

The

6<sup>p</sup>

# SHORT-WAVE MAGAZINE



No. 1

MARCH, 1937

Our cover photograph,  
"Radio City by Night,"  
is by courtesy of The  
National Broadcasting  
Co. Inc.

Short-wave radio

Empire's Strongest Link!

MODEL U.647.

PHILCO CORONATION "EMPIRE" RECEIVER 18<sup>G</sup><sub>S</sub>

**Circuit.** Six-valve superheterodyne unit-constructed Receiver, with full delayed A.V.C. and pentode output (4 watts) for operation on long, medium and two short wave-bands. Built-in connections for Philco All Wave Aerial, aerial selector built into and operated by the wave-change switch. Provision for pick-up which may be left permanently connected. Provision is also made for an external speaker of the permanent magnet moving coil type having an impedance of 2-3 ohms.

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**Wave-bands—Coverage.** Four—(a) Long 148-320 kcs. (2026-937.5 metres); (b) Medium 530-1750 kcs. (566-171.4 metres); (c) Short 1.75-5.75 mcs. (171.4-

(52 metres); and (d) Short 5.75-18.2 mcs. (52-16.4 metres).

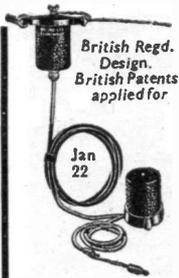
**Tuning Drive.** Two-speed drive-ratios 8:1 and 40:1 for slow and accurate tuning. Glowing beam station indicator, new spread band 270 degrees scale and shadowmeter tuning device.

**Tone Control.** Combined tone switch and control which is continuously variable enabling a fine degree of tone between brilliant and mellow to be obtained. In the extreme anti-clockwise position the bass response is reduced; this improves clarity on speech.

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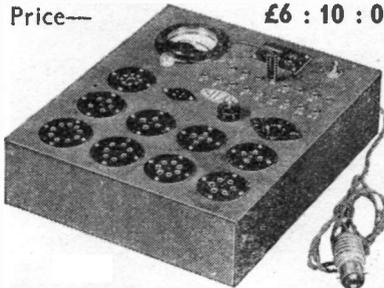
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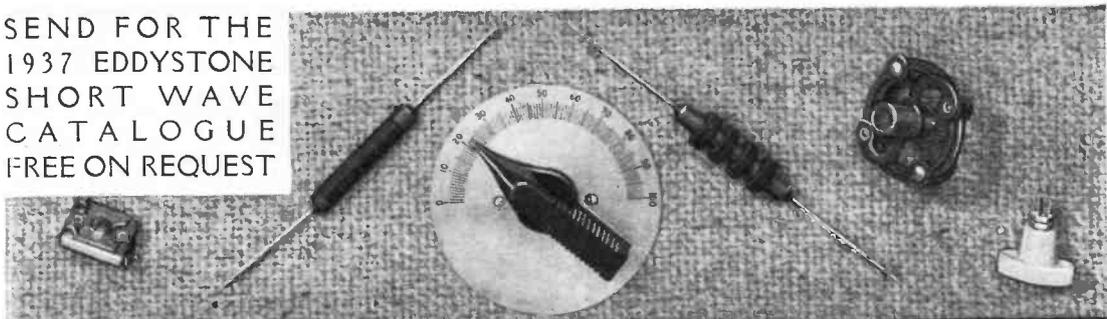
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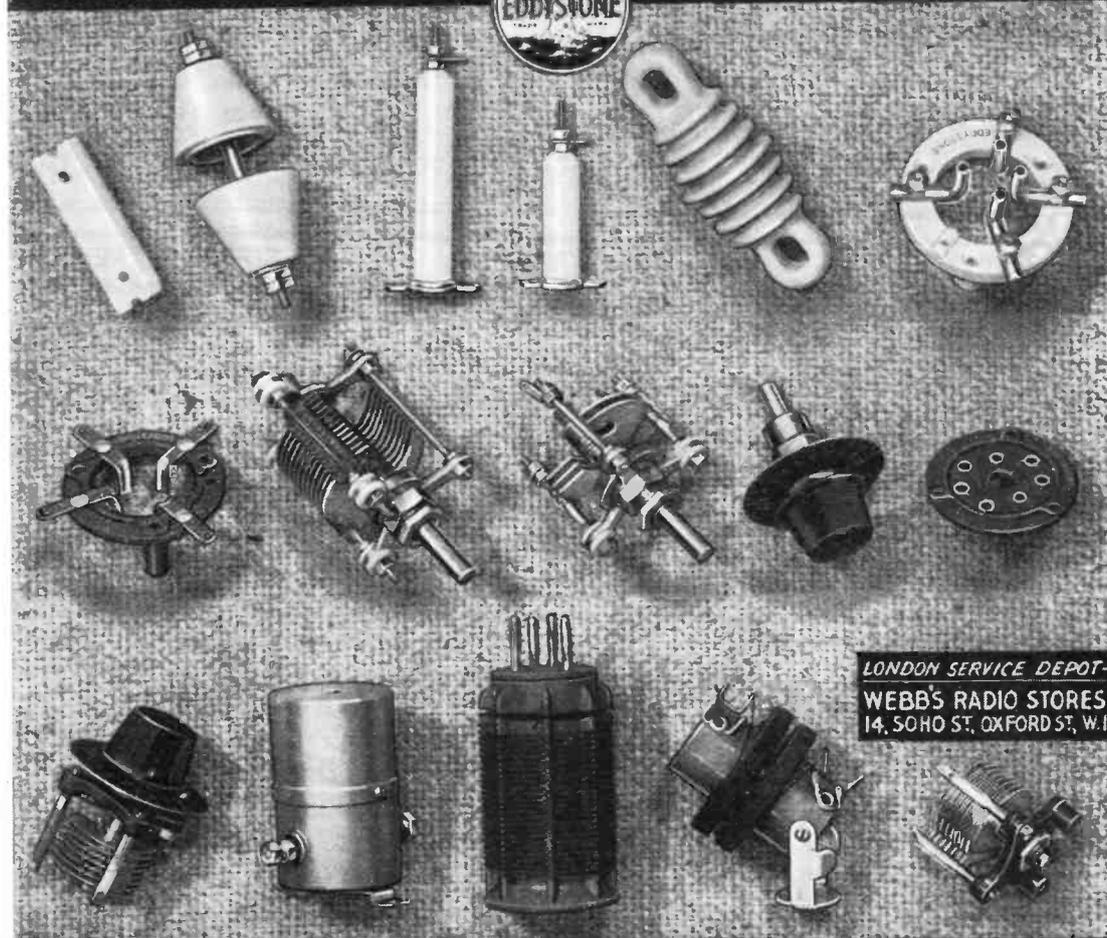
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# THE SHORT-WAVE MAGAZINE

Vol. 1

MARCH 1937

No. 1

Editor: BASIL WARDMAN

Editorial Asst.: S. W. CLARK

## About Ourselves

Our policy will be directed to interesting and informing everyone who listens to short-wave radio. The family owning or intending to own an "all-wave" set, will find exclusive programmes of short-wave broadcasts, useful and expert tips on getting best results, news of broadcast "stars," tests of new sets, and many other features. The keen amateurs and experimenters will find first-class articles on new apparatus, construction, technique, and news of short-wave clubs and societies.

Short-wave work, radio's newest, most interesting development demanded and deserved a journal exclusively devoted to it. That want we hope to fill with regular monthly issues of which this is the first.

Our staff and regular contributors include well-known experts, whose authoritative up-to-the-minute articles assure every amateur experimenter of a means of keeping abreast of developments in short-wave radio.

We aim to be unbiassed, independent, viewing all proposed features from the standpoint of value and interest to the increasing number of enthusiasts in short-wave radio.

This is *your* journal. We want *you* to tell us how we may best serve you, and so co-operate in the development in technique and popularity of short-wave radio. Your problems will be gladly investigated by our technical staff; your suggestions for features you would like to see in succeeding issues will be welcomed and carefully considered by our editor and his colleagues. With your co-operation we hope to make THE SHORT-WAVE MAGAZINE something you will look forward to with keenness and read with interest and pleasure.

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**BUT**



*I'm going home to my Philco*

# WHEN TO LISTEN

## for short-wave stations

SOME PEOPLE appear to have all the luck with their short-wave listening; every time you see them they tell of fresh stations they have heard, whereas others never seem to hear anything at all. The secret of success of course is to listen on the right wavelength at the right time, and to interpret the prevailing conditions correctly. For example, when South Americans are coming in well on the 30 and 49 metre bands, it is safe to assume that North Americans will not be of good programme value.

### ● Asia and Western America

Waves lower than about 28 metres give best results during daylight hours; for the reception of Asiatic stations in the morning, as their time is in advance of ours, the signal will follow a path which is entirely in daylight, and therefore a wave well below 28 metres would be the best to listen on. Now Japan is received on 19 metres very well about 8 p.m., and it would appear that the signal is coming through total darkness, because it is night throughout Asia and Europe, but in this particular case the path taken is the longer one, across the Pacific, North America (where it is daylight), the Atlantic, and so to England. At the same time it may often be heard on 35 metres, over the night path across Asia and Europe.

This condition also applies to the Pacific Coast of North America (W6, W7, VE5), and so we have:

*Japan, Pacific Coast of North America—*

- 19-28 metres : 6.30 a.m. to 9.30 a.m. (across Asia).  
4 p.m. to 9 p.m. (across N. America).
- 35-45 metres : 7 a.m. to 8 a.m. (across N. America. Poor).  
7 p.m. to 9 p.m. (across Asia).  
Poor.

### ● Australia and New Zealand

With these two countries the signal path is almost the same distance either way round, and it is difficult to lay down a rule for which direction signals will take. At the same time of day sometimes the shorter waves are best, and other times the longer waves are best. Generally speaking, signals are at their best around our sunrise and sunset, and the best times to listen are:

*Australia and New Zealand—*

- 19-28 metres : 7 a.m. to mid-day, and occasionally up to 2 p.m.  
5 p.m. to 8 p.m.
- 30-45 metres : 7 a.m. to 9 a.m.  
4 p.m. to 8 p.m.

### ● U.S.A. and Canada

For U.S.A. and Canada, it is best to look for stations starting at mid-day on 13 metres, and gradually changing to higher waves as the day progresses.

- 13 metres : 12 noon to 2 p.m.
- 16 metres : 2 p.m. to 8 p.m.
- 19 metres : 3 p.m. to 10 p.m.
- 25 metres : 8 p.m. to midnight.
- 31 metres : 11 p.m. to 5 a.m.
- 49 metres : 11 p.m. to 8 a.m.

The 38-49 metre band time varies considerably from summer to winter. The times given above are for Winter and Spring, but in the summer, although this band is not useful much before 2 a.m., from that time until fade-out, three hours later, it is often productive of very fine signals.

### ● South America

South American stations are not heard often much before 8 p.m., perhaps because they do not come on the air very early. The approximate times for them are:

- 19-28 metres : 8 p.m. to midnight.
- 28-31 metres : 10 p.m. to 5 a.m.
- 35-50 metres : 11 p.m. to 6 a.m.

### ● South Africa

Although commercial companies find that South Africa is one of the easiest circuits for the telephone and telegraph services, reception of amateur and broadcast signals is most erratic. Approximate reception times are:

- 19-28 metres : 5 p.m. to 9 p.m.
- 31-45 metres : 5 p.m. to 8 p.m. (November to April inclusive).

### ● Ten Metres

The ten metre band is the most erratic of all. The easiest way to determine the possibilities of this band is to listen on twenty metres, and if "skip" is short, that is local stations coming in well, then there is every chance of ten being good. Always listen for at least a quarter of an hour as this band frequently has dead periods of 15 minutes, and it is easy to turn on during one of these periods and come to the erroneous conclusion that the band is useless.

### ● General

Remember that varying conditions affect all these times, and affect each band in a different manner, so if the station required is not audible on one band, it does not mean that it will not be heard on another, but actually may be coming through at full speaker strength on a different wave, so always try on all bands before giving it up as a bad job.

# Malayan Views

## on the Empire Broadcast

WRONG TIMES, POOR TIMING—BUT  
STILL WE LISTEN—IN

by E. Crossley

ON A CALM EVENING in Malaya, work done and the game of tennis or golf over, you might well fancy yourself in England now that radio is here. But there is one major obstacle to this otherwise easy stretch of imagination, G.M.T. Outside of the cost of living that time element is the only topsy-turvy thing in the land of (reputed) topsy-turvy.

The moments when we can settle down in comfort and tune in to "London calling" just don't coincide with the times when we are best able to receive some of the programme features we want to hear.

### ● Poor chances for the News

We have, I admit it, three alternative times for hearing one of the most important broadcast features, the News. The first bulletin is at 8 in the morning. To hear it then we must postpone our toilet until such a time as ensures our being late for the office, or follow a sterner path and be ready for work at 8 a.m.—an impossibility to most of us.

Our next chance is 8.50 p.m. Probably very well for England, but we have the funny little custom of dining at 8.30 or 8.45. Therefore we may dine in complete silence, except for the voice of the News announcer, or miss the second chance.

Then we have our final chance of listening to England's news at 11 p.m. Again, that may be lovely for you at ease at home but for we who have spent a strenuous day in our tropical climate winding red tape, our immediate, or often prior, needs are bed and sleep.

In times of national emergency, like the Test Match season, we are willing to get up early, or go to bed late or dine in Trappist silence. But as a rule we would like to listen to the News in comfort, and if we could have our News between 7 and 8 in the evening there would be fewer cases of News Starvation.

### ● Hard on the Children

And then the Children's Hour. What time do they think our children go to bed? While on holiday in England we switched on to the Children's Hour at 5.15. The announcer explained that this was also part of the Empire programme and we must wait a moment for Empire listeners to join in. "And now," said he, after a pause, "we hope they have joined in." Optimist! Five-fifteen in England is after midnight in Malaya.

To be fair we'll explain that Children's Hour in Malaya is usually at 8.30 p.m. But even so, who

would wake the children at that hour? Certainly not us.

### ● Highbrows never sleep?

Contents of the Empire programme often affect us as much as the time factor. Some of us enjoy classical music. There is a certain amount of it in the Empire programme, our only opportunity except for the gramophone. But it seems that the better the item—in our view—the later it is. Two o'clock in the morning is the time to hear the best music.

There is a good deal of music-hall variety during the evening but although it has a wide following we become tired by so much of it.

Empire programmes seem to have little regard for the middlebrow. But he tunes to the D.E.I. programmes and hears just what he likes—light classical music and plenty of it.

One final criticism of Empire programmes; broadcasters are not kept in order. When we listen-in in England we find items starting and ending strictly on scheduled time. But let those same folk loose on an Empire programme and punctuality and timing are forgotten. The B.B.C. should keep their Empire-programme broadcasters in order and on time.

### ● Praise that is Due

Our criticisms are well meant. Let us now render due praise. The B.B.C. arrangements for special occasions are excellent. The broadcast on the day of King George's funeral was difficult to hear in Malaya because of local weather conditions, but the admirable electrical recording was given more than once. The Christmas message from the King in 1935 came through perfectly, but again there were electrical recordings. On other great occasions we are wisely given more than one opportunity of listening to the broadcast.

We have briefly mentioned the D.E.I. (Dutch-East Indies) stations. There are also stations in Penang, Kuala Lumpur, and Singapore. They probably have not such a wide appeal as the European stations or Hong Kong. The principal object of having a receiver in Malaya is, after all, to keep in touch with affairs in England, with those highlights of the year, the Boat Race, the Derby, with political crises and the like. Through radio we are able to keep in touch with England, Home and D.O.R.A., and up-to-date on our knowledge of the Homeland.

# LISTEN TO

## Liners, Cops and Aeroplanes, between 10 and 160 metres

"MUSIC HATH CHARMS," we learned at school, but there are times when it palls, and we want something different. Just what we want we hardly know ourselves, but instead of sitting back and listening we feel that we should like to take an active part in something exciting. Maybe it's a fine day and even Zeesen's mouth-organ solos bore us. Right, let's forget broadcast and chase around after something new.

### ● From the Airways

Seems a nice day for flying, so we will start at 80 metres and see if anything is happening.

Hello, what's this?

"Blue One calling Yellow Two. Change formation to . . ." What on earth can it mean? War-planes at exercise. The orders of the squadron leader and the answers of the rest of the flight can be picked up as they make mock warfare in the air. If they are very near, their evolutions may be followed through a pair of binoculars, while their voices proceed through the loud-speaker, often audible until the plane is taxiing into its hangar.

