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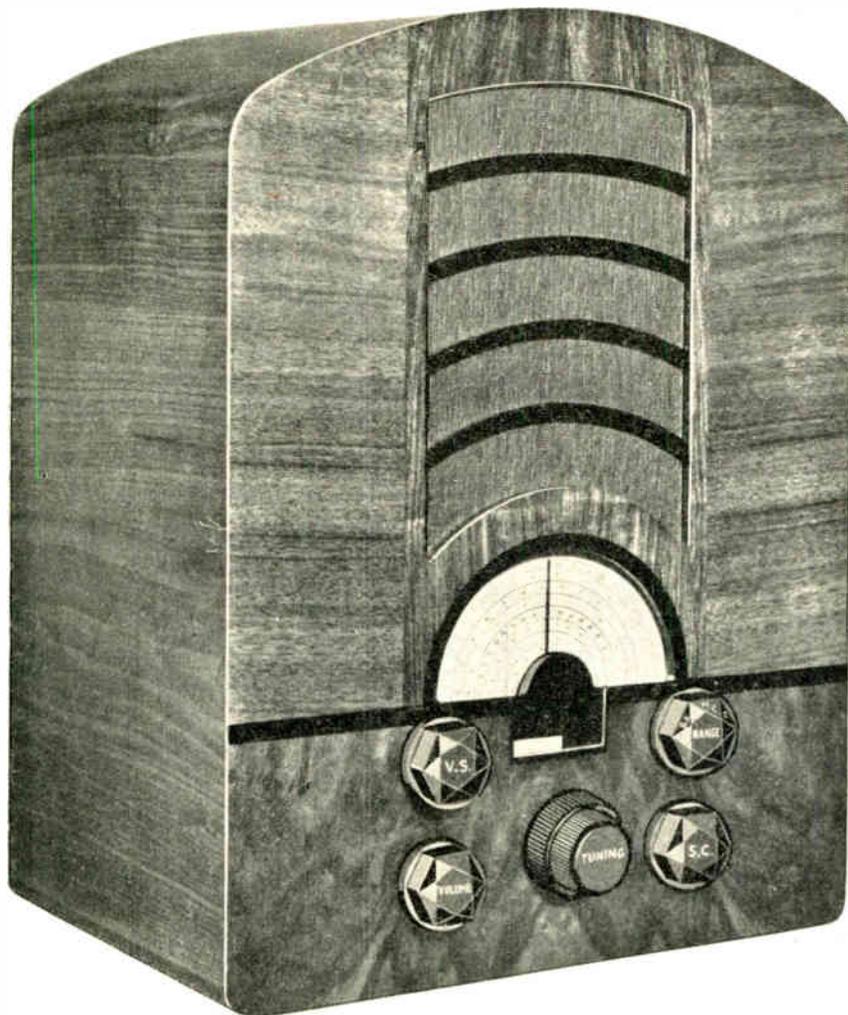
Short Wave

No. 1.

VOL. 1.

