduras	HR4C	9:15 a.m.
India	VU2AU, VU2CQ. VU2FV	8:00-10:30 a.m.
Irish Free State	EI2L	9:00 a.m.
Italy	IIT, IIKN	7:45-10:00 a.m.
Japan	J3FI, J8CF, J3FF, J5CC	4:45- 8:30 p.m.
Latvia	YL2CD	9:15 a.m.
Malaya	VS1AA	9:30 a.m.
Morocco	CN8AJ, CN8AV	11:00 a.m.- 2:00 p.m.
Netherlands	PAOFB, PAOAR	9:45-11:00 a.m.
Newfoundland	VO3I, VO3X	2:30- 5:15 p.m.
New Zealand	ZL2CI, ZL4MR, ZL4DQ, ZL1DV, ZL4DJ	4:00- 7:45 p.m.
Peru	OA4J	6:15 p.m.
Poland	SP1HH, SP1DC	7:30- 9:15 a.m.
Porto Rico	FR8VX K4DDH	8:00 a.m.-5:45 p.m.
Reunion	FR7VX	8:00 a.m.
Roumania	YR5CF	9:35 a.m.
South Africa	ZS6DW, ZTB, ZT2G ZT6Y, ZT2Q, ZT6AU, ZS6T, ZS6AI, ZE1JR, ZT6AK, ZE1JI, ZS6T, ZS6DW, ZT2B, ZT2G	10:45 a.m.- 2:00 p.m.
Sweden	SM5OI, SM5YH	8:15- 9:30 a.m.
Venezuela	YV5AK, YV5AA	8:30 a.m.- 4:00 p.m.

Police Stations

Since we have not been doing much listening on any of the police frequencies, we decided that we would devote Dec. 19th to them. Everything ran true to form and so below we list what was heard.

Station	*Location*	*Freq.*	*Time*
W6XBF	Piedmond, Calif.	33.1	12:35 p.m.
W9XGE	Sioux Falls, S. Dak.	33.1	12:36 p.m.
W5XB	Ft. Worth, Tex.	33.1	12:43 p.m.
W6XMW	Arcadia, Calif.	33.1	12:45 p.m.
W6XDL	Modesto, Calif.	33.1	12:47 p.m.
W6XEH	Long Beach, Calif.	33.1	12:49 p.m.
W3XBD	Atlantic City, N. J.	33.1	12:55 p.m.
W6XHR	Monrovia, Calif.	33.1	12:56 p.m.
W6XHO	Santa Rosa, Calif.	33.1	1:00 p.m.
W6XIK	Burlingame, Calif.	33.1	1:00 p.m.
W3XBP	Wilmington, Del.	33.1	1:00 p.m.
W6XKW	Alameda, Calif.	30.1	1:01 p.m.
W6XFE	Alhambra, Calif.	30.1	1:02 p.m.
W3XEK	Trenton, N. J.	33.1	1:05 p.m.
W5XF	Amarillo, Tex.	33.1	1:12 p.m.
W5XBI	Tyler, Tex.	33.1	2:02 p.m.
W6XHM	Orange, Calif.	33.1	2:33 p.m.
W6XBA	Los Angeles Co., Calif.	30.1	2:35 p.m.

A number of other stations were heard, but because of the interference they were not identified.

We received an interesting clipping from George Swanson about Englewood's transmitter being heard in England. Robert Everard, one of Great Britain's better known DXers, sent a letter to the supervisor of police asking for a verification. He reported hearing W2XES on October 14, 20 and 25, 1937. W2XES operates on 33.1 mc. outputting 15 watts. The antenna is 190 feet above ground.

Last-Minute Flashes

From the Bamberger Broadcasting Service we learn that they are installing a 100-watt transmitter. They already operate four broadcast pickup stations: W2XMI, W2XMJ, W2XMK, and W10XIP. Power of the first two is two watts, the latter two output 10.5 watts. They operate on the same frequencies as the stations of The Travelers Brdcstg. Svc. mentioned in this article.

W10XED, the portable pickup station of the N.B.C., was heard here testing on 37.6 mc. at 3:45 p.m.

The New York Marine Fire Department has obtained licenses to operate several fire boats on 35.6 mc.