Talking of flying, how about the Graf Zeppelin? Running on regular schedule across the Atlantic this giant dirigible keeps in touch with land by means of one of the most up-to-date short-wave radio equipments in existence, and can be identified by the call sign "DENNE." It's very amusing to hear this airship talking of fine weather high above the clouds while liners are complaining bitterly of rough seas and "mal de mer."

### ● And the Seaways

And then we can turn to the liners themselves.

"Hallo Rugby, "Aquitania" calling. We have a telephone call for London." A few degrees away Rugby can be heard answering. The circuit is completed and, if we are lucky, they may not "scramble" the speech, and we can listen-in to the conversation.

We heard a lot about the "Queen Mary" when she sailed last year, and a few broadcasts were radiated from her, but many more intended for the U.S.A. were not broadcast in this country, and so many of us listened to her direct. Although the operators were saying that they didn't think their transmission quality up to broadcast standard, there seemed nothing to complain of from what most of us heard.

### ● The Relay that Leaked Out

The chief of one of the big Atlantic liners told me that on one occasion they were on a world cruise and arrived at a port in Portugal. The liner being a bit on the large size could not get into the harbour, so had to anchor about a mile from the shore. As they stayed there a few days they got friendly with the local officials who suggested that perhaps they would relay the music of the ship's orchestra to the town. As running a cable a mile out to sea was impracticable the chief thought he would try and do it by low power radio on about 80 metres. It turned out a great success but to his surprise the relay was received in England and other countries, several listeners writing in to him about it. Not only did they hear the broadcast but also one or two remarks not intended for their ears!

Eighty metres is used by ships during the night, especially during the winter, but most of the work is done on about 31 metres, where there are often so many big liners talking at once that it is difficult to sort them out.

### ● From the Lady—to the Trawler

From the trans-ocean liner to the humble trawler we turn to 160 metres. We may not hear highly-edifying conversation from the trawlers, but what they lack in refinement they make up in force of expression. There is no misunderstanding a North Sea trawler captain who is asked whether he has had a good catch when his nets are empty. The answer is emphatically negative, with plenty of emphasis. Budding novelists should listen on this band and get their nautical expressions first hand.

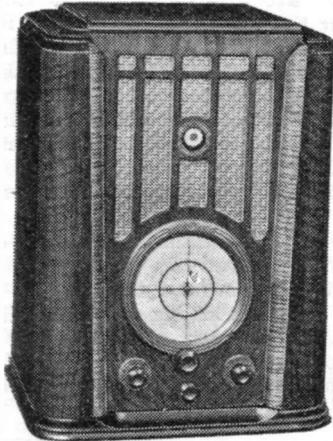
One word of warning, though. I knew an enthusiast who had expectations from two maiden aunts who were visiting him, and to obtain a spot of cash out of them for a new set he thought it would be a good idea to let them listen on his set so that he could impress them. He succeeded in impressing them all right—the first thing they heard was a quarrel between two trawlers, and, needless to say, he did not get the new set he coveted.

### ● Police!

Now that we are in this wave-band, let's have a look round and see if there is anything else interesting to be picked up. Several of the police transmitters are now using this band, both on Morse and on voice. Scotland Yard still transmit solely on Morse so it's not much good hoping to hear them

# Pilot Radio

*"The Standard of Excellence"*



PILOT MODEL U.650

THERE IS NO TERRESTRIAL LIMIT TO THE RECEPTIVE RANGE OF PILOT RECEIVERS, EUROPE IS ONLY ONE OF THE CONTINENTS THEY CAN SPAN.

Far proof, read the extracts from published "test" reports:—  
**"THE WIRELESS WORLD"** said: "Before one has traversed more than a few degrees of the dial on the 16-52 metre band it becomes apparent that the performance on short waves is something quite out of the ordinary. The crisp response and excellent signal-to-noise ratio are only two of the qualities which mark this set as a thoroughbred!" (Model U.650.)

The wonderful Pilot Tuning Beacon enables anyone to tune in stations without sound. It is much easier to tune by the eye than by the ear. You get dead accurate tuning and then get all the volume you want by just turning the volume control knob. Simplicity itself. Fitted to Table Model U.650 and Console Model CU.650.

**MODEL U.650**, 6 Valve Super-het, as illustrated above, 4 Wavebands, 16-52, 48-150, 175-550 and 750-2,100 metres. Tuning Beacon for silent accurate tuning. 3 watts undistorted output. For A.C. Mains 200/250.

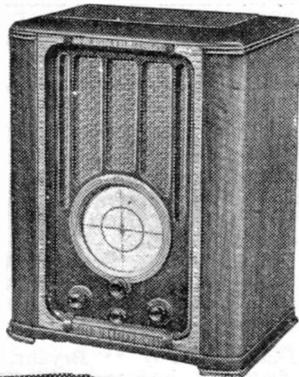
There is a D.C. **Model U.690** at 17 Gns.

Console **Model CU.650** for A.C. Mains 23 Gns.

Console **Model CU.690** for D.C. Mains 24 Gns.

**16 Gns.**

**MODEL U650**



PILOT  
MODEL  
U.225

The **"STAR"** writing about the **PILOT U.225 Universal A.C./D.C. Model** said:—

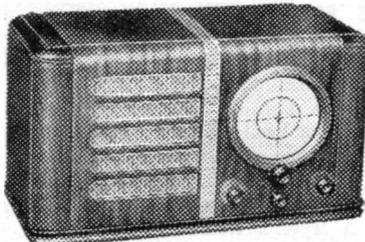
"The distinction of this set is its clear reception of short-wave stations. It has the quietest background of any set of its size that I have tested. Amos 'n' Andy have been followed night after night from New York . . . a remarkable product, one of the few that makes short-wave listening tolerable for people who judge the music by what it sounds like and not by where it comes from."

**MODEL U.225**, this 6 Valve Universal Receiver for A.C./D.C. mains, covers three separate wavebands, 16-2,140 metres. 5½-in. Compass Dial, sectionally illuminated. High and Low Ratio Tuning Dial. 8-in. Speaker. 2½ watts undistorted output.

Console **A.C./D.C. Model CU.225**, 19 Gns.

**14 Gns.**

**MODEL U225**



**PILOT MODEL U.355**, 5-Valve Superhet for A.C. Mains. Three wavebands 16-52, 180-540, 800-2,000 metres. 5½-inch Compass Dial. Fast and Slow tuning. 8-inch Speaker. 3 watts undistorted output.

**12 Gns.**

The **"DAILY HERALD"** said of Pilot Model **U.355**:—

"Its performance is out of all proportion to its size, and I was frankly astonished at the results. On the short waves my first station was Pittsburg W8XX on the 19 metres band, at full strength. Later on, Caracas, Java, Barranguilla, New York, Tokio and a host of other stations were received. In my opinion, this Pilot Model U.355 is an excellent all-wave superhet."

THERE ARE TWELVE PILOT MODELS TO CHOOSE FROM

Prices from **12** to **42** Guineas.

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Please send me Free and without obligation details of all Pilot All-Wave Superhet Receivers; also the special Pilot STANDARD TIME CONVERSION CHART "S.W."

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Place Coupon in unsealed envelope, **1d.** postage.

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Pilot Pilot Pilot



directing the flying squad in a bandit chase. But the provincial police favour the voice to the key, and stations like Swansea and Nottingham and some of the Scottish transmitters put out a strong signal all over the country.

They have not got the style that we see depicted in American ganster films, and they don't "call all cars," but rather copy the B.B.C. announcers with their very slow and precise announcements. However, they certainly put out some very interesting material, instructing cars and policemen to look for and arrest certain people, whose descriptions they read out. Stolen cars and "Hit and run" motorists take up most of their time. Incidentally they often repeat their voice announcements afterwards in Morse, at a very slow speed, so those anxious to learn the code can practice on them.

### ● Calling all cars

Dropping down right through the short-wave bands we arrive on the ten-metre band. It's a pretty erratic wave; often there is nothing to be heard because only when radio conditions are just right do signals travel any distance on it, but recently it has been remarkably good, and will

### INTERNATIONAL S.-W. CLUB (GUERNSEY CHAPTER)

At meeting (February 10) Mr. C. E. Coker, winner of first short-wave receiving contest limited to residents in Channel Islands, was presented with a 12-inch world globe on table stand. Demonstration was given of new Cossor type 3774 all-wave receiver. Details of meetings from Hon. Sec., F. S. LE PAVOUX (2BTP), 8, Upper Canichers, St. Peter-Port, Guernsey, C.I.

### INTERNATIONAL S.-W. CLUB (LONDON CHAPTER)

European and Colonial Representative: ARTHUR E. BEAR, 100, Adams Gardens Estate, S.E.16. London Chapter has own clubroom at 80, Theobalds Road, W.C.1., where a transmitter, receiver and a library are installed. Open daily to the members; to the public Friday evenings. Facilities for instruction in television. Friday evenings feature commences 8 p.m. Meetings also held in Manchester: Sec., H. WILD, 1, Elm Street, Middleton. Brighton: Sec., J. BENNETT, 205, Braeside Avenue, Brighton, 6. Guernsey: F. S. LE PAVOUX, 8, Upper Canichers, St. Peter-Port.

### INTERNATIONAL DX'ERS ALLIANCE (LONDON CHAPTER)

Primarily for listeners interested in long distance on medium and short waves. Meetings monthly, 45, Essex Street, Strand (Chequers Restaurant). Home Counties DX competition now running. Members may borrow club receivers and converters for home tests. Next meeting March 23, 7 p.m. Inquiries to H. M. Blaber (2BMH), 9, Stanton Road, S.W.20; or Secretary, J. W. KNIGHT, 6, Fleetwood Street, N.16.

### RADIO, PHYSICAL AND TELEVISION SOCIETY

Loud speaker comparisons was subject of meeting February 19, at 72a, North End Road, West Kensington. Members brought own loud speakers for comparison with a "W.B." model lent by Whiteley

probably remain so for most of the coming year.

Just below ten metres can often be heard the American police transmitters, not just audible but a really good readable signal. There you will hear the famous "Calling all cars" (or "Calling both cars" as the excited operator in a small town is reputed to have said).

They appear to have to attend to more varied things than do our English police, but even so it is interesting to hear them proceeding to their fires, or chasing traffic rule infringers. The greatest thrill with them, though, is to try and pick up the replies of the patrol cars. They are also fitted with short-wave radio, with which they answer their control station, and a little snappy wrist work on the tuning dial will permit both sides of the conversation to be heard.

At some of the American stations the actual telephone conversations between the police and the citizens who ring them up are broadcast so that the patrol cars may get information at the earliest possible moment, and to hear a harrassed police officer trying to pacify an angry, hysterical citizen can be funny, and it is unlikely that a listener's report card would meet with a reply!

Electrical Radio Co., Ltd. Test showed that for comparatively small sum it was possible to obtain first-class reproduction. Society extends a welcome to all readers of THE SHORT-WAVE MAGAZINE. Lectures on Radio, Physical Science and Television. Morse instruction, instrument calibration, technical advice, and use of reference library. Hon. Sec. and Treas., M. E. ARNOLD (2AYU), 12, Nassau Road, Barnes, S.W.13.

### WORLD FRIENDSHIP SOCIETY OF RADIO AMATEURS

No fees or subscriptions. Members sign and honour a simple pledge. Certificates of membership free to accepted applicants. American Secretary is DUANE MAGILL (W9DQD), 730, N. 6th Street, Grand Junction, Colorado, U.S.A. Applications to: ARTHUR H. BIRD (G6AQ), 35, Bellwood Road, Waverley Park, Nunhead, S.E.15.

"RADIO TO THE RESCUE"—*continued from p. 9.*

Illinois, and W. O. Bryant, W9NKD, at Campbelleburg, Kentucky, are among the many stations serving as the only communications link into their towns. A. W. Friend, W8KIU, at Morgantown, West Virginia, operated continuously from the evening of January 21st to the morning of January 24th, when he was relieved by a local operator unable to reach him previously because of the water height. Canadian amateurs co-operated by curtailing all transmissions, and thus reducing interference. In Buffalo, W8AOM took a week's holiday to assist in the handling of flood messages.

The floods subside, normal services are restored, and the amateur returns to his usual obscurity.

Is he paid for it? No, it's just part of the amateur tradition, and next time he'll be ready to do the same thing again.

And so next time you read these headlines in your paper, listen on the amateur bands, and maybe you will hear drama being made.

# RADIO to the RESCUE

You can hear drama on  
the amateur wavebands

"Storms and floods in America. Thousands homeless and dead."

B.B.C. bulletins and newspaper headlines tell of another disaster in U.S.A.

Heavy snow has fallen, covering the ground to a depth of many feet. Suddenly the thaw comes, water pours down from the mountains, rivers overflow their banks, and the flood waters race across the countryside, sweeping everything before them.

Telegraph, telephone, and electric light poles are uprooted. Houses collapse before the swirling waters of the flood, roads are swept away, whole towns are isolated and many of their population drowned and injured.

Communication is at a standstill, but the people must have food and fuel, the injured need doctors and medical supplies.

On the amateur bands thousands of stations are talking; interference is so bad that it is almost impossible for any of them to talk to anybody else.

Suddenly a weak signal is heard through all this jamming of morse and speech. It is calling "QRR," the call used to denote the emergency service.

Immediately silence falls over the bands. Amateur stations close down to avoid interfering with it. And then the amateur emergency service comes into operation.

Back in the flooded area amateurs have seen their apparatus smashed to pieces by the floods. Even if it has escaped there is no electric power to work it.

Salvaging a few odd parts and tools, the amateurs proceed to the local police station or town hall, where with the few pitiful parts left they endeavour to construct a small transmitter. Power for it must be obtained, so batteries are taken from the now useless cars. In one case they carried a car engine on to the roof of a building out of the reach of the floods, where some of them took charge of it for two days, unprotected from the pouring rain, so that it would keep the batteries charged for the transmitter they had constructed.

At last the transmitter is made—the call "QRR" is sent out, and amateurs in the nearest big town are contacted. Information is given about the locality of the floods and the extent of the damage. Supplies are ordered. Railways and roads are out of action, so, to avoid accidents, this information must be given. Supplies must come by plane, and the planes have to be told where they can land their goods. Aerial ambulances must be ordered to take away the injured.

The Press wants news of the catastrophe. Thousands of words of news are sent by the amateurs, to keep the rest of the country informed of the situation.

Anxious relatives are wondering whether their loved ones are safe. Stations all over the country arrange to forward messages to and from the flooded area. Perhaps for days the amateurs in the affected town will have to perform this service, besieged by worried inhabitants wishing to have messages sent, newspaper men with urgent news for their papers, and all the time they are wondering whether their hastily made set is going to break down,—no time for sleep or food, but just working on with the realisation that there is a job to be done.

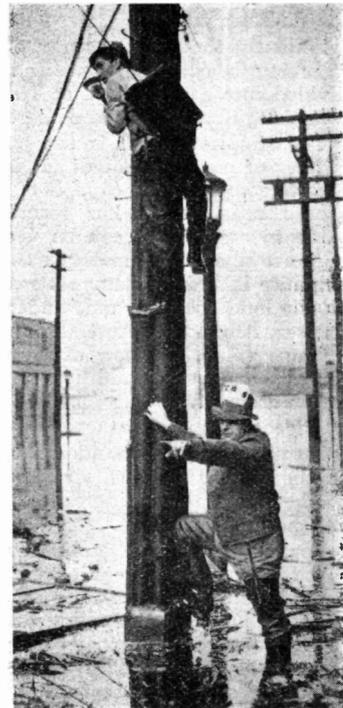
\*Once again this year floods have occurred in U.S.A., and a state of emergency still exists. In Cincinnati, W8YX, the University of Ohio's amateur station has been in continuous operation since the start of the emergency, the local power companies co-operating by installing emergency power equipment to keep the station on the air after the power failed. K. E. Schonert, W9HQD, at Harrisburg,

(Continued on page 8).

\*From information supplied by The American Radio Relay League (The American National Radio Society).

All kinds of vantage points were utilized as radio station engineers reported progress of floods in U.S. Radio stations freely gave facilities for aid in national catastrophe.

Our picture shows an observer equipped with a pack transmitter climbing a pole in flooded streets of Louisville, Kentucky, whence (C.B.S.) bulletins kept both inhabitants of stricken area and nation at large informed of hour-by-hour progress of the disaster.