6001	0.5	Havana (Cuba) COB. Daily 12.00-13.00	31.25	9370	15	Toronto (Ont.) WANE. 12.00-13.00
6002	0.09	Singapore (S.S.) ZHL Mon. Wed. Thurs. 00.00-02.30; Sat. 04.45-06.15	31.31	9380	1	London (England) GSC.
6003	5	Zenith (D.C.) 27.00-04.30; 18.00-22.30	31.23	9390	20	Sydney (Australia) VK3LR. Mon. to Fri. 09.15-12.30; Sat. 04.00-12.30
6004	0.1	Panama City HP3B. 18.00-19.00; 01.00-04.30	31.07	9350	20	Philadelphia (Pa.) W3XAU. 17.00-01.00
6005	0.1	Calgary (Alb.) VE3CA. Thurs. 15.00-02.30; Fri. 18.00-05.00; Sat. 15.00-05.00	31.31	9377	20	Sydney (Australia) VK3ME. Sat. 06.00-09.00; 10.30-14.30; 17.30-19.30
6006	5	Boston (Ma.) W1XAL. Sun. 11.00-06.00; W. Tu. Thu. 05.30-09.45	31.31	9377	20	Radio Nations (Switzerland) HBL. Sat. 17.30-19.45
6007	15	Pennsylv. PR6S. Daily 21.00-01.30	31.31	9377	20	Rome (Italy) RLO. Sat. 01.45-03.15; Mon. from 00.00; Wed. and Fri. 01.45-03.15 and from 00.00
6008	10	Cincinnati W3KAL. 11.00-01.00; 04.00-05.00	31.31	9377	20	London (Portugal) CT1CT. Thurs. 17.00-19.00; Sat. 12.00-14.00
6009	7	Philadelphia (Pa.) W3XAU. 01.00-04.00	31.31	9377	20	Madrid (Spain) EAQ. 23.15-01.30; Sat. 10.00-12.00
6010	0.5	Sanchez (Cuba) W3XAL. 01.00-01.30; Sat. from 17.00	31.31	9377	20	Funchal (Azores) ORK. 18.30-20.00
6011	0.5	Nairobi (Kenya) YP1LO. Sat. 17.00-20.00; Mon. to Fri. 14.45-17.15 and 17.30-20.30; Sun. and Thurs. 14.30-17.30; Sat. 17.10-19.30	31.31	9377	20	Caracas (Venezuela) YV3RC
6012	0.25	Vienna (Austria) OE3L. Dly (ex Sat.) 15.00-18.00; Sat. 11.00-14.00	31.31	9377	20	Winnipeg (Man.) C1R. Dly. 00.00-01.00; Sat. 21.00-06.00; Sun. 22.00-03.30
6013	2	Lima (Peru) LT3AA. Tues. Thurs. Sat. 21.00-23.00	31.31	9377	20	Radios Colonial (Paris) FVA. 01.00-04.00; 07.00-10.00
6014	0.5	Chicago (Ill.) W3XAC. Sun. 16.00-20.30	31.31	9377	20	Toronto (Ont.) GSD.
6015	10	London (Eng.) GSC.	31.31	9377	20	Zenith (Germany) DJD. 15.00-22.30
6016	0.1	St. John (New Brunswick) VE3HJ. Daily 02.00-04.30	31.31	9377	20	Boston (Mass.) W3XAL. 11.00-00.30
6017	0.5	Birmingham (Canada) VE3W. Mon. Thu. Wed. 21.00-06.00; Thurs. Fri. Sat. 13.45-09.00; Sun. 12.00-17.00	31.31	9377	20	London (Holland) HLLDy (ex Tues. Wed.) 14.30-16.30; Sat. 10.30-17.30; Sun. 10.30-17.30
6018	5	Charlottesville (Va.) ZT1. (Experimental) Round Brook (N.J.) W3XAL. Mon. Wed. Sat. 11.00-12.00; Sat. 09.00-10.00	31.31	9377	20	Wayne (N.J.) W3XE. 20.00-22.00
6019	10	Chicago (Ill.) W3XF. Dly 01.00-02.00 and 07.00-08.00 (Sun. to 08.30)	31.31	9377	20	Toronto (Ont.) GSE.
6020	15	Dauntsey GSC.	31.31	9377	20	Pittsburgh W3XK. 01.15-04.00
6021	0.5	Calcutta (India) YUC. Dly 08.00-09.00; Tues. 12.00-17.30; Sat. 09.30-10.30	31.31	9377	20	Radios Colonial (Paris) FVA. 17.15-20.15; 24.00-00.00
6022	0.25	Caracas (Venezuela) YV3RC. Daily (ex Sat.) 10.30-15.30; 21.00-24.00; Sun. 11.15-10.30	31.31	9377	20	Moscow (Russia) RW39. Sun. 04.00-07.00; 12.00-15.00; 17.00-19.00
6023	1	Wayne (N.J.) W3XE. 23.00-04.00	31.31	9377	20	London (Portugal) CT1CT. Sat. 14.00-16.00; Sun. 10.00-12.00
6024	1.5	Bundobst (Java) Y1A. 11.30-19.00	31.31	9377	20	Paris (France) FVA. 13.00-15.00; 17.00-19.00
6025	0.18	Kuala Lumpur (F.M.S.) ZGE. Sun. Tues. and Fri. 12.40-14.00	31.31	9377	20	London (England) GSC.
6026	40	Pittsburgh W3XK. 04.00-07.00	31.31	9377	20	London (England) GSC.
6027	2	Winnipeg (Man.) C1R. Dly 00.00-05.00; Sat. 21.00-06.00; Sun. 22.00-03.30	31.31	9377	20	London (England) GSC.
6028	0.5	London (Port.) C1L. 12.00-13.30; 19.00-23.00	31.31	9377	20	London (England) GSC.
6029	0.5	Caracas (Venez.) YV3RC. 21.30-01.30	31.31	9377	20	London (England) GSC.
6030	0.35	London (Portugal) CT1GO. Sat. 16.30-18.00; Daily (ex Tues.) 00.20-01.30	31.31	9377	20	London (England) GSC.
6031	..	Santa Domingo (D.R.) HIZ. Daily 22.40-23.10; Sun. 17.00-18.30	31.31	9377	20	London (England) GSC.
6032	..	Caracas (Venez.) YV3RC. 21.30-01.30	31.31	9377	20	London (England) GSC.
6033	18	Round Brook (N.J.) W3XAL. Experimental	31.31	9377	20	London (England) GSC.
6034	0.3	Barnstable (Mass.) H3ABH. Dly 22.30-04.00	31.31	9377	20	London (England) GSC.
6035	0.1	Coli (Columbia) H3ABD. 04.00-04.00	31.31	9377	20	London (England) GSC.
6036	0.5	Valencia (Venezuela) YV3RV. 16.00-19.00; 20.00-01.00	31.31	9377	20	London (England) GSC.
6037	..	Riobamba (Ecuador) PRADO. Fri. 07.00-09.30	31.31	9377	20	London (England) GSC.
6038	0.1	Guayaquil (Ecuador) HC3PL. Sat. 23.45-13.45; Sun. 01.15-04.15	31.31	9377	20	London (England) GSC.
6039	0.3	Montreal (Canada) H3ABH	31.31	9377	20	London (England) GSC.