Our Thanks To—

Our best thanks of the month go to all those operators of the u.h.f. broadcasting stations who courteously answered all of our inquiries about their charges.

We always like to receive letters from our readers and it gives us much pleasure to be able to answer them. We are always pleased to receive information on any u.h.f. station whether we have reported it or not.

Address all letters to Perry Ferrell, Jr., Linwood, New Jersey, enclosing return postage if you desire a reply.

HAMFEST

(Continued from page 89)

column is therefore the logical place in which to air these items.

There exists considerable confusion—where there is any knowledg at all—concerning the use of the letters BK. BK is an abbreviation for *break*, and occasionally is used in place of — . . . — the more conventional code symbol for a written dash - - indicating a separation. However, BK is also a command to break or interrupt. In answering a CQ, the experienced operator will often call a station three times, send BK, call the station again, send BK . . . and so on without signing his own call. BK here means, "Break in on me, I can hear you through my own transmission and will sign my call as soon as I know you hear me." The operator who sent the CQ, upon hearing this, should send BK. The answering operator will send de or V and sign his call.

The advantage should be obvious. The answering station has a much better chance of raising the station that sent CQ than if, instead of BK, he signed his own call two or three times, during which period the operator at the other station might tune across the signal without realizing that he was being called.

However, this procedure is useful only when it is understood. We have answered CQs in this way—calling and sending BK three or four times without response. We have then signed our own call (as should always be done, of course), and the station has snapped right back at us. This has happened so often that there is no doubt that we had been heard before, but that the command of BK was not understood.

When the original CQ is sent by an OT, it will seldom be necessary to transmit the BK order. He, without prompting, will send BK the moment he hears you calling, which is your cue to cease calling and to sign. Obviously, the intelligent use of this procedure eliminates considerable unnecessary calling.

Of course, break-in operation is essential on at least one end of the circuit. But there is no excuse for any station not being equipped for break-in operation.

Incidentally, to those of you who have been unduly influenced by the broadcast

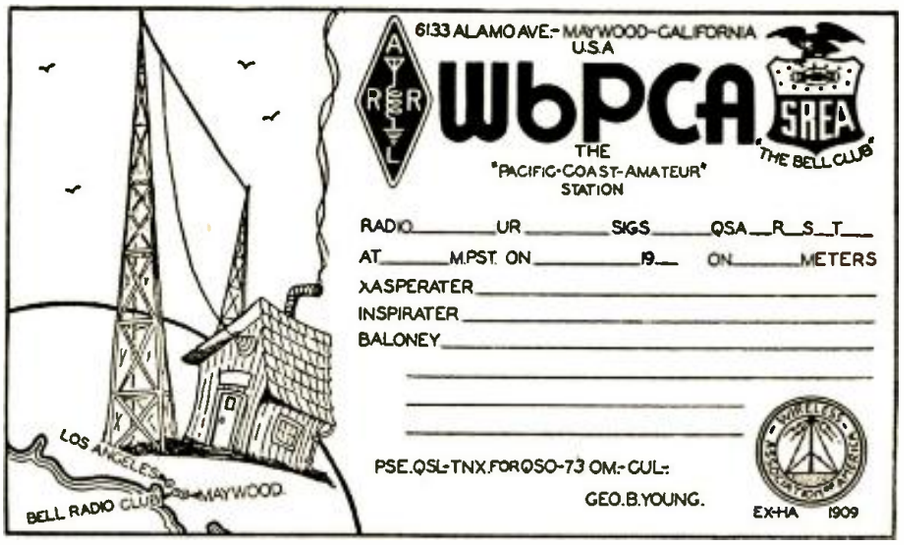


Fig. 1. Distinction, originality and humor—all in one QSL card. Black printing on green background.

era and do most of your hamming with the loudspeaker, we suggest that you try fones for break-in operation. This will often make possible break-in operation even on spot frequency—where the thump and screech of the speaker would bring down the roof.