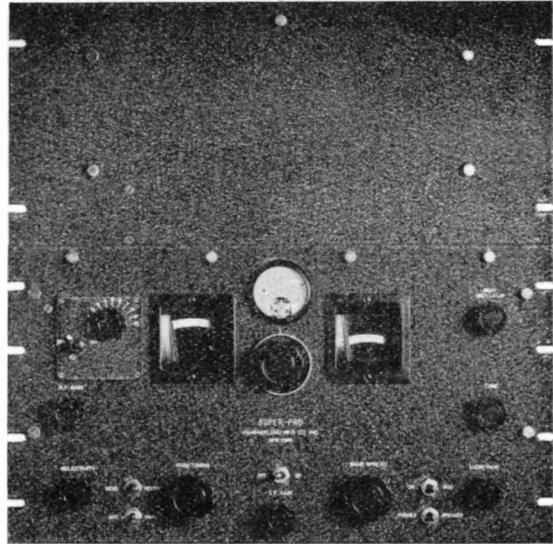


# 16

## VALVES

## TO

## ONE



### DISCUSSING VARIOUS TYPES OF SHORT-WAVE RECEIVERS

SHORT-WAVE RECEPTION is like Meccano—you can start off with a cheap, baby one-valve set, listen to Australia, America and Japan, have all the fun in the world, and then, if your pocket permits, work up to one of those terribly expensive looking multi-valve sets with enough power to fill a cinema, and enough gadgets to fill a car. Then you can sit back with a Rolls-Royce look and get the butler to turn the dials for you.

Seriously though, the array of sets available now is pretty bewildering, but in reality they can be divided into a few types, so I am going to tell you something about them and what they can do.

The simplest of all is the one valve set, either battery or mains operated. It is cheap to purchase, easy to construct and capable of giving extraordinary good results. As it has reaction, and so can be made to oscillate, it can be used for the reception of Morse signals for amateur use. If a low-frequency amplifier is added, many stations can be picked up on the loud speaker, and, under favourable circumstances, America or Australia are of quite good programme value. I know of several people who own big sets and yet in addition keep one of these sets for amusement.

Adding a radio-frequency amplifier is a further refinement giving a considerable increase of strength on the weaker stations, and also helping to obviate dead spots in the tuning caused by the aerial damping the detector valve.

For many years "straight sets," as they are called, were standard equipment in amateur stations, and I would strongly advise any amateur beginning his transmitting or receiving career on short waves to try one of these, particularly if finances are not too strong. Admittedly they require a certain amount of skill if the best results are to be obtained,

but the enthusiast often enjoys this, in the same way as many people still prefer the old type of gearbox in a car, rather than have one of the new self-changing type.

#### ● Communication Receivers

If you ever listen on the amateur bands you will have heard amateurs talking about "single signal" receivers. This is a class of set built expressly for communication use, as opposed to broadcast entertainment use. The main purpose of this type is to bring in a signal—if interference is bad it must be cut out, and if quality suffers in the process what does it matter? As long as the station is readable, that is all that counts. One of these sets, equipped with a crystal filter, can separate stations only 200 cycles apart, compared with the 5,000 cycle separation requirement of a receiver designed for broadcast reception. I do not mean to imply that the quality of these sets is poor, because they are fitted with variable selectivity, and when this is adjusted "broadly" their quality is excellent, but they are mainly used under reception conditions in which the standard all-wave set would get nothing but a bedlam of interference.

There is a photograph of one of these at the top of this article, and you can see what a complicated looking piece of apparatus it is—built in heavy steel for rough commercial use, and having sixteen controls on the front. Fancy trying to twiddle all those at once!

#### ● All-wave Receivers

With short-wave broadcast stations springing up almost daily, the public began to take an ever-increasing interest in short-wave reception. From being purely the happy hunting ground of the enthusiast, short waves became a new source of pro-

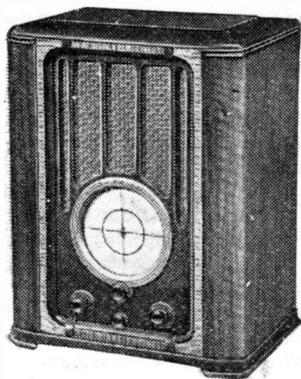
gramme entertainment. The demand was for a set similar to the usual type of broadcast receiver. It must be as easy to tune, possess as good quality of



A typical "straight" set referred to above — an "Eddystone" 2-valve Kit receiver.

reproduction. have automatic volume control to minimise fading, and be as selective as a broadcast receiver. If it could at the same time receive ordinary broadcasts, and so fulfil two purposes at the same time, so much the better.

With these requirements in mind, designers evolved the present type of all-wave receiver, capable of giving all we want on the broadcast



bands, while at the same time it will pick up practically any station on the short waves. With a set of this description it should be possible to receive a dozen stations of good programme value on the short waves at any time during the day, and as it costs no more than the ordinary broadcast set, why not have the advantage of hearing

many more of the programmes that are available. wave bands, and slow motion tuning on the two short wave bands.

Use of a pre-selector stage in the circuit effectively cuts out all traces of second channel interference, while the A.V.C. holds all but the worst fading stations constant. On the short wave bands the set was found to be capable of picking up the U.S.A. and South American stations with ease, the background noise being low, while the 8-inch moving coil speaker ensured excellent quality.

A useful feature of this receiver is the range of 48-150 metres, the 150 metre portion being particularly interesting as many police and trawler transmissions were picked up.

The receiver is equipped with a cathode ray tuning indicator, variable tone control, provision for external speaker and gramophone pick-up, and the standard finish is in a polished walnut cabinet.

## ON TEST See also page 14

### ● PHILCO CORONATION MODEL

Type U-647, all-wave table model super-het. Wave ranges: 16.4-52, 52-171.4, 171.4-566, 937-2,000 metres. Six valves, types: two 78E, one 6A7, one 75, one 2151, one 304. Universal mains model, price 18 guineas. Makers: Philco Radio and Television Corporation of Great Britain, Ltd., Perivale, Greenford, Middlesex.

PHILCO'S were one of the first firms to produce all-wave superhets, and so we were very interested to see how the latest product of their long experience in this field performed under test.

The Coronation model was tested in comparison with a 16-valve receiver specially built for THE SHORT-WAVE MAGAZINE, the necessary allowance being made for the difference in size of set. Under these circumstances, the Coronation model proved to be of the highest efficiency, and capable of picking up any short-wave signal of reasonable strength. The relay of the Opera "Norma" by W2XAD (New York) was followed for over an hour although the check set fading meter showed considerable movement, indicating excellent A.V.C. action. The tuning control consists of two concentric knobs, one giving a ratio of 8/1, and the other 40/1, resulting in ease of handling on all bands.

An interesting feature of the set is automatic aerial switching, which comes into operation when a "doublet" type aerial is used. When the receiver is used on the short wave bands, the "doublet" works in the normal manner, but on changing over to the broadcast bands the "doublet" is automatically switched over for efficient reception of broadcast, eliminating the loss of signal strength usually noticed when a "doublet" is used.

Provision is made for the use of an external speaker and pick-up, and variable tone control, shadow tuning indicator, and glowing beam wave-band indicator are incorporated.—B.W.

### ● PILOT MODEL U650

All wave table model superheterodyne. Ranges: 16-52, 48-150, 175-550, 750-2,100 metres. 7 valves (including rectifier), types: two 6D6, one 6A7, one 75, one 42, one 6G5, one 80. Price: A.C. model 16 guineas, D.C. model, 17 guineas. Makers: Pilot Radio, Ltd., 87, Park Royal Road, N.W.10.

Immediately on switching on this set, two things are noticed, one, the very clear tuning dial, and the other, the ingenious slow motion control. The compass dial is so arranged that only the tuning range in actual use is illuminated, and prevents any confusion in tuning, while by pulling the tuning knob out, the tuning ratio is altered from 12½/1 to 95/1, allowing normal tuning on the medium and long (Continued on previous column).

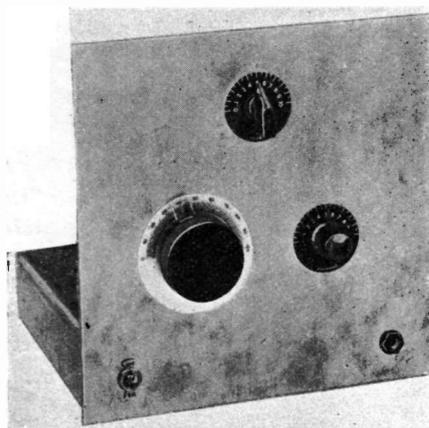
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*Presenting a*  
**One-valve, high efficiency  
receiver specially designed  
by our constructional staff**

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**Simplicity, high performance and low cost, combined with ease of construction have been factors borne closely in mind in the planning and building of this entirely new receiver. We present with pride to the constructor making his first acquaintance with short waves, to the amateur needing a receiver to give fine results, and for the owner of a "big" receiving set for use when the family have borrowed the bigger one.**

Although the design incorporates only one valve it will bring in American short-wave broadcasters at moderate loud speaker volume: during test the recent broadcast of the Metropolitan Opera "Siegfried" from W2XAF was heard for more than an hour. The set will also give a surprisingly good account of itself on the amateurs, and should be an excellent one for the American Radio Relay League contest which is described on another page of this issue.

### ● Two Valves in One

A Class B valve is used; the first section is used as a detector and the second as L.F. amplifier. As there is only one filament to light drain on the accumulator is at a minimum, the wiring is of the utmost simplicity and the veriest novice need expect no difficulty in construction.

### ● No Wavelength Gaps

The receiver covers all waves between 9 and 80 metres, with no gaps, and incorporates "band-spread" over the whole range. Consequently the user of it will find that all the short-wave broadcast bands are spread out, ensuring easy tuning, while the amateur will see that although he can quickly search for stations his bands are also band-spread.

Particular attention has been paid to the reaction control. This consists of a condenser, one side of

which is earthed—obviating hand-capacity effects—with the result that the control is unbelievably smooth. Even on the weakest CW or broadcast signal there is no sign of overlap.

### ● Simple Construction Described

To obtain full advantage from this design it is essential that each component and each wire be placed in its respective planned position. The three photographs will make this unmistakably easy.

The construction is so simple that this receiver is easier to make than to describe. The chassis is of aluminium and can be purchased ready drilled. For those who prefer to construct their own the dimensions are as follow: Front panel  $9\frac{1}{2} \times 9\frac{1}{2}$  ins.; chassis  $8\frac{3}{4}$  ins. wide by 8 ins. deep; depth of sides 2 ins. These sizes allow a  $\frac{3}{8}$  in. flange at the sides for fixing in a cabinet if desired. The relative positions of the various holes can be judged by comparing the photographs and the components.

It is advisable to leave the mounting of the three condensers on the panel until last in order to avoid possible damage while wiring under the chassis.

First fix the coil and valve holder in position, with 6 B.A. bolts (as used for the other parts). Use the bolt through the coil holder nearest to the valve for holding the .001 fixed condenser, which is in series with the variable condenser.

Next, wire together the choke and .5 mfd. condenser, at the same time fixing to the centre point one end of the 25,000 ohms resistance. These three components are placed in position after the transformer is fixed. A short wire from the free end of the choke to the nearest filament pin on the coil holder also connects a tag of the .001 condenser already mentioned. The opposite end of the .5 mfd. condenser is connected to the terminal marked "con" on transformer. Allow  $\frac{1}{4}$  inch. clearance from the "ceiling."

The grid leak ends pass through holes in the grid condenser tags and then to grid pins on the coil and valve holders.

After fixing in position the second .001 condenser, the phone-jack and switch, the wiring underneath

the chassis may be completed, leaving the four wires that pass through the chassis. All earth connections are taken to the nearest bolt and fixed.

The aerial-trimming condenser and the three panel condensers are then attached. The latter will require metal washers to take up excess thread, and must be placed at the rear of the panel. When wiring this section avoid cutting the wire insulation where it passes through the chassis.

Set the condenser pointers at maximum reading with the plates in full mesh. When tightening the knobs in position slack them slightly away from the panel to ensure freedom of motion.

Check the wiring carefully before connecting the batteries.

The terminals are, left to right: 1, H.T. +; 2, H.T. —, G.B. +; 3, L.T. —; 4, L.T. +; 5, Earth; 6, Aerial.

### ● Operation

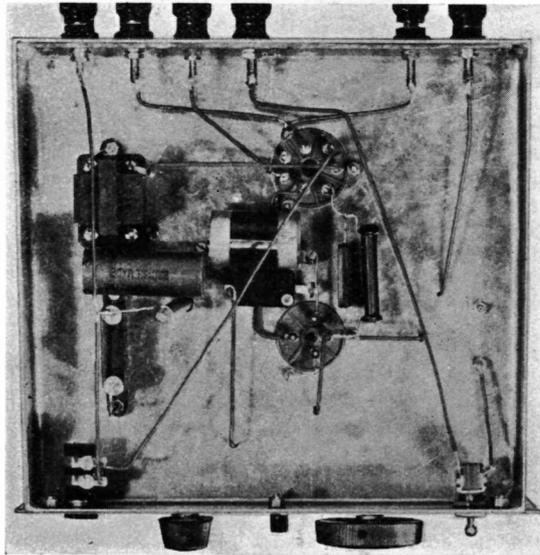
Use 150 volts H.T. for best results. With 3 volts grid bias the current consumption is only 2½ ma. A 20 a.h. accumulator will give approximately 70 hours listening.

The top control is the band setter, bottom controls left and right are respectively bandspreader and reaction.

Set the aerial trimming condenser full out and select a coil and band setting position from the table below. The reaction dial should be set about mid-way. Rotate the bandspread condenser slowly until a signal is heard. If the aerial coupling is now tightened and the station is re-tuned an increase in signal strength is gained. Carry out this process gradually until reaction fails, then ease the coupling until reaction becomes apparent again. This setting will serve the band selected.

Make a note of the position of the aerial trimmer for each band. The top fixed plate may be marked off in degrees, using the moving plate as a guide when marking with a pin.

Messrs. Burne-Jones can supply the chassis ready-drilled and with a 7-terminal strip. In the original construction the G.B. battery used was a 3 v. cell clipped near the transformer. If the seven terminals are used, that next to the earth terminal is wired to "G.B." on transformer, and a lead to negative of the battery is required.



APPROXIMATE SETTINGS.

Band.	Bandset Condenser.	Coil.
10 metres	0	} See text
16 "	5	
19 "	2	} Blue Spot
20 "	3	
25 "	5	
31 "	0	} Yellow Spot
40 "	5	
49 "	0	} Red Spot
80 "	5	

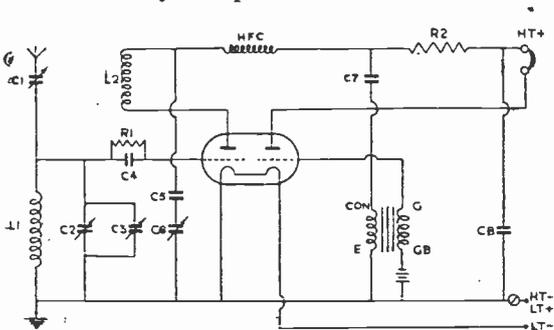
### ● On Ten Metres

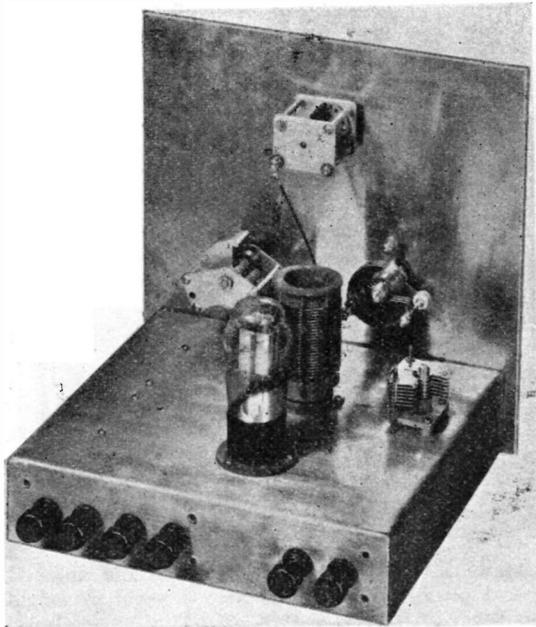
As many amateurs are interested in ten metre work it was decided to see what results could be obtained. A standard former was wound with 2½ turns for grid and 2½ for reaction spaced double the distance of the standard coils. The results, American amateurs heard in a half-hour, are listed below:

#### Phone:

W2IMX	W1AEP	W2CTO
W2FWK	W2JOH	W2IIQ
W8JFC	C.W.:	W2JXZ
W1HUV	W3ERP	W2AFM
W1HQN	W2GMM	W3CP
W9OKU	W2JAZ	VE3ER
W4WJ	W5EHM	W2JWZ
W3BC	W2ICA	W2JWZ
W3ECO	W8AAJ	W2IUD

This receiver is undergoing an independent test, and next month a report will be published on its full capabilities on all wave-bands.





#### ORIGINAL PARTS

- C2, C3--Bandspread Tuning Outfit (Eddystone—1042, 1043).
- C6—.0002 slow-motion reaction condenser (Eddystone—957).
- 3 4-pin coils (Eddystone—LB, Y, R).
- 4-pin former, wound for ten-metre band (Raymart—CT4).
- 4-pin coil base (Eddystone—953).
- 6-pin valve holder (Eddystone—964).
- C1—Aerial trimming condenser (Jackson—2144).
- L.F. transformer (Bulgin—LF12).
- Phone jack and plug (Igranic).
- Single-pole switch (Bulgin—S8OSB).
- 6 terminals (Belling-Lee—1001).
- H.F. choke (Bulgin—H.F.14).
- R1—5 m. grid leak (Erie).
- R2—20,000 ohm resistance (Erie).
- C4—.0001 condenser (Dubilier).
- C5, C8—.001 condensers (T.C.C.).
- C7—.5 condenser (Dubilier).
- 1 dozen 6 B.A. nuts and bolts.
- Valve (Hivac—B230).
- Phones (Ericsson—2,000 ohms).
- Accumulator (Fuller, 2 v., 20 a.h.).
- H.T. (Drydex).
- Battery plugs (Clix).

#### FOLKESTONE RADIO AMATEURS

Meetings second Mondays monthly, 26, Cheriton Place. Last meeting, lecture on E and F layers by G2GD. Morse classes Monday and Thursday evenings. TX building and working Tuesday evenings, at "Valiant Sailor." General work Sundays, same place. Experimenting in 56 mc. work. Hon. Sec., E. W. THOMPSON (G8BG), 70, Sandgate Road.

## ON TEST

### ● STENTORIAN DUPLEX EXTERNAL LOUD SPEAKER

Price £6 6s. Makers: Whiteley Electrical Radio Co., Ltd., Mansfield, Notts.

The Stentorian Duplex loud speaker consists of two moving coil units, one to deal with frequencies between 60 and 3,000 cycles, the other, a high note type, to deal with frequencies between 3,000 and 12,000 cycles.

Each of these units is provided with a separate volume control, and with a separate matching control, and are arranged for coupling to any normal receiver output impedance. By this means either or both units can be used at any one time, and the response balanced to the desired degree. Thus it is possible to obtain substantially straight line response between 60 and 12,000 cycles, or to attenuate either end of the response curve. This was found useful in many ways, perfect reproduction being obtainable on normal transmissions, yet on the short waves, when man-made static of a low frequency caused interference with the programme, it was possible to reduce the L.F. response, increase the H.F. response, and so clear the interference.

The unit is supplied complete in an artistic walnut cabinet.

### ● MILNES H.T. SUPPLY UNIT

120 volt super capacity High Tension Unit. Capacity: 300 m.a. hour. Discharge rate: 30 m.a. at 120 v. Price: £4 5s. 0d. Makers: Milnes Radio Co., Ltd., Bingley, Yorks.

The Milnes H.T. unit is designed for the listener situated in localities where H.T. supply is difficult. By the movement of a switch, the batteries are connected in parallel, allowing them to be charged from an accumulator.

The unit is designed for the roughest use, such as may be encountered in the Colonies. As an example of this we have been privileged to see a Milnes H.T. Unit under severe test recently. The unit was demonstrated before a radio club and the lecturer (Mr. F. G. Glanfield, sales manager) after explaining the construction and operating details, offered to supply a standard battery for use of the club. This was accepted and put into immediate use for the transmitter. As may be imagined a hard test resulted, over a period of about eight weeks. When finally checked over before returning it was found that the abnormal drain at times imposed had no damaging effect on the cells for they were in the same perfect condition as when received.—S.W.C.

# NOISE can be Cut Out with these devices

USERS OF SHORT-WAVE sets who are unfortunate enough to live near a main road, or in a road where there is plenty of motor traffic, are only too familiar with that terrible buzzing noise heard in the loud speaker when a car goes by. Just in the middle of a really good programme, or when that elusive distant station is going to announce in English, some wretched noise ruins reception and temper.

Others, in worse (radio) localities, not only have to put up with this noise, but also with the clicking of electric advertising signs, and the lift motor which announces its progress from floor to floor, through the loud speaker.

What can be done about it?

## ● The Post Office

Well, there are several ways of tackling the problem. To begin with we can start at the source of noise itself and try to suppress it there. Of course this cannot be done in the case of car interference, although many manufacturers are now fitting suppressors as standard, but it will be many years before every car on the road is so equipped. But with lift motors and signs something can be done. The best thing to do in their case is to get the help of the Post Office. Obtain a form from the local Post Office, fill it in and send it up. Engineers who are experts at suppressing interference will then investigate and try to cure the noise.

## ● Mains' Suppression

The second point of attack is at the mains themselves. It is surprising how much noise is introduced into the set through the mains. For a few shillings special suppressors can be purchased and fitted where the mains enter the house—that is at the main switch, and these devices really do cut out quite a lot of noise. Most of them consist of condensers which pass to earth any signal reaching them. The idea is that the mains (even though they are underground) pick up interfering noises just like an aerial does. These noises want to return to earth by the easiest possible way, and this is usually through the set. But by fitting one of these mains' suppressors an easier path to earth is provided, so of course the noise takes it.

## ● Special Aerials

Then there are many forms of "Anti-Static" aerial, expressly designed to reduce the pick up of noise: These operate on the principle of placing a small aerial high up out of the area of the noise, and then connecting it to the set with a special cable which can pass through the noise area without

picking up any noise. As this area only extends for about 30 feet above the ground, or source of interference, this method may often be adopted. On another page readers will find details of many of these aerials.

## ● Inside the Set

Finally noise can be suppressed actually in the set. In England this system has not yet been used commercially, but in America it is proving very popular, especially in dealing with car interference.

The theory of this method is ingenious. With car interference measurements were taken and it was found that each sharp crackle only lasted for one-thousandth part of a second, but owing to the natural characteristics of the loud speaker or headphones the crackle was prolonged to one-hundredth of a second, or even longer. So the inventor devised a circuit in which noises of this type were picked up by a valve and amplified by another one. The output of the second one was connected to the set. Now when one of these short-duration noises occurred, this device cut the set out of action for the period of the noise. The noise may occur twenty times a second so the set is cut out twenty times a second. But as the length of time it is cut out is so small, the ear cannot detect it, the noise doesn't reach the speaker, and so noise-free reception is obtained! For the technically minded it can be described as a reverse A.V.C. system in which the noise is the control for the A.V.C.

For cases which cannot be tackled at the source, such as with cars, this last system certainly seems to be the only means of escape, and perhaps we shall soon see on the market what our American friends so aptly call "Noise Cans," to add to ordinary sets.

## ● Trouble Sometimes Begins at Home

Finally, before blaming outside sources for the noise you may be getting, make sure that it does not emanate from your own house. Obvious things, such as the vacuum cleaner or the sewing machine motor are not the only household appliances that affect short-wave reception. A noise that is difficult to locate is often caused by an electric light bulb "about to go home." Try switching off the light in the room—it may be causing the trouble. The inoffensive-looking electric iron causes similar "frying" noises when the element is at the end of its useful life. Unexpected crackles, heard when others walk about the house can often be traced to loose mains wires, and on one occasion, at least, a crackle that completely obliterated reception on all waves was found to be due to a loose fuse wire.

# AERIALS

## can help or hinder short-wave reception

AN EXPERT EXPLAINS HOW AND WHAT TO USE

THE ERECTION of a short-wave aerial looks to be about the simplest thing under the sun. A few feet of wire strung round the picture rail, and presto, short-wave stations from all over the globe roll in. Or perhaps they don't.

The design of aerials for medium-wave broadcast reception has been restricted by the amount of space required to fix up anything out of the ordinary. At least 600 feet is required and that far exceeds the Post Office regulation of 100 feet. Apart from this, reception on the medium waves is mainly confined to high-power stations in fairly close proximity to the receiver, and so powerful is the received signal that even with short, inefficient aerials it is more than sufficient to provide satisfactory volume above the local noise and atmospheric level.

A different state of affairs exists on short waves. Reception is from stations thousands of miles away, signals are correspondingly weaker, atmospheric are weaker but more than compensated for by increased interference from "man-made static" (neon signs, vacuum cleaners and the like). Hence one consideration in the design of a short-wave aerial is that of noise elimination.

But another factor enters into the case at this point, that of dimension. We cannot use aerials 600 feet long on medium waves, but we can use the equivalent of them on short waves, and being able to do that it follows that we can make them directional if need be.

The basic aerial is the "half wave"; that is to say the aerial length is half the wavelength it is desired to receive or transmit on. For 20 metres the length will be about 33 feet (10 metres), a size which can be easily erected compared with the 400 feet which would be required if a similar aerial were used for London National on 261 metres.

Practically every type of short-wave aerial employs a half-wave—either singly or in groups. The

small one in the back garden has its counterpart in the dozens seen in the arrays of the big beam stations. And so the one important figure regarding them will be mentioned, the centre impedance of a half-wave aerial is 75 ohms.

When an external loud speaker is added to a set, instructions are issued by the makers that the impedance of it must be, say, 4,000 ohms, and accordingly one having this impedance is purchased. In exactly the same way any cable connecting the centre of a half-wave aerial to a receiver or transmitter must have an impedance of 75 ohms, and if this is not done most of the aerial power is lost, but if the aerial is matched up properly with the cable (or feeder as it is correctly called) 99 per cent. of the aerial power will be transferred to the receiver. This cable consists of two wires, insulated from each other and kept a definite distance apart.

### ● Anti-Static Aerials

Now we come to the anti-static part. It has been proved that most noises cling to ground level, rarely being picked up at more than 35 feet above the ground. If an ordinary aerial is erected well above the ground it will be clear of interference, but unfortunately the lead-in will pass through the 35-foot zone and pick up the noise just the same. With the half wave, however, connected to the set by means of 75 ohm cable feeder, this does not occur. Why not? Because the aerial is above the noise area. But what about the feeder? Well, the feeder consists of two wires, each of which picks up the noise, but the noise in each feeder wire is out of phase with the other wire, so the noise signal cancels itself out and does not reach the receiver. Further, the length of the feeder does not matter; it may be as much as 1,000 feet without intro-

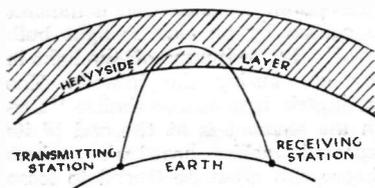


FIG. 1.

View from above.

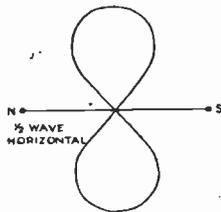


FIG. 2.

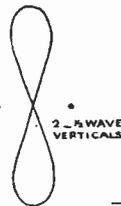


FIG. 3.

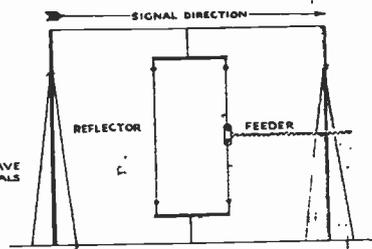


FIG. 4.

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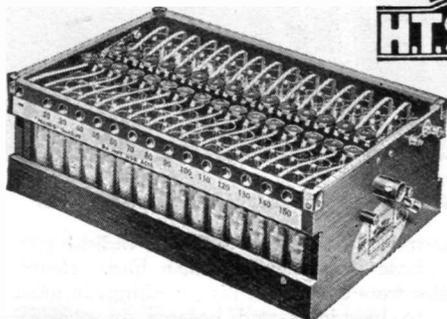
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*Important extracts from users' letters :*

From MR. H. J. BARLOW, 8, Harton Avenue, Gorton, Manchester.

"Having had my Unit now 9 months, I can say that it is worth every penny of its price and every short wave listener should invest in one. It is dead quiet in operation and I have been able to log many stations on 10 metres which I couldn't hear before owing to mains hum and noises."

From MR. JOHN H. GEAR, 8, Nottingham Terrace, N.W.1.

"I have had a 130 v. Milnes Unit in constant use for the past 9 months. It is an unqualified success. It is good for any wave length reception but specially fine for Ultra Short Wave radio. Apart from any statics which may be about, I look upon short-wave work with it more like a glorified Crystal set, as it is so perfectly free from extraneous noises."

From MR. FRED LANAWAY, 49, Granville Avenue, N.9.

"Three years have elapsed since the day I put my 120 volt D.S.C. Unit to work during which time it has done all I have asked of it. For short-wave work, a silent, crackle-free background is essential. This is where the Milnes Unit comes to the fore. A more silent H.T. supply could not be obtained, and the voltage drop, even after a long period of use, is very little. This also is a great advantage. to the DX fan, as a receiver, once calibrated, stays calibrated. My success in the International Short Wave Club's DX contest is due, in no small measure, to my Milnes Unit which I used throughout the contest."

**T**HE MILNES H.T. SUPPLY UNIT is a battery of alkaline cells with nickel-cadmium plates. It is fitted with an ingenious trouble-free switch whereby banks of four cells can be connected in parallel for automatically regulated charging from a 6 v. L.T. accumulator. With the switch in the opposite position, all cells are connected in series, giving H.T. voltage.

Recharging takes place whenever the set is not in use, so that the Milnes Unit maintains a fully-charged condition. Running costs are negligible.

Any voltage available up to 200 volts, with or without G.B. sections.

Ask your radio dealer for details or write to—

**MILNES RADIO Co., Ltd.,**  
CHURCH ST., BINGLEY, YORKS.

ducing losses, so the aerial may be erected high up well away from the house.

In the case of a transmitter the same rules apply, the two sides of the feeder cancel-out; it cannot therefore radiate and maximum power is transferred to the aerial.

### ● Height

The height of the aerial can be very important. Signals from a short-wave station do not travel along the surface of the earth but go up into the air until they reach the Heavyside layer, which refracts them as a prism does light, and so bends them back to earth (*fig. 1*), which will be reached at a definite angle. The angle at which a half-wave aerial best sends or receives a signal is determined by its height above ground, due to reflection of the signal from the ground (ground reflection). It is well, therefore, to experiment with the height until best results are obtained. In one case in which the aerial was 70 feet above the ground excellent reception was obtained from U.S.A. stations, but no South Americans could be heard. On dropping the aerial to 30 feet, U.S.A. stations dropped out and South Americans came roaring in. In cases where some particular country is elusive this is a useful tip.

### ● Directional Aerials

The half-wave aerial radiates most strongly and picks up signals best at right angles to its side, with practically no pick-up in the directions in which it points (*fig. 2*). If erected vertically the direction of no signal pick-up will be from immediately above it and immediately below it, but it will receive from every other direction. If two vertical aerials are erected a half-wave apart, and connected to the set as described, decidedly directional results will be obtained, which will mean a large increase of signal strength, and the cutting down of interfering signals from unwanted stations. The direction of reception (or transmission) is indicated in *fig. 3*. The aerials may be increased to any convenient number, commercial stations using as many as sixteen, but they should be spaced a half-wave apart. As well as giving a directional effect, adding aerials increases the pick-up considerably, two aerials picking up half as much signal again as one aerial.

Reflectors may be used to increase signal strength. A reflector consists of a wire placed about one quarter wavelength behind an aerial, and its length is slightly shorter than that of the aerial. The reflector is not connected to anything. It increases signal strength while at the same time cutting out all signals coming from behind the aerial, and is another help to reduce "man-made static."

A simple system for use on 20 metres is shown in *fig. 4*, in which both aerial and reflector are attached to two 16-foot bamboo spreaders, which are suspended from a rope slung between the two masts. The whole arrangement can be easily rotated to point in the desired direction. In beam stations a large number of aerials each have reflectors behind them.

## ARTISTES YOU CAN HEAR

### BENNY GOODMAN

Clarinet Genius and Exponent of "Swing"

By Basil Kolk

BENNY GOODMAN, featured with Jack Oakie's College programme over CBS every week is not quite 28, and is considered by the authorities of that phase of syncopated music to be the best clarinet player in this country and America.