◆

WITH THE FROST still on the pumpkin, etc., Ron G. Bullock, of Red Deer, Alberta, Canada, writes concerning a certain ham on 80-meter fone who placed his prize pumpkin atop his new ½-kw rig last October:

"Following Hallowe'en, this lad was pretty busy on the air for several weeks with long QSOs. One day he noticed that said vegetable had a list to the starboard. When he endeavored to straighten it up—gush—and nicely baked it collapsed into the power stage upon which it had been resting during the long period of incubation. Result—much language not approved by the FCC. *Moral:* Ham radio not advanced enough to replace the XYL at cooking. The only reason the boys got the dope was the fact that the big switch was on—and so was a VE4 at the other end!"

◆

GETTING BACK TO QSL cards—we're still on the market for the original. If your own is out of the ordinary—or you have received one of the "different" kind—send it in. (We'll be glad to return any sent to you.)

A good many operators are numbering their QSOs, and indicating the number on their QSL cards. We were QSO nr. 950 with W2KFM, nr 3 with W2IN, nr 455 with W2KFB and nr 10,518 with W3BES.

Another idea is to send out QSLs the first of the month—making an evening's work of the month's accumulation. This has genuine merit. There is nothing we'd rather send out the first of the month.

◆

DEAR QMR.; So u figure all the fone ops r dumb—wl dont forget they were cw ops 1st—last week I had a msg for Boston es up at the shack in eastern NY I sent CQ Mass—a W8 cums back but I sent CQ Mass agn—still the W8 cums back—it was afternoon on 75 cw es there were only a coupla stans on—I tried CQ Mass agn es the same W8 cums back—wl I figured tt mebbe he had a sked east so I gave him a buzz—he cums back quote fb OM ur sigs rst 569x hr in Buffalo mani tnks for buzz QRK? QRA? close quote—after I told him es he eased himself of a long string of 73s cuagns good luck culs es wl be luking fr u agn sn es vy 73 es tnks fr the fb QSO OT OB OM I still had my msg fr Boston es had to go to wrk—I dropped it in a ltrr box on my way to the office—73—HI.

5-METER RECEIVER

(Continued from page 71)

tenna often will give excellent response, if its length is trimmed, say six inches at a time, until maximum output is had. The single-turn antenna coupling coil is made from hookup wire and may be bent to adjust for coupling to the coil L1.

Details of the panel, subpanel, and cover box are given in the accompanying sketch. The material is 16-gauge galvanized sheet. The entire assembly, both electrically and mechanically, is rugged and very well suited for emergency work.

GLOBE GIRDLING

(Continued from page 79)

identified by a bird singing just prior to first opening announcement and immediately after the last announcement when closing the transmission.

TIPG, 6410 kc., San Jose, Costa Rica, has been testing out on 25-meter band as stated in last month's issue. It is understood that it is the intention of the owner of the station, Mr. Perry Girton, to build a new transmitter for the 6410 frequency and use the old transmitter on the 25-meter band, the broadcasts to be made simultaneously. If you hear a broadcast of TIPG on 12820 kc., do not be surprised as it is the harmonic of TIPG on 6410 kc.

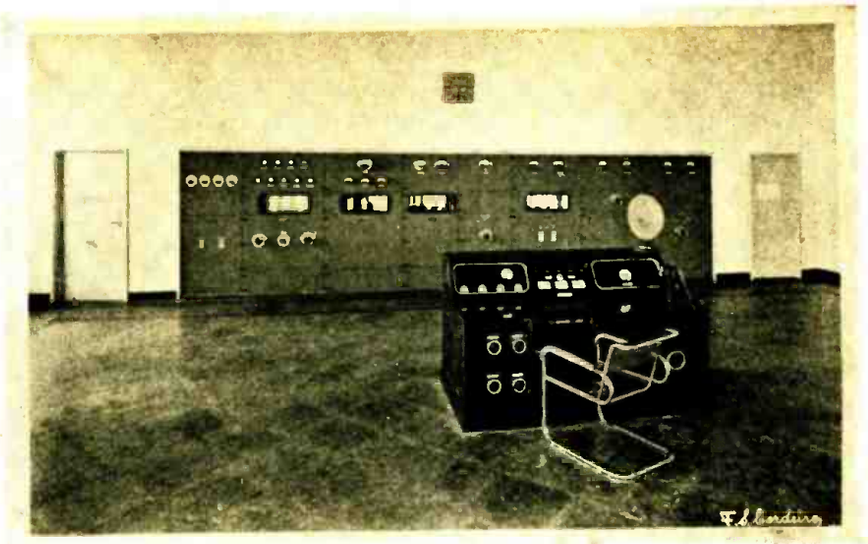
TGWA, 11760 kc., Gautemala City, Gautemala, is being heard quite regularly with good signal strength and entertaining evening programs.