Benny, who was heard over the B.B.C. recently in a programme from the States, was born in Chicago—one of eleven children. At the age of six he bought his first clarinet on the instalment system. His first big job was in Ben Pollack's band playing at the Black Hawk in Chicago. But Benny tired of shifting from one band to another, decided to strike out on his own. More things happened and almost at once he won a big musical competition and played at Billy Rose's Musical Hall.



Benny Goodman with his soloist, Helen Ward.

Then he assembled a new crowd, a radical group in music whose records were smash hits. Benny's records sales were one of the biggest things in music. He began to broadcast and became an overnight sensation, terming his group a "swing band."

Benny arrived at Chicago for six weeks—he stayed seven months. You may have seen him in the film 'Big Broadcast of 1936.' He is one of the mildest maestros. His rehearsals are such quiet affairs that those privileged to witness receive an impression of people sitting around and trying to work out a small problem.

Benny is reputed to forget completely to shop for clothes and suddenly telephones a friend to buy him enough clothes for a year. He wears blues, greys and blacks.

Ask Benny what "swing" music is and he looks a bit vacant—finally he mutters that it's probably "rhythmic integration." A good enough definition, but hear him play it.

## BROADCAST PROGRAMMES

With the knowledge that a number of the countries broadcasting via the short-waves are beaming their transmissions in the direction of this country, we publish the following timetable of regular weekly features. Arrangements for the inclusion of other systems are maturing, and as and when these transmissions become regular items of listening value, they will be included.

(a) W2XE, 21,520 kc. 13.9 m. (b) 17,760 kc. 16.8 m. (c) 15,270 kc. 19.2 m.  
(d) 11,830 kc. 25.3 m. (e) W3XAL 17,780 kc. 16.87 m. (f) 6,100 kc. 49.18 m.

### SUNDAY

p.m.

- 1.00 On the Air To-day (a)
- 1.05 Organ Reveille (a)
- 1.30 Lyric Serenade (a)
- 2.00 Children's Sunday Programme (a)
- 2.00 Children (e)
- 2.55 Press Radio News (a)
- 3.00 Church of the Air (a)
- 3.30 Children's Hour (a)
- 4.00 Press Radio News (e)
- 4.15 Hendrik Willem Van Loon (e)
- 4.30 MAJOR BOWES' CAPITOL FAMILY; Dalton Brothers; Helen Alexander, Coloratura Soprano; Nicholas Cosentino, Opera Tenor; Edward Matthews, Baritone; Charles Magnante, Accordionist; Sam Herman, Xylophonist; and Waldo Mayo's Orchestra (a)
- 5.30 Service from Utah (a)
- 5.30 RADIO CITY MUSIC HALL (e)



**Dr. Frank Black, the General Music Director of the National Broadcast Company. Known to English listeners in "Five Hours Back" programmes.**

- 7.00 MAGIC KEY OF RCA (e)
- 7.00 Music of the Theatre. Howard Barlow with Concert Orchestra and Guest Stars (e)
- 8.00 NEW YORK PHILHARMONIC-SYMPHONY ORCHESTRA (e)
- 10.30 GUY LOMBARDO and His Orchestra (c)
- 10.30 Col. Stoopnagel and Budd (f)
- a.m.
- 12.00 "Professor Quiz" (d)
- 12.30 Robert L. Ripley; Nelson Orchestra (f)
- 12.30 Phil Baker and Orchestra (d)
- 1.30 EDDIE CANTOR, with Bobby Breen, Deanna Durbin, Jimmy Wallington, and Jacques Renard's Orchestra (d)

p.m.

### MONDAY

- 12.30 Organ Reveille (a)
- 1.00 On the Air To-day (a)
- 1.05 The Oleanders, male quartette (a)
- 1.25 City Consumer's Guide (a)
- 1.30 Lyric Serenade (a)
- 1.45 Montana Slim, the yodelling cowboy (a)
- 2.00 Metropolitan Parade (a)
- 2.30 Richard Maxwell, Songs of Comfort and Cheer (a)
- 2.40 Press-Radio News (a)
- 2.45 "Bachelor's Children" (a)

- 3.00 "Betty and Bob," dramatic sketch (a)
- 3.00 News (e)
- 3.15 "Modern Cinderella," dramatic sketch (a)
- 3.30 Betty Crocker, cooking expert (a)
- 3.36 Hymns of All Churches (a)
- 3.48 News (a)
- 4.00 "Magazine of the Air" (a)
- 4.30 "Big Sister," dramatic sketch (a)
- 4.45 DR. ALLAN ROY DAFOE (a)
- 5.00 "The Gumps," sketch (b)
- 5.15 Ted Malone (b)
- 5.25 News Reporter (e)
- 5.30 National Farm and Home Hour (e)
- 5.30 "The Romance of Helen Trent," dramatic sketch (b)
- 5.45 "Rich Man's Darling," dramatic sketch (b)
- 6.00 FIVE STAR REVUE, Variety Programme; Morton Bove, Tenor; Mari Bell, Popular Songstress; Ray Sinatra's Orchestra and Bill Johnstone, Hollywood Reporter (c)
- 7.00 U.S. Navy Band (e)
- 7.00 "News Though a Woman's Eyes" (e)
- 8.00 Rochester Civic Orchestra (e)
- 9.30 Chicago Variety Hour (c)
- 10.00 Let's Talk it Over (e)
- 11.00 News (f)
- 11.00 Tito Guizar, Mexican Tenor (c)
- 11.05 U.S. Army Band (f)
- 11.10 News (c)
- 11.30 News (f)
- 11.45 LOWELL THOMAS--News (f)
- a.m.
- 12.00 "Poetic Melodies," Jack Fulton with Orchestra (d)
- 12.15 "POPEYE THE SAILOR," sketch (d)
- 1.00 HORACE HEIDT'S BRIGADIERS" (d)
- 1.00 HELEN HAYES in Bambi--Sketch (f)



**Fred MacMurray, film star is also M.C. at "Hollywood's Hotel" broadcast feature. His voice is familiar to film and radio fans alike. Frances Langford, dressed in slacks and a jacket, popular wear in Hollywood, is at the opposite microphone.**

## PROGRAMMES—continued.

### TUESDAY

- p.m.
- 12.30 Organ Reveille (a)
  - 1.05 The Bluebirds, Girls' Vocal Trio (a)
  - 2.40 News (a)
  - 3.00 "Gold Medal Feature Time" (a)
  - 3.00 News (e)
  - 4.30 "Big Sister" (a)
  - 5.00 "The Gumps," dramatic sketch (a)
  - 5.15 Ted Malone (a)
  - 5.25 News (e)
  - 5.30 "Romance of Helen Trent," sketch (b)
  - 5.30 National Farm and Home Hour (e)
  - 5.45 "Rich Man's Darling," dramatic sketch (b)
  - 7.30 American School of the Air (c)
  - 8.00 U.S. Marine Band (e)
  - 10.00 Tito Guizar (c)
  - 10.30 ST. LOUIS SYNCOPATORS (c)
  - 10.45 "Wilderness Road," dramatic sketch (c)
  - 11.45 News. LOWELL THOMAS (f)
- a.m.
- 12.00 "Poetic Melodies" (d)
  - 1.00 Hammerstein Music Hall (d)
  - 1.30 AL JOLSON SHOW, with Martha Raye, Sid Silvers and Victor Young's Orchestra (d)
  - 2.30 "JACK OAKIE'S COLLEGE," with BENNY GOODMAN'S BAND (d)



Here is Dr. Allan R. Dafoe, famous as doctor to Dionne quins, in his study at Callander, Ontario. He broadcasts regularly giving a daily diary of quintuplets' doings, and tells how babies and young children may benefit from the same methods of child care exercised during the infancy of his famous charges.

### WEDNESDAY

- p.m.
- 12.30 Organ Reveille (a)
  - 1.00 On the Air To-day (a)
  - 2.25 News (e)
  - 3.00 Gold Medal Feature Time (a)
  - 3.00 News (e)
  - 4.45 DR. DAFOE (a)
  - 5.25 News (a)
  - 5.30 National Farm and Home (e)

- 6.00 Five Star Revue. Variety programme (c)
  - 6.15 Art Giles and His Orchestra (c)
  - 7.00 News Through a Woman's Eyes (c)
  - 8.00 Manhattan Matinee (c)
  - 10.30 Singing Lady—Children's Skit (f)
  - 10.30 Blue Flames, Mixed Quartet (c)
  - 11.00 News (f)
  - 11.30 News (c)
  - 11.45 LOWELL THOMAS. News (f)
- a.m.
- 12.15 Vocal Trio (f)
  - 1.00 BEATRICE LILLIE, comedienne (f)
  - 1.30 ETHEL BARRYMORE (f)
  - 1.30 BURNS AND ALLEN; Henry King's Orchestra; Tony Martin, vocalist (d)

### THURSDAY

- p.m.
- 12.30 Organ Reveille (a)
  - 1.00 On the Air To-day (a)
  - 3.00 Gold Medal Feature Time (a)
  - 3.00 News (e)
  - 4.30 Big Sister (a)
  - 5.15 Ted Malone (a)
  - 5.25 News (e)
  - 5.30 National Farm and Home (e)
  - 5.30 Romance of Helen Trent (b)
  - 7.15 American School of the Air (c)
  - 8.00 Variety Programme (c)
  - 8.00 Jorge Megrete, Ramon Armengo, songs (e)
  - 8.45 Light Opera Company—Harold Sandford (e)
  - 9.30 Metropolitan Opera Guild—Talk (e)
  - 11.00 News (f)
  - 11.30 News (f)
  - 11.45 LOWELL THOMAS—News (f)
- a.m.
- 2.00 MAJOR BOWES' AMATEUR HOUR (d)

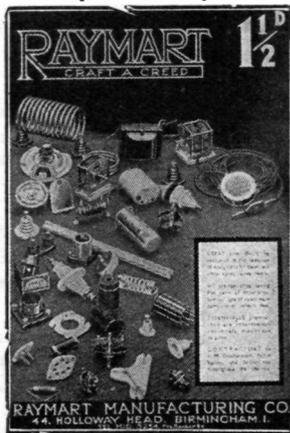
### FRIDAY

- p.m.
- 12.30 Organ Reveille (a)
  - 1.00 On the Air To-day (a)
  - 1.45 Montana Slim (a)
  - 2.00 Metropolitan Parade (a)
  - 2.25 News (a)
  - 2.30 Richard Maxwell (a)
  - 3.00 News (e)
  - 3.00 Gold Medal Feature Time (a)
  - 4.45 DR. DAFOE (a)
  - 5.25 News (e)
  - 5.30 National Farm and Home (e)
  - 6.00 Five Star Review (c)
  - 7.00 News through a Woman's Eyes (c)
  - 10.15 Singing Lady—Musical Plays (e)
  - 11.45 LOWELL THOMAS—News (f)
- a.m.
- 12.15 POPEYE THE SAILOR MAN (d)
  - 1.00 Broadway Varieties (d)
  - 1.30 HAL KEMP'S DANCE BAND (d)
  - 2.00 Hollywood Hotel (d)

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## SATURDAY

- 12.30 Organ Reveille (a)
- 1.00 On the Air To-day (a)
- 1.45 The Oleanders—Male Quartet (a)
- 3.00 News (a)
- 3.00 News (e)
- 3.15 Richard Maxwell—Songs of Comfort and Cheer
- 4.00 Young People's Concert—Philharmonic Symphony Society of New York; Ernest Schelling, conductor (a)
- 4.30 Magic of Speech—Vida Sutton (e)
- 5.25 News (e)
- 5.30 National Farm and Home (e)
- 5.30 George Hall and his Orchestra (b)
- 7.05 METROPOLITAN OPERA (e)
- 8.00 Down by Herman's (c)
- 11.00 News (f)
- 11.35 Home Symphony—Ernest La Prade (f)
- a.m.
- 1.00 Ed Wynn, Graham McNamee, comedy (f)
- 2.00 Speedshow (d)

Helen Jepson, the internationally known opera star, heard over the N.B.C.'s network on Saturday afternoons.



## A SOLUTION

to any problem relating to short-wave radio is offered free to our readers. All queries must be sent with the coupon cut from page 40 and addressed to "The Editor, The Short-Wave Magazine, 84-86 Tabernacle

Street, London, E.C.2." Problems considered of sufficient general interest will be published. A stamped addressed envelope must accompany all correspondence.

# A NEW "DX" AERIAL

## For Multi-band Operation

THE AMBITION OF most transmitters is to work as much "DX" as possible, with the minimum of power, and the maximum of consistency. Admittedly high power is a great help, but what is of far more importance is the aerial. Practically every type of aerial available to the amateur has been tried out at station G5GQ, but very serious disadvantages have been encountered with each one tried.

Take, for example, the half-wave single-wire feeder. On paper it looks very nice, easy to adjust, and can be used on several bands, but how about its directional effect? Put one up running North and South and "Yanks" can be worked by the dozen, but South Africa is off the map. If the aerial is centre fed, the position is worse because the aerial can only be used on one band. These are only two instances, but almost every type can be considered in the same way. End fed aerials appear to overcome the problem but do they give the same signal strength in all directions? No, there are always some countries out of range.

### ● Aerial Requirements

The considerations involved therefore are:

- 1.—Multi-band operation.
- 2.—Equal radiation in all directions.
- 3.—Ease of operation.

The answer to these seemed obvious: the use of a vertical aerial, but then difficulties arose regarding height. It was easy to fix up a 33ft. for half wave on twenty metres, but to use 66ft. for forty metres was a sheer impossibility. A 33ft. quarter wave Marconi type could be used on 40 metres, but that meant special switching arrangements when a band change was required.

For test, a 33ft. vertical was tried out on twenty metres, and it gave excellent results as far as covering all continents was concerned, but the height adjustment was far too critical. With the end about

8ft. from the ground good reports were received from the East Coast of U.S.A., but signals were poor on the West Coast. Raising the aerial decreased the QRK on the East Coast and raised it on the West, and so on with other parts of the world. While it was fine to get such good reports from W6, it was annoying not to be able to raise the East Coast when some particular friend there was heard.

After carrying out innumerable tests, the aerial shewn in *fig. 1* was evolved. This consists of a half wave vertical (or semi-vertical) section connected to the centre of a 66ft. horizontal section. It looks like a single wire fed type, but the 33ft. section is not a feeder; it is intended to radiate, acting as a half wave omni-directional aerial, the waves being vertically polarised. The horizontal section radiates horizontally, the combined radiation of the aerial being at a far lower angle to the ground than that of a vertical aerial alone.

### ● Results

Now for results. On twenty metres the average report from W6 was R7-8, and at the same time similar reports could be obtained from W1, ZU, and PY, all in different parts of the world. From Japan (only one J had been worked before with a QRK of R4) reports of R7-9 were received, while out of four KA stations worked, two gave R9 and the other two R7. For most of these tests an input of 180 watts was used, but with three watts input R8 has been received from W2 on 14 mc. and R7 with six watts on 7 mc.

### ● Adjustment

The adjustment is simple (*fig. 2*). The 33ft. section is connected to the P.A. tank coil via a series coil L1, consisting of about ten turns of 14 S.W.G. 4 inches diameter. The tap on the tank coil is set to where the valve draws a reasonable amount of anode current. Then the 33ft. section tap on the series coil is adjusted until the anode mls. are at

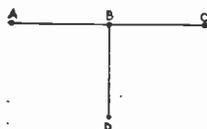


FIG. 1.

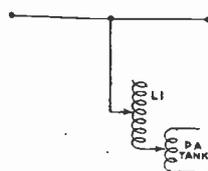


FIG. 2.

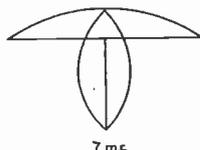


FIG. 3.

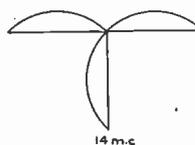


FIG. 4.

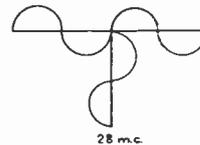


FIG. 5.

a minimum. The aerial itself is then trimmed for correct length (compensating for surrounding objects) by adding a small length of wire to, or cutting a small length off the 33ft. section until the mils. are further reduced to a minimum. Here it is found that an alteration of two feet to this will reduce the anode mils. from 90 to 50. The aerial is then ready for use, the tap on the P.A. coil is altered until the valve takes the anode current required, and the whole job is done.

The 33ft. section need not be dead vertical—tests moving it through an angle of 45 degrees have resulted in no appreciable difference.

In pruning the aerial length only the vertical section has been mentioned. Now the length A.B.D.=the length C.B.D. (66ft), so that cutting a foot off the vertical section automatically adjusts both lengths at once, but should it be preferred to cut the top, then if a foot is cut off one end, the same amount must be cut off the other end to make the two lengths equal.