TG1, 6180 kc., Guatemala City, Guatemala, has not yet settled on regular frequency as heard near 6180, 6300 and lastly on 6210 kc. TGQ will therefore not be listed until later.

YN1PR, 8580 kc., Managua, Nicaragua, is making requests for reports as to quality of broadcasts and types of programs desired.

Mexican Broadcasters

XEME, Merida, Yucatan, Mexico, has been added to lists at 7010 kc., although the Director General of Radio in Mexico states assignment of frequency is 7100 kc. It is reported heard by many near the first mentioned frequency.



View of the transmitter and control room at station CS2WA, Lisbon, Portugal.

XEUZ, Mexico, D. F., has changed frequency on 49 band from 6120 kc. to 6130 kc. and also works on 11880 kc.

XEBM, 15440 kc., Mazatlan; XETA, 11760, Monterrey; XETM, 11730 kc., Villahermosa; XEYU, 9600 kc., Mexico, D. F.; XEFT, 6050 kc., Mexico, D. F. and XEBQ, 6030 kc., Mazatlan, Mexico, did not appear in the latest list of Mexican stations issued by the Director General of Radio at Mexico City, and it is not known if all are off the air or not.

New Nova Scotian

CJCX, 6010 kc., is a new broadcasting station at Sydney, Nova Scotia, Canada. It is owned and operated by Eastern Broadcasters, Ltd., and relays the programs of CJCB which operates on 1240 kc. Both transmitters employ 1000 watts and are located on South Bar Road, near Sydney. Reports should be forwarded to address as shown in station list.

CJCX is not on the air regularly at the present time. For various local reasons, regular schedule will not become effective until some time in February.

U. S. Stations

W2XE, 11830 kc., New York, is now broadcasting a daily program to South America from 6:30 p.m. to 12 midnight.

W8XK, Pittsburgh, has installed their new transmitters and the programs are being carried on 21540 kc., 15210 kc., 11870 kc. and 6140 kc. and the revised schedules are shown in station lists.

W1XAL, Boston, transmits special and test programs on 11790 kc., 15250 kc. and 21460 kc., in addition to scheduled programs as listed.

Amateur Phones

The following is a list of 20-meter amateur phone stations not previously reported or listed:

STATSRADIOFONIEN
COPENHAGEN, DENMARK

The Danish State Broadcasting Service acknowledges with many thanks receipt of your report on your reception of the transmissions from our short wave transmitter OZF at Skamlebaek.

The very formal and neat verification card sent out by OZF, Skamlebaek, Denmark.

Country	Frequency	Calls	Time Heard
Australia	HF	VK4HS	1:00 a.m.
Africa (South)	LF	ZS6AC-ZS2N	10:40 p.m.-10:45 p.m.
Africa (South)	LF	ZS1B-ZT5AH	3:40 p.m.-10:12 p.m.
Africa (South)	HF	ZS5BZ-6AA-ZU5S	10:00 p.m.-12:00 a.m.
Africa (South)	HF	ZS1AH-ZT5S-ZT6AM	10:00 p.m.-12:00 a.m.
Africa (So. West)	HF	ZS3F	11:22 p.m.
Algeria	HF	FA8IH	5:14 p.m.
Argentina	LF	LU1JC	8:20 p.m.
Antigua	LF	VP2AT-2DA	4:30 p.m.
British Guiana	LF	VP3ABC-VP3CX	6:37 a.m.-7:00 a.m.
British Guiana	LF	VP3BA-VP3THE	7:30 p.m.-9:30 p.m.
Colombia	HF	HK1ZS	7:00 a.m.
Colombia	LF	HK4AB	7:45 p.m.
Cuba	LF	CO8ET-7AS	10:00 p.m.-11:00 p.m.
Costa Rica	LF	TI3WD-2JF	8:00 p.m.-12 a.m.
Dom. Rep.	LF	HI1C-7I-3G	4:15 p.m.-5:30 p.m.
England	LF	G6NJ-6AG-8IG	1:15 a.m.-3:30 p.m-1:50 a.m.
Ecuador	LF	HC1GW	12:25 a.m.
France	LF	F3HL-3OA-3HM-8DC	1:30 a.m.-2:55 a.m.
Guatemala	HF	TG2F	8:03 p.m.
Hawaii	AB	K6BHL-6CDQ-6GNW	10:38 p.m.-1:15 a.m.
Irish Free State	LF	EI6G	5:40 p.m.
Labrador	HF	VO6J-6L-6B	7:00 p.m.-10:00 p.m.
Madagascar	HF	FB3AH	10:00 p.m.
Mexico	LF	XE2HF	7:15 p.m.
Peru	LF	OA4A	6:35 p.m.
Spain	LF	EA7QI	9:38 p.m.
Tasmania	LF	VK7JB	8:10 a.m.
Venezuela	LF	YV4AB-5ABA	9:00 p.m.-9:50 p.m.