An examination of the diagrams 3, 4 and 5 will show the curves for operation on 7, 14 and 28 mc. On all these three bands this aerial has been found far superior to any normal type used, with the added advantages that there are no complicated systems to adjust, and no switching necessary to change bands.

It is not proposed to set forward here any theories regarding the actual radiation patterns, or to suggest why it should give such low angle radiation. Results are the things that matter. This aerial has now been thoroughly tested, and although many other aerials have been tried during the testing period, none have been found to give as good results as this one.

#### SOUTH HANTS. RADIO TRANSMITTING SOCIETY

For those interested in radio from a scientific point of view. Mere DX hunters, etc., not welcomed as members. Meetings monthly, usually first Wednesday. During the past season lectures have included, "Propagation of 28 mc. signals," "The Transmitter Power Amplifier," "The Metal Rectifier," "Radio Measurements," etc. Field days being arranged for summer season. Lecture March is "Transformer Construction"; for April, probably the Ultra-high frequencies. Hon. Sec., EDW. J. WILLIAMS, B.Sc. (G2XC), "Rochdale," London Road, Widley, Portsmouth.

#### MEDWAY AMATEUR TRANSMITTERS SOCIETY

Meetings twice monthly, Tuesdays, 8.15 p.m. "The Sailor's Rest," Military Road, Chatham. Radio Show, March 3, in Queens Hall, Military Road, Chatham.

# FACTS



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37 SC (Senior)	63/-
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37 CC (Cadet)	39/6
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Duplex	£6 6s.

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37 B	23/6
37 M	17/6
EM/W	70/-
Duplex	84/-

If you are the type of person whose ear has become accustomed to registering in terms of frequencies and decibels, the task of describing the 1937 Stentorian's performance to you becomes infinitely easier; for the labour of evolving colourful phrases to do justice to it is completely eliminated. We merely need say—Sensitivity is up on last year's equivalent. There is no sharp hump at 100 cycles, 3,000 cycles, or indeed anywhere else. Our 42/- model gives a good response well below 50 cycles and above 10,000. The substitution of this new instrument for any normal domestic speaker brings a pronounced improvement.

HEAR ONE!

# 1937 Stentorian



WHITELEY ELECTRICAL RADIO CO., LTD. (ENQUIRY DEPT.), MANSFIELD, NOTTS.

# Morse Speed King

## Tells How to Receive at 60 words a minute

Ted McElroy, speed champion of the world, in an article specially written for this magazine recounts his experiences and gives useful hints on transmitting and receiving at high speeds.

THERE is scepticism over high-speed Morse reception in England and here in the States, but an actual demonstration soon changes disbelief into friendly accord. There was ample evidence of this some months back when I was privileged to demonstrate before the largest group of radio amateurs ever gathered under one roof, at the Central Division Convention, in Chicago, of the A.R.R.L.

As I have been honoured with an alliance with a British amateur radio apparatus distributor, G2NO, I feel especially close to radio men of Britain. I look forward with keen pleasure to visiting Britain during the late Spring or Summer of this year, when I hope to give talks and demonstrations before many radio societies.

I recently met two radio officers from a British merchant vessel. They had been brought in by the local U.S. Government radio inspector. The officers of the radio club where I was giving a demonstration had these two visitors select plain English written material from a Boston newspaper of the current day; another man took it and perforated it on a Kleinschmidt perforator and then it was run through the Creed transmitting head at a speed somewhere in the vicinity of 70 words per minute. I gave a copy of the material as I copied it at that speed to the visitors who said they were taking it back to England as souvenirs.

### ● How the Transmitter Operates

Now for a little of technical explanation. When material is to be transmitted in radio signals at high speeds the material is prepared on a perforated tape on a machine known as a Kleinschmidt. This is similar in appearance to a typewriter, but when a key is depressed, say the letter "V" there appears on the paper tape (which is automatically fed into the perforating mechanism) a series of tiny holes. On the transmitting device pins shoot through these holes making contact. The arrangement of the holes make either dots or dashes.

For example, the letter "V": three holes appear on the tape at the top of an imaginary centre line

and three holes directly under them. Then one more hole on top of the tape and another one just one hole removed on the under side. A pin shoots through the top hole to break the contact. In the case of a dash the bottom hole being one hole removed, it is twice as long before the "break contact" pin shoots through. So, on the letter "V" it is three dots and a dash.

### ● The Basic Word for Counting

In ordinary application there is the space of one dot between letters and the space of three dots between words. Below is a sample of the tape with the words "PARIS" which is considered in commercial practice as a perfect five-letter word, and it is upon this word that all word counts are based.



Note that this perfect 5-letter word takes exactly 24 centre or feed holes. In high-speed contests the judges take a piece of perforated tape with the word "PARIS" on it and run this tape through the transmitter to determine the exact speed. For example: we run "PARIS" through the transmitter thirty times in one minute and the speed is 30 w.p.m.; we run it through 70 times in one minute and the speed is 70 words per minute, and then with the transmitter continuously running at that speed brand new, unknown plain English press material is run through and the contestants try to copy.

Just for purposes of the record, and not to do any boasting, I might say at this point that the highest speed I have ever known as actually being copied in an official tournament was the 69 words per minute I copied for three minutes steadily with but one error when I last regained my title in 1935.

### ● 75 and 80 w.p.m.!

In demonstrations at various places and times, where there was no strain such as I might be under at an official tournament, I have copied with perfect copy up to 75 and 80 words per minute. But the only records that actually count are those where

there are certified officials and the figures are very carefully checked and the material carefully guarded so that no contestant has any ideas as to what might be in the material.

The average extreme limit for copying is 45 words per minute. I have been an operator for about 25 years and have travelled extensively during that time, and I know that 45 words per minute is just about the tops for the average exceptionally good radio or telegraph or cable operator. In my own case I can simply plead that I must have very little else in my head to encumber whatever portion of the brain responds to radio-telegraph signals!

I might mention that skill as a typist has much to do with the higher speeds. I find no difficulty whatever in typing much better than 100 words per minute, here again figuring five strokes of the typewriter keys to the word.

### ● My Sending Limit

Although it is true that I have been very fortunate in winning a number of tournaments in transmission of signals, I can lay no claim to any extreme speeds on sending. Using a semi-automatic transmitting key of my own design I have attained speeds slightly in excess of 50 words per minute, but it is a terrific strain and I would say that when I sit down and transmit 45 words per minute, 5 letters to the word, and have it recorded on an ink recorder with perfect signals, that I am doing my average limit.

Generally I find that radio men can receive faster than they can write the matter down. But that can be overcome by purchasing a typewriter—not costly if one secures a second-hand machine—and practising until one can do 40 or 50 words a minute. That is about the limit with most radio signals.

To develop real speed listen to press messages, not "hash." Try to copy plain English or press matter at 40 words a minute with few mistakes. That is better practice than trying to copy puzzling "hash" at lower speeds.

### ● Tips on Sending

Put a book under the key to bring the knob about two inches above the table. Then place the raised key in the centre of the desk, about where a letter to be signed would lie. With your elbow just off the edge of the desk send your dots. See how easily they flow. You will get rhythm in your sending this way.

### ● How to use a "Bug"

Correctly designed and adjusted the semi-automatic can be the greatest plaything on your radio desk. The same hints that I have given above apply to these. The fibre handles should be about two inches off the desk, and the paddles naturally up, above the table. That helps keep the wrist straight.

To send correctly with an automatic slap the paddle with your thumb, actuated by your whole arm, for dots. Slap it over to the dash side with your whole arm, the index and second finger hitting

## American Radio Relay League COMPETITION

### Open to Phone Stations

A STARTLING CHANGE in the March International DX Tests is announced by the American Radio Relay League, who organise them every year. This year, instead of the contest being only open to C.W. stations, an additional contest is to be held for phone stations only.

Quite apart from the interest this new competition will have for operators of phone transmitters, listeners will have a wonderful opportunity to hear speech from many countries which previously they have not heard, and many more will no doubt find this test the means by which they will be able to claim to have "Heard All Continents."

The phone contest begins at 00.01 G.M.T. on March 20, and ends at 23.59 G.M.T. March 28. American and Canadian amateurs will endeavour to contact as many other amateurs in other countries as possible, while amateurs outside these two countries will try to contact as many American and Canadians as possible.

Competitors will assign themselves a three-figure number, which, together with the RST report, must be exchanged for a contact to count. Thus a British station assigning himself the number 444, and receiving the W station RST 559, will transmit the number 559,444. In the case of phone contacts the tone number will naturally be omitted, and the number sent will be 55,444.

### ● The C.W. Contest

The usual C.W. contest will be held from 00.01 G.M.T. March 6 to 23.59 G.M.T. March 14. G stations may work unlimited W's and VE's, but W's and VE's are limited to three contacts with any one outside country on each wave-band used.

The final score for a G station will be 3 points for each completed contact, multiplied by the number of districts worked in each band added together. If six districts are worked on 7 mc., ten on 14 mc., and four on 28mc., then the multiplier will be twenty.

As usual certificates will be awarded to the highest scoring station in each country, one for the phone test, and one for the C.W. contest.

It should not be forgotten that American stations do not use phone on the 7 mc. band, so for the phone contest only the 1.7, 3.5, 14, and 28 mc. bands will be used, unless (and its a big unless) someone breaks the record and gets across on 56 mc.

---

the paddle. You must slap the dashes over with the wrist straight up and down, and those two fingers hitting the paddle with a full arm movement. Keep your wrist off the table, your arm diagonally across it, and the elbow up, and send with your whole arm.

# SHORT-WAVE CONVERTERS

F. H. Tidmarsh\*

## Discusses the problem of adapting broadcast sets to short waves

IN ORDER to receive short-wave transmissions on a receiver designed only for broadcast reception two methods are available: (a) A short-wave adaptor; or (b) A short-wave converter.

### ● Short-wave Adaptors

The short-wave adaptor is only a convenient way of replacing the broadcast tuning coils and condensers with those suitable for the higher frequencies used on the short waves. Essentially an adaptor consists of a tuning coil and associated condenser, reaction coil and condenser, grid leak and condenser and detector valve. Usually the H.T. and L.T. leads from the adaptor terminate in a special plug with on one side 4 pins and on the other 4 sockets arranged with standard valve spacing. In use the detector valve in the set is removed, the special plug inserted and the detector valve replaced. The tuning circuits then are those of the adaptor while the A.F. side remains as before. There is no gain on the R.F. side at all and the set behaves as a simple detector and audio-frequency amplifier.

### ● Short-wave Converters

The short-wave converter converts the incoming signal frequency to a different frequency; in the early days it converted the tuned radio-frequency receiver into a superheterodyne receiver.

For the benefit of readers unfamiliar with the superhet principle, I will digress to explain briefly how the superhet works. Let us imagine that we have our signal frequency circuit(s) tuned to 300 m. (1,000 kcs.). In addition to this we have a source of local oscillations (i.e., a valve operated in an oscillating condition). Assume that we tune the latter to oscillate at a frequency of say 890 kcs. We now feed both of these signals into a valve operating on the non-linear part of its characteristic, e.g., an anode bend detector.

As a result of these operations we shall find in the output of the valve many things (too many sometimes, as our technical readers well know); among them are signals at 1,000 kcs., 2,000 kcs., 890 kcs., 1,780 kcs., etc., and also a signal on  $1,000 + 890$  kcs. and  $1,000 - 890$  kcs. This gives us, in particular, a signal, on 110 kcs., usually referred to as the intermediate frequency.

Now it is easier to arrange to amplify a signal of fixed frequency especially when we can choose which frequency it shall be. We therefore arrange our signal and oscillator circuits so that this 110 kc.

signal is always produced whatever the incoming frequency.

By the aid of the converter we are able to use our broadcast receiver as an amplifier and detector. Actually the radio frequency circuits of our receiver amplify at the intermediate frequency, our detector acts in the usual way as does the audio frequency side of the receiver. In a short wave converter we provide the local oscillations and the mixing. The intermediate frequency output is then amplified, detected and reproduced by the broadcast receiver.

The methods of carrying out what I have described above will naturally vary according to the type of set used and will range from the simple battery triode taking its power supply from the existing batteries, to elaborate models incorporating their own power supplies.

The simple battery triode type can only be used with a set incorporating at least one stage of R.F. amplification. Without this amplification it would be much easier to use the adaptor principle. I will take it for granted that the model will work into such a set as I have mentioned.

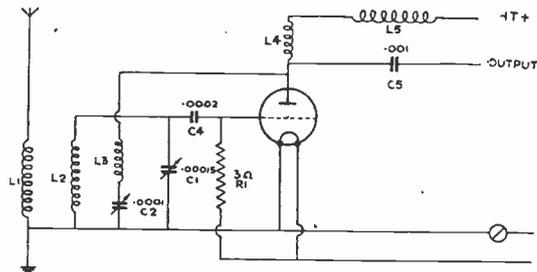


FIGURE 1.

Fig. 1 is a diagram of a converter consisting of an aerial transformer L1 L2 the secondary (L2) of which is tuned by the variable condenser C1. Wound on the same former is the reaction winding L3; this has associated with it the condenser C2. In addition there are the leak and condenser R1 C4, which rectify the beat or I.F. currents. In the anode circuit there is a short wave R.F. choke L4 to prevent R.F. from reaching the battery and hence the set, which would cause instability. The normal choke L5 acts in conjunction with the condenser C5 as a choke capacity coupling between the converter and the R.F. stage in the broadcast receiver.

In practice the coil L2 can be made either of the plug-in type or the multi-range type, so that the range of the converter can be extended. In opera-

\*Of J. J. Eastick & Sons, 118, Bunhill Row, E.C.1.

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**Bakelite case BUZZERS,** 1/6 ; Walnut case "Loud-tone," 2/6 each. Super Quality lightweight **HEADPHONES,** 3/9 pair.

tion the aerial is connected to the converter and the output from the converter to the aerial terminal of the set, the broadcast receiver is tuned to somewhere between 1,000 or 2,000 metres. This is not usually critical except that the particular wavelength chosen, must be free from any other transmission.

### ● Operating the Converter

The converter is switched on and the reaction control advanced until a rushing noise is heard. This shows that the valve is oscillating. It must be remembered that nothing will be heard unless the valve is oscillating although excessive use of reaction will have the same effect. Tuning can then be carried out on the converter. The tuning control on the broadcast set can be used as a sort of vernier tuning device. As with most superhetrodyne receivers the signal can be received in two positions corresponding to the plus and minus beat, i.e.,  $f + f_1$ , and  $f - f_1$ , where  $f$  and  $f_1$  are signal frequency and oscillator frequency respectively. This fact can be made use of if the wanted signal is being interfered with. By tuning a few degrees higher or lower the signal may be received free of interference. (The Ealex B.M. and B.I. converters are of this type.)

There is one disadvantage with this type of converter, although this does not apply to modern sets. It will not function with a simple detector-L.F. receiver. This difficulty can be overcome, however, by what is in effect an H.F. stage exterior to the broadcast receiver.

### ● Mains Converter

So far I have dealt only with the battery type converter, and we can now turn our attention to those driven from the mains.

Firstly there is the single valve type very similar to that for battery operation. The difference is in the filament heating, biasing and power supply. I propose to omit those parts of the circuit except such as are bound up with the power supply. The parts omitted can be considered to be as *fig. 1*.

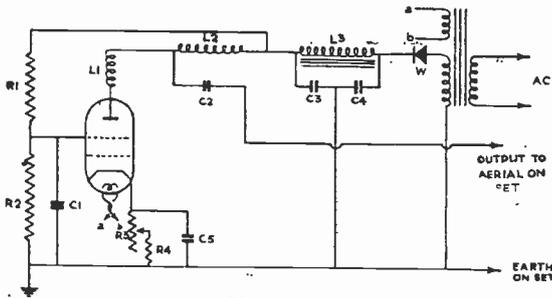


FIGURE 2.

*Fig. 2* shows a typical circuit. R1 and R2 are the screen potentiometers decoupled by C1. R3 and R4 are the cathode bias resistors decoupled by C5. Resistor R4 is to prevent the removal of all bias from the valve. L1, L2 and C2 are as in the pre-

vious example respectively R.F. choke and choke capacity coupling. T is the mains transformer and W a half-wave metal rectifier. L3 is an iron-cored smoothing choke while C3 and C4 are the smoothing and reservoir condensers. The heater of the valve is supplied from a separate winding a.b. on the mains transformer.

The Ealex M2 Super is an example of a more elaborate form of mains driven short-wave converter. It consists of a screened grid oscillator and R.F. pentode detector amplifier; and incorporates its own power pack.

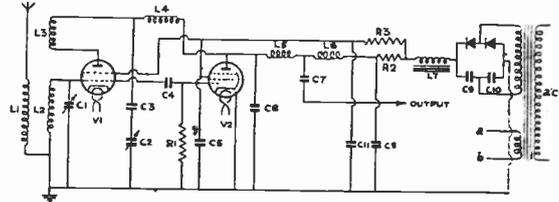


FIGURE 3.

Referring to *fig. 3* it will be noticed first that for changing the frequency a Heising or choke modulation is used. Valve V1 acts as previously described as an oscillator. The incoming signal is also fed to the grid of V2 where it is amplified. The anode of V1 is coupled to the anode of V2 by L4. Thus the signal in V2 is modulated by the oscillator frequency. This is virtually what has been happening before in a different way. In fact this changing of frequency is often referred to as modulation. As a result of this we find our required I.F. appearing in the anode circuit of V2. As previously L5 acts as a R.F. choke and L6, C7 choke capacity coupling. Full wave rectification is used. L7 is the smoothing choke. The operating values of H.T. are secured by means of voltage dropping resistors R2, R3. These, in conjunction with C8 and C11, give the additional smoothing necessary.

My next example has been made possible by the ingenuity of the valve designer who has succeeded in producing two valves in one envelope. We refer particularly to the triode-hexode valve, this consists of a triode valve and a hexode valve in one bulb. As a result of this the modulation or mixing of the signal and oscillator frequency is accomplished by means of the electrons passing from cathode to anode of the hexode section. This gave rise to the term electron- or electronically-coupled.

An example is shown in *fig. 4* (the Ealex A.2.)

Firstly there is the oscillator section, consisting of the coil L4 (dual-range) tuned by C5 and the anode coil L3. These oscillations are communicated to a grid in the hexode section. We must now digress for a moment to study the electrons on their way from the cathode to the anode. These electrons must pass the grid of the hexode referred to. As the triode section is oscillating the grid potential is swinging positive and negative at the oscillation frequency, hence that grid of the hexode mentioned above is also alternating at this frequency. The

electrons, being negative are repulsed when the grid is negative and assisted when it is positive. We may imagine the cathode-anode electron current being modulated in its passage through this grid.

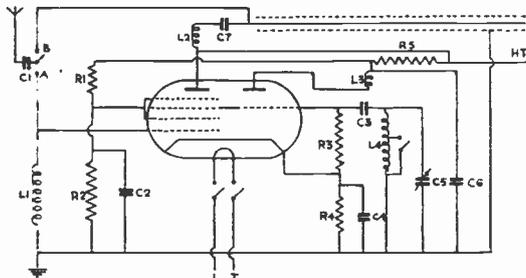


FIGURE 4.

To return to *fig. 4*. The aerial is connected through C1 to an inductance L1 which is aperiodic (i.e., untuned). Thus the signal frequency is impressed on the control grid of the hexode, and the electron current fluctuates at the signal frequency. The second and fourth grids act as accelerators or suppressor grids. The third grid causes modulation of the incoming signal as described above. In consequence the I.F. signal appears in the anode circuit of the hexode. This is coupled by the choke L2 and condenser C7 to the aerial terminal of the set via a screened cable. The remainder of the circuit will probably, by now, be quite familiar.

One important point is that of the switching system. All the switches are ganged. In one position (the centre one) the heater circuit is broken and also the aerial is transferred to the set via contact B and the screened cable. This obviates the

necessity of detaching the converter. In the other positions the heater circuit is closed, the aerial transferred to contact A and switch S opened or closed according to the wave-band in use. The connections L.T. and H.T. are brought out to a 5- or 7-pin plug which is inserted in the output stage, the output valve being afterwards replaced. In some cases it is necessary to remove the H.T. connection from the plug and tap off from the smoothed side of the speaker field. This converter has the advantage of single knob tuning. There is no reaction control and further reaction is constant over the whole wave band.

### ● A.C./D.C. Converters

Converters are also being made for use on universal mains but here again the only difference is in the H.T. supply. This entails a separate rectifier, smoothing circuit and some form of ballast resistor. In general, however, the circuit is similar to those described above.

### ● Operating Notes

In using a converter several points should receive attention if successful working is to be achieved.

- (1) *Tune slowly. This is assisted by excellent slow motion dials now available.*
- (2) *Make sure that the required station is transmitting when you are trying to receive it.*
- (3) *Have a really efficient aerial and earth system.*
- (4) *Make allowances for the effect of climate on short-wave reception.*
- (5) *Listen on the band appropriate to the time of day. This is roughly 15-30 metres in daylight, 30-60 metres during darkness (both being meant at the reception end).*

### BLACKPOOL AND FYLDE S.-W. RADIO SOCIETY

Series of talks on radio, from the elementary to the more advanced stages, including practical work on receiver design, is being arranged. Morse instruction is under the guidance of G8AK. Active members include: G5MS, well known 14 mc. DX station; G6UQ, G8GG and G6YV, active on 7 mc. and G8BA on battery powered 7 mc. C.W. Meetings are held every Thursday, 7.30 p.m. at the "Scout Den," between 49 and 51, Dean Street, Blackpool. Visitors are cordially welcomed. Hon. Sec., H. FENTON, 25, Abbey Road, Blackpool.

### BRITISH S.-W. LEAGUE

A year old. Some 500 members, including W9DXX, SUIGP, G5LP, W4UP, W4DSY, G6TF, G6GR, G12CC, TI4NRH, G2UV, G6LB, W6NDF, CJRX—CJRO. March 28, S. J. A. Nicholl (BSWL300), has arranged special broadcast, to celebrate Club's birthday, from COCD (48.92 m.), Havana, 23.00-24.00. Sec., F. A. BEANE, Ridgewell, Halstead, Essex.

### CARDIFF AND DISTRICT S.-W. CLUB

Active society recently visited Head Post Office at Cardiff, local B.B.C. studios, West Regional Station and the Upper Boat Power Station. Annual dinner held February 4, attendance including many well-

known transmitters from distant parts of Wales, G5WU taking the chair. Transmitting members include G8AM, G5XN, G5VX, G6ON and G2JL. Subscription 5s. per annum, payable 1s. 3d. per quarter in advance. Meetings held weekly at the Clubroom, City Road, Cardiff. Hon. Sec., H. H. PHILLIPS, 132, Clare Road, Cardiff.

### INTERNATIONAL S.-W. CLUB (BRIGHTON CHAPTER)

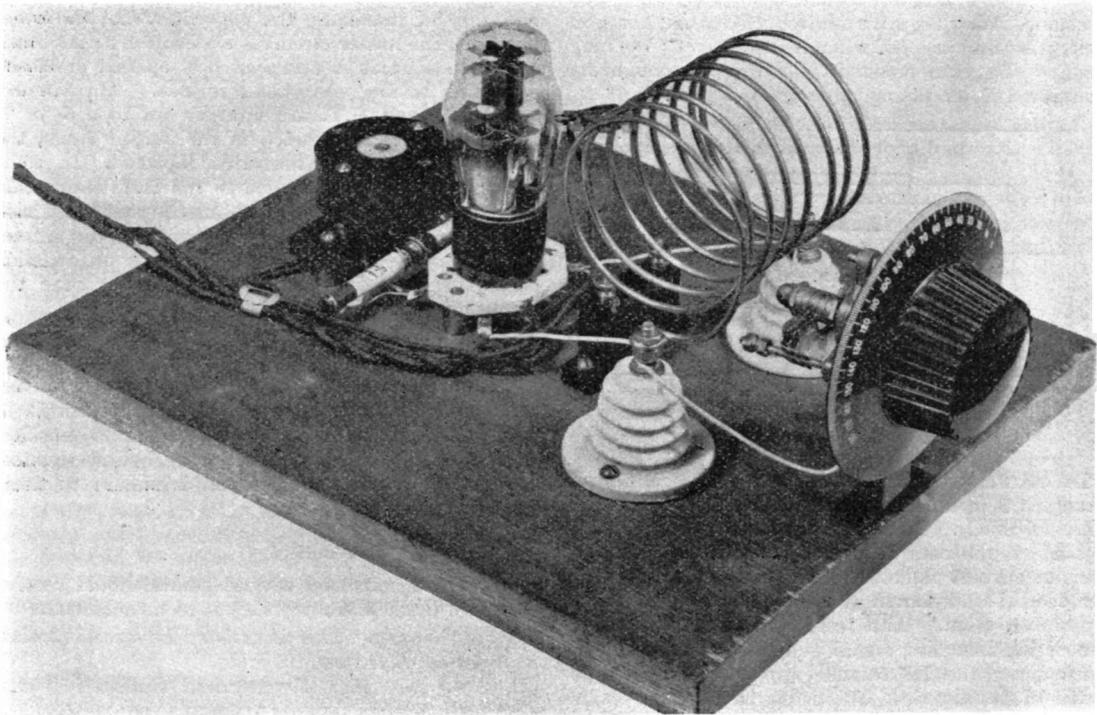
Inaugurated recently. Sec., JOHN C. BENNETT, 205, Braeside Avenue, Brighton, 6. Meetings, etc., being arranged.

### HARCO RADIO CLUB

Meetings Tuesdays, 8<sup>1</sup>/<sub>2</sub> p.m., canteen lounge, G. A. Harvey & Co. (London), Ltd., Woolwich Road, S.E.7. Free car park, and a refreshment bar. Hon. Sec., C. W. KEMP, Dept. (H.R.C.), 124, River Way, S.E.10.

### JERSEY S.-W. CLUB

Weekly meetings. Members' receivers have been tested, and some members are learning Morse. Tube 7-valve superhet being constructed for club use. Hope to apply for A.A. licence shortly, and that a contest will be held. Hon. Sec., 2AOU, "Credition," Samares.



## “ Built in a Half-Hour ”

FACED BY AN EMERGENCY, OUR EDITOR BUILT THIS  
SIMPLE, EFFICIENT TRANSMITTER IN 30 MINUTES

WHAT STARTED the whole business was a condenser “going down.” It happened like this. The other evening conditions on twenty suddenly took a turn for the better, the whole world was rocking in, so what was there to do but to turn on the transmitter and do a spot of key pounding. On went the filaments, then the H.T., and down went the key, but . . . what had happened to the aerial current? Only about half normal, but the P.A. was taking its usual input, until suddenly there was an eight-inch arc somewhere “inside the works,” the breaker came out, and all that was left of the anode by-pass condenser was a burning mass of ebonite.

Well, we put out the flames, but we were not going to lose our evening at the key. We started right away to knock up a ten-watt rig with the odd-

ments at our disposal, and well within half an hour we were on the air again.

The little transmitter we built is shown in the photo. It is a push-pull crystal oscillator, no neutralising, only one control.

Why push-pull? For two reasons; to get more power, and, because with high-frequency crystals (especially on frequencies above 7 mc.), the push-pull oscillator is really the easiest and safest to use. This circuit has given good output as a crystal oscillator with crystals having a fundamental frequency of 45 mc.

### ● Components

The value of the components is not critical—we used those we had handy. The value of the grid resistors was 12,000 ohms, but almost any value up

to 100,000 ohms did not seem to make any difference. Grid resistors were used instead of grid chokes because chokes often have resonant points near the crystal frequency, and that would cause the crystal to fracture, but no such danger exists with resistors. The condenser was the smallest "Eddystone" variable made—it had previously been used to neutralise a twenty-five watt amplifier—so any value up to .00025 may be used providing the coil is cut to match it. The coil should be roughly ten turns of 14 S.W.G. 3-inches diameter for twenty metres, and eighteen turns for forty.

The valve can be a 6A6 if 6.3 volt filament supply is available, or a 53 if only 2.5 volts is available. Both these valves are indirectly heated mains valves, having indirectly heated cathodes. The valve connections are perfectly clear in the photo. Looking down on the top of the valve holder, the two big holes are the filaments. Next to these, on each side, are the anodes. Next to the anodes, again on each side, are the grids, and the remaining connection, at the back of the transmitter, is the cathode.

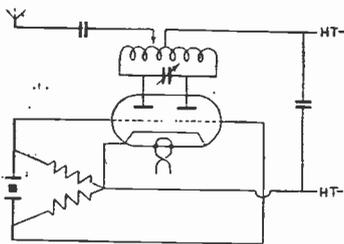


FIG. 1.

The centre-tap of the filament transformer should be connected to the negative H.T. This connection is not shown in the circuit because most amateurs connect this as

usual practice at the power supply unit.

H.T. volts up to 500 may be used, but it is better to keep them down to 350 as crystal heating and frequency drift are less with this lower value.

### ● Tuning Up

The easiest way to tune the transmitter is to use a neon bulb. Connect the H.T. tap to the centre of the coil and touch the neon bulb on either end of the coil, adjusting the variable condenser until the bulb glows brightest. Then attach the aerial a turn or so away from the centre tap (either side) and touch the bulb on the aerial lead, adjusting the tap position and condenser until the bulb glows brightest. Do not forget to touch the bulb on the aerial where the volts are—if it is tried at a current position no glow will be seen, so if this happens, alter the point of contact a few feet until a light is obtained.

Keying may be done in several ways—by inserting the key in the cathode or by keying the H.T. plus or minus. If H.T. keying is used, a resistor of 50,000 to 250,000 ohms and a small condenser across the key will result in very smooth, clickless keying.

### ● Battery Operation

If battery operation is required, the British type of "Class B" valve can be used, and in this case there will be no cathode connection, so the resistances and minus H.T. will have to be joined to one filament, and the H.T. reduced to 150 volts, at which value the power will be eight to ten watts input.

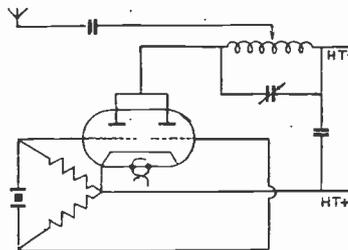


FIG. 2.

### ● Aerial Coupling

The aerial used with this "hook-up" was the one described on another page. It may be tapped on the tank coil at either side of the centre tap, and this method gives the same output as the more usual one of coupling via a link coil.

If a two-wire feeder system is used, one feeder should be tapped on each side of the centre tap, and the feeders adjusted until there is the same power in each.

### ● Other Uses

This transmitter can be used to drive a larger P.A. up to 75 watts, and if the anodes are connected in parallel instead of push-pull (fig. 2), the unit can be used as a doubler to ten metres, either on its own or to drive another stage.

#### *Components Required.*

- 2 resistances, one watt, 12,000-100,000 ohms. (Erie, Dubilier).
- 1 variable condenser .00005-.00025 mfd. (Eddystone, Jackson, Radiomart).
- 1 fixed mica condenser, .001 mfd. (Dubilier, T.C.C.)
- 1 crystal and holder (Brookes).
- 1 large seven-pin American valve holder (Eves Radio, Radiomart, Premier, Clix).
- 1 valve. 6A6 or 53 (Eves Radio, Radiomart, Premier, Ward) or if battery type: Mullard, Cossor, Osram, Hivac Class B.
- 2 stand-off porcelain insulators (Eddystone, Premier, Eves Radio, Radiomart).

### WELLINGBORO' AND DISTRICT RADIO AND TELEVISION SOCIETY

E. Cholot lectured on and demonstrated Lissen Hi-Q apparatus at last meeting. Hon. Sec., L. F. PARKER, G5LP, BSWL54. Meetings fortnightly open to all. Morse classes. Slow Morse from G5LP on 14,080 kc. (approx. 21 m.), Sundays, 11 a.m.

# On the Amateur Bands

“Ham” News by G5GQ

ONCE AGAIN the DX Contest season is upon us. First there was the South African, then the Brazilian followed by the B.E.R.U., and now everyone is getting ready for the A.R.R.L.

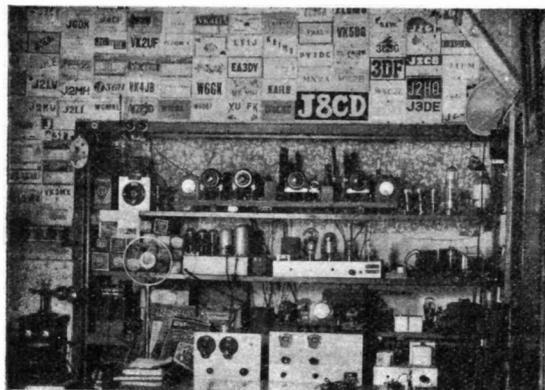
Several complaints were overheard about B.E.R.U. and PY contests dates clashing, but in one way it was fortunate, as it gave the W's something to do while the Empire stations were busy among themselves.