Mr. H. A. Rinker, 513 East Euclid Avenue, Springfield, Ohio, desires to exchange SWL cards with foreign listeners.

Acknowledgement

It is our continued pleasure to acknowledge the receipt of many letters and reports from our readers and to thank one and all for their loyal support to the department. If you are a member of R.S.S.L. kindly show your Monitoring station number on your letters and reports.

It is always our pleasure to answer your inquiries and to give information regarding unknown stations, reception, station matters in general, and exchange information with all.

Address your letters to Mr. J. B. L. Hinds, 85 Saint Andrews Place, Yonkers, New York, enclosing self-addressed stamped envelope in case you expect or desire a reply.

All questions of a technical nature should be forwarded to Queries Editor, ALL-WAVE RADIO, 16 East 43rd Street, New York, N. Y.

ON THE MARKET

(Continued from page 100)

of ORR Radio Stores, Editor of radio book publications of Experimenter Publishing Co., Consrad Company and E. I. Co., Managing Editor of "Radio Review" and "Radio Listeners' Guide & Call Book," Eastern Editor and Advertising Manager

of "Radio Industries," and for the past six years as Advertising Manager of Aerovox Corporation.

WILLIAM G. MANY

New Kenyon Sales Manager

Mr. Many's appointment is in line with keeping closer cooperation with Kenyon jobbers in serving servicemen and amateurs with quality built audio and power components. ALL-WAVE RADIO.

•

HARVEY TRANSMITTER CATALOG

CATALOG NO. 52, covering high-frequency radio transmitters for amateur and commercial services has been made available by Harvey Radio Laboratories, Inc., 25 Thorndike St., Cambridge, Mass.

Complete details are given on the eight standard transmitters manufactured by this company. Powers range from 12 watts to 200 watts output. ALL-WAVE RADIO.

INDEX TO ADVERTISERS

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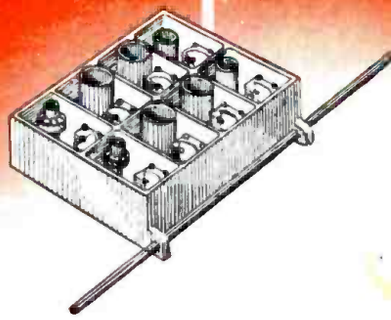
In these few short months the NC-80X has become part of the National tradition. Their advanced circuit details, including the wide-range crystal filter and high IF frequency for image rejection, have brought a new standard of performance to the low priced field. Their thorobred construction keeps that performance consistently high. And their convenience makes operation swift, accurate, and tireless.

NATIONAL NC-80X



National Company, Inc.
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We are proud to announce the Sky Challenger II, not as just another new receiver, but as a definite contribution to amateur radio. With the Sky Challenger II, we offer another new and far-reaching Hallicrafters development—the Infinite Image Rejector.

With this new circuit, equivalent in operation to several expensive pre-selectors, and an integral part of the New Sky Challenger II, annoying image interference is completely eliminated. But this is not all. It has the same famous 1000° Spiral Band Spread System used in the Super Skyrider, and a host of other quality features that make it an outstanding value at its new low price. See it! Operate it! Compare it! Write for full information today.

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*Patent Applied For