Conditions for both tests have been good—the PY's have been plentiful on both 7 and 14 mc.—in fact stronger than they have been for some time. PY2AJ and PY2AR, in particular, have been R8-9 several nights running.

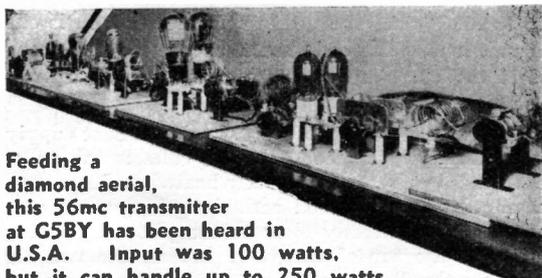
In the B.E.R.U. the air has been full of VK's, ZL's, and VE's. Of others, VP2AT has been an outstanding signal, and every time he comes on, stations can be heard calling him over almost every kilocycle of the band.

## ● A New Contest?

I see that the International Amateur Radio Union is compiling a calendar to avoid contest dates clashing, but why not scrap all our present ideas of tests and begin afresh with an inter-continental one? Run it on the lines of the A.R.R.L. and let each continent take it in turn to be the one worked. Allowing a week for each continent, it would take six weeks (spread over the year) and certificates could be issued for each, and a special certificate for the best performance of stations competing in the entire series. It would give many of us the chance to get W.A.C. and to try out directional aerials, which, in a competition of the nature of B.E.R.U. are out of the question, unless about ten of them can be put up.



J8CD, Korea, 200 watts on 14,300kc.



Feeding a diamond aerial, this 56mc transmitter at G5BY has been heard in U.S.A. Input was 100 watts, but it can handle up to 250 watts.

## ● Conditions

Conditions during the month have been variable, but greatly improved towards the end. 28 mc. has been good for W's but not for other continents. On 14 mc. VK's and ZL's have been the stars of the month, with W's fading in and out. W6 and W7 have been coming through during the late afternoon, W6BAM, W6GPQ, W6BXI, W6HEW, and W7EK having all been heard 589.

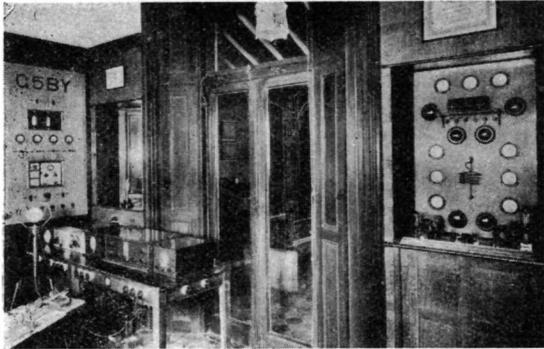
Asia has been the difficult continent, only Siberians seem to be getting through, the only "J" heard being J8CD in Korea, who was rather weak on 14,300. He is using an input of 200 watts, and last summer was one of the most consistent signals on the band. J5CC seems to be hibernating as he has not been heard recently.

7 mc. is alternately full of Spanish propaganda and W's. For some obscure reason it is always difficult to raise W's on 7 mc. before midnight—after a number of calls one of them is raised and a report of 579 obtained, but even with this report it is hard to get hold of a second one. Yet in the early morning, around 7 a.m., one test call brings the entire band back with just the same report. Maybe QRM is too bad during our late evening over there.

Duplex phone on 7 mc. is on the increase—evidently more of us are getting over the QRM problem. The objection has been raised about duplex that it causes too much QRM to others, but surely such is not the case because when QRM comes on either of the participating stations, they know immediately, and so avoid needless repetitions. G5KJ has been turning out some very fine work in this line.

## ● 56 mc

History has been made on 56 mc. by G5BY, who has at last got across the pond on five. A fine achievement, and not just luck, but the result of months of preparation. Talking to him the other day, I was told that he uses a 53 on 3.5 mc. as CO and quadrupler to 28 mc., Pen A4 doubler to 28 mc., Pen 4A doubling to 56 mc., followed by two



Remote control of all transmitters is possible from the operating table of G5BY. Left to right; 500 watt modulator, transmitter remote control board, receivers, 250 watt 3.5, 7, and 14mc transmitter. Note the first British W.A.C phone certificate and the trophy for the 1929 A.R.R.L. award for the world's best amateur station.

PM24d's in p.p. buffer to drive two Eimac 35T's in the output stage.

He avers that the transmitter is as easy to neutralise on 56 as the ordinary one is on 7 mc. Like myself he is doubtful about carbon anode valves on high frequencies. It is so easy to have a circuit out of tune at these frequencies and the high anode current resulting soon heats the anode up, and that is supposed to be fatal for carbon anode types. Perhaps some valve technician will give a definite ruling about this point.

G5BY is a staunch believer in the straight receiver, and does not like superhets. He contends that in the super the oscillator volts must be adjusted for the signal input volts, otherwise the sensitivity is below that of the straight regenerative detector. Of course a variable oscillator control can be used but then that means another control.

### ● Talking of Power

The high-power, low-power argument still goes on, and neither side will give way, but this week I received two QSL's which can be used by the combatants. The first comes from VK3PG, whose transmitting valve is a 201A, maximum H.T. 180 volt battery, power four watts, and he states that he has been QSO all continents and 59 countries. The other comes from a W7 who believes in doing things on a large scale, as his card says "Input 9 kilowatts"! I expect there is a moral somewhere. Perhaps that is why some of the W's are stronger than their broadcast stations.

### ● Coincidence

First station worked by a "G" the other night was a W2, who asked the "G" to give his greetings to W2AIW, as skip prevented them working. At the end of the QSO, the "G's" QRZ was answered by W2AIW!

Returning home from a two months' holiday, VE4PH turned on the rig, called "CQ," and the first station back to him was a "G."

### BRADFORD S.-W. CLUB

Club is building transmitter for experimenting (2BWC) on "dummy" aerial. About 50 per cent. members have artificial aerial licences. Lecture, March 12, by P.O. Telephone Interference Dept. Hon. Sec., G. WALKER (2AWR), 33, Napier Road, Thornbury, Bradford. G8JD conducts Morse class weekly. Meetings, Fridays, 7.30 p.m., Bradford Moor Council School, Leeds Road.

### SOUTHALL RADIO SOCIETY

Programme for March: 2—"Television," by Douglas Walters, G5CV; 9—Demonstration of transmitting and receiving apparatus, by Messrs. Lissen, Ltd.; 16—"Propagation of Radio Waves," by F. Charman, G6CJ; 23—The Transmitting Group Entertains, by 2CGS, 2BLX and G5JL; 30—"The Amateur Radio Movement," by John Clarricoats, G6CL. Further details from Hon. Sec., H. F. REEVE, 26, Green Drive, Southall, Middlesex.

### SWINDON AND DISTRICT S.-W. SOCIETY

Formed just over twelve months; has artificial aerial licence as well as own S-W receiver. Six A.A. licenses held by members who hope to obtain full shortly. Meetings fortnightly, lectures, Morse practice and discussions. President: W. W. Wakefield, M.P.; vice-presidents: R. A. Hiscocks, G6LM and E. Howell, G2HN. New members welcome. Hon. Sec., W. C. BARNES (2BWR), 7, Surrey Road, Swindon.

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## SHORT-WAVE FLASHES FROM ROUND THE GLOBE

IT IS the aim of SHORT WAVE MAGAZINE to supply its readers with an up-to-the-minute service of news items and reception reports obtained from all corners of the earth. To enable this to be accomplished listening posts under the control of expert operators have been established in various parts of the world—their number will be added to as time goes on. News items and reports have been, and always will be, compiled with the greatest care, and every endeavour will be made to ensure their accuracy.

Before proceeding to the news items I propose to give you a brief outline of reception experienced by our observers in New Zealand, the U.S.A. and elsewhere.

### ● Reception in New Zealand

In front of me is a report from our listening post at Waikato, North Island, New Zealand. Our operator reports hearing DJB in Zeesen at good strength on the loud speaker, but makes no mention of the Empire stations which, presumably, are not coming in well there if at all.

American transmissions have provided excellent signals and, peculiarly enough, although one of the furthest American stations from New Zealand, W2XAF in Schenectady, has been providing the best signal. W8XAL at Cincinnati and W9XAA in Chicago, although many hundred miles nearer, have seldom equalled 2XAF for consistency or strength.

A report received from Wellington, N.Z., dealing with the reception of amateur transmissions upon the 20-metre band gives reception on this waveband as extremely good, as the following log shows: XU8HW, 8MT, VE1CH in Canada, VU2HQ and 2JN in India, J2NG in Japan, ON4ZA in Belgium and F8II, France.

### ● American Conditions

From sunny New Zealand we turn to America, a country in the throes of floods which have swept away hundreds of homes and silenced many a transmitter.

Reports from New York and San Francisco show that European stations are coming in at excellent strength in the former city and only moderately in the latter. In both cities listeners report reception of many South American stations at excellent strength. Australia, on the other hand, has been a poor signal.

Our Canadian operator reports that much the same state of affairs exist there, whilst, in Venezuela the Australian stations are unheard at our listening post.

Zeesen, the Empire transmissions, as well as Buenos Ayres and North American transmissions are well heard, however.

### ● Change of Call Letters

Recently YV1BC at Caracas, Venezuela, changed its call to YV2RC. A letter before me, from the station manager, notifies me of yet another change. Henceforth the station will be known as YV5RA.

Already I have heard queries as to whether the reception of the station under its three call signs should be considered three stations or one. My opinion is that, as the station is located in the same place and has not undergone any structural change a verification for YV1BC is a verification for YV2RC and YV5RA as well.

Yet another station has taken the air in Venezuela. It is YV1RG at Maracaibo and it operates upon 1,120 and 6,350 kcs. I have not heard this station yet—have you?

### ● Little NRH

I wonder how many of my readers remember "little NRH" as TI4NRH was known a few years ago? Those who do remember him will also probably remember that the owner of the station wrote a very interesting and entertaining history of it, rendered more entertaining by being written in pidgin-English. Subscriptions towards publication of this book were made by listeners to his station.

Recently the owner of TI4NRH had an accident with one of his transmitting "bottles" (or valves, if you prefer it that way) and he is now inviting the aid of listeners to enable him to procure a new one.

TI4NRH is in reality little more than an amateur station, and does not have any licence income yet it puts over quite a decent programme as short-wave listeners will testify.

### ● Siam

From Siam—Bangkok to be exact—come details of the schedule of HS8PJ. This station operates at the following times: On Mondays from 2 to 4 p.m., G.M.T., on 11,950 and 19,020 kcs. (usually the latter), and on Thursdays at the same times upon 9,350 kcs. Announcements are made in Siamese, French and lastly, but not least, English.

### ● Coast Guard Station

An interesting American station to listen for is W1JZT of the Coast Guard Academy. Operated by cadets in their spare time it has been heard in most

parts of the world. It employs phone on the 80-metre band (with a power of 200 watts) and c.w. on 40 and 20 metres with a power of 500 watts.

Another unusual transmission, much nearer at hand, emanates from Madrid. It is UGG on 40.6 metres. This station operates nightly from 8 p.m. onwards, the "Internationale" and the Spanish Anthem being the chief, and often the only, musical items broadcast.

Others include ECM1—CNE5, 7,025 kcs. gives news in English at 8.55 p.m. PFU1, also in the 7 mc. band, English news at 8.50 p.m. and asks for reports, P.O. Box 5,264, Barcelona.

EAQ at Madrid broadcasts news bulletins in English nightly. Indeed one often picks up news of the war from one or other Spanish station. The trouble is to know whom to believe—both sides claim to be winning!

### ● At Home

Conditions have been variable during the month. Of the Americans W2XAD has been the most consistent. LRU, COCH, COCX and COCQ have been heard well also, but the only Mexican was XBA, JZI and JVP, operating simultaneously with 50 kw. asking for reports to: Kokusai Denwokaisha, Osaka Building, Tokyo, Japan.

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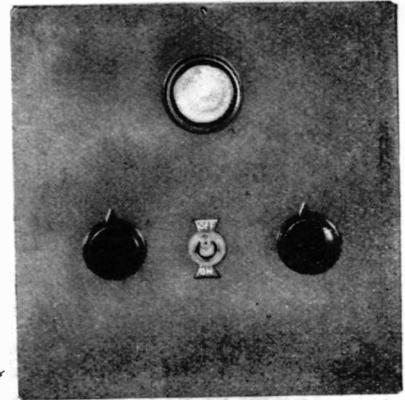
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In accordance with our policy of giving up-to-date information on the latest apparatus, THE SHORT-WAVE MAGAZINE provide advance information of this experimental model, using the 230 v. mains for the sweep circuit.

The photograph, showing the unit in a 6½-inch steel cube, and the circuit will enable the amateur to construct the apparatus to his own requirements. For those who require details of construction, etc., we shall publish in our next issue a full descriptive article.

## ● Compact Size

The tube is of extremely small dimensions: these are—

Overall length	...	4½ inches.
Base overall diameter	...	1 23/32 inches.
Tube overall diameter	...	1 5/16 inches.
Screen diameter	...	1 inch.

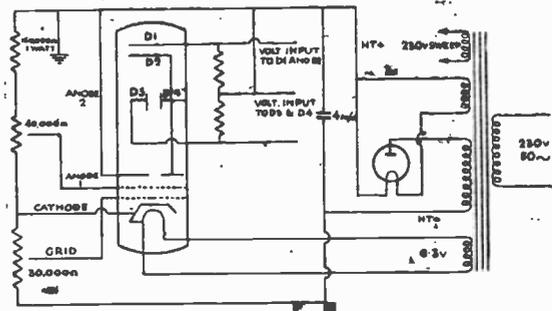
The characteristics are:

Heater volts.	...	6.3 volts.
Heater current	...	0.6 amperes.
Screen material	...	Phosphor No. 1.

## ● The Circuit

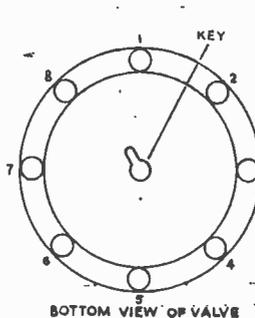
The rectifier portion of the circuit is simple and consists of a specially-wound transformer, using a rectifier of the DW4 type, and is incorporated with the cathode ray in the box illustrated.

The casing of the tube is connected to No. 2 anode. It will be realised, therefore, that the



screen end must be fully insulated from the box and should be completely covered by a glass window to prevent risk of contact.

The 913 tube fits the new octal base. Viewed from under the valve the pin connections are:



BOTTOM VIEW OF VALVE

Pin

1. Anode No. 2, D2, D4 and Shell.
2. Heater and Cathode.
3. Anode No. 1.
4. D1.
5. Grids.
6. D3.
7. Heater.
8. Tied in tube to Pin 1.

## ● Rack Mounting

The experimental model shown above is designed to fit a standard relay rack panel, leaving space at the side for a separate variable sweep circuit unit.

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WAYNE	W2XE	13.94	21.52	RADIO NATIONS	HBL	31.27	9.59
DAVENTRY	GSH	13.97	21.47	PHILADELPHIA	W3XAU	31.28	9.59
BANDOENG	PLE	15.93	18.83	SYDNEY	VK2ME	31.28	9.59
DAVENTRY	GSG	16.86	17.79	EINDHOVEN	PCJ	31.28	9.59
BOUNDBROOK	W3XAL	16.87	17.78	DAVENTRY	GSC	31.32	9.58
ZEESEN	DJE	16.89	17.76	LYNDHURST	VK3LR	31.32	9.58
WAYNE	W2XE	16.89	17.76	MILLIS	W1XK	31.35	9.57
BUDAPEST	HAS3	19.52	15.37	BOMBAY	VUB	31.36	9.56
SCHENECTADY	W2XAD	19.57	15.33	ZEESEN	DJA	31.38	9.56
DAVENTRY	GSP	19.60	15.31	ZEESEN	DJN	31.45	9.54
BUENOS AIRES	LRU	19.62	15.29	JELOY	LKJ1	31.48	9.53
ZEESEN	DJQ	19.63	15.28	TOKIO	JZI	31.48	9.53
WAYNE	W2XE	19.65	15.27	SCHENECTADY	W2XAF	31.48	9.35
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EINDHOVEN	PCJ	19.71	15.22	BUDAPEST	HAT4	32.88	9.12
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