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Advertisement of Lissen Ltd., Edmonton, London. N.18.

Short Wave

NO. 1

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THE BIGGEST

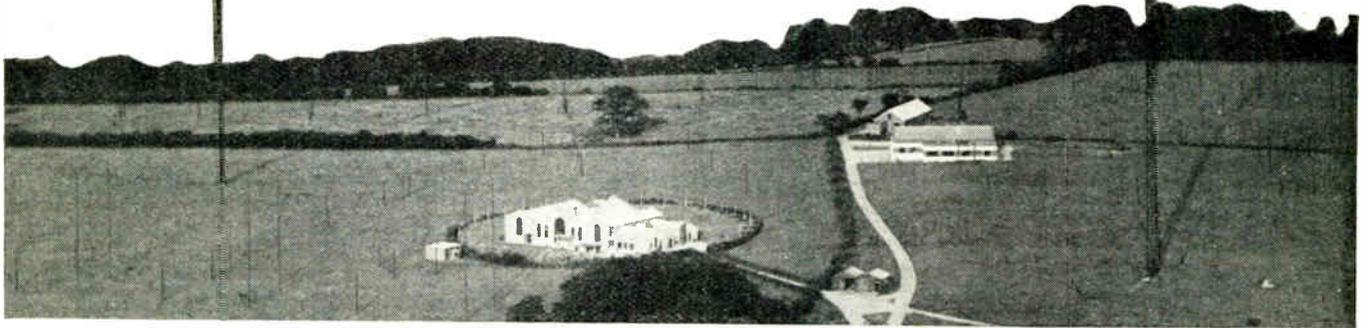


Crowding in on your aerial to-night there are hundreds of tiny voices. From over the mighty mountains they come and over the face of deep waters. From the furthest corners of the earth, from strange lands you will never see, they come to whisper on the aerial at the bottom of your garden. And your radio is deaf to them.

They are the SHORT WAVES! The long-distance adventurers of radio—outside the range of your ordinary receiver.

Yet only the simplest, inexpensive apparatus is required to receive them. Inside this issue are full details of an amazing set which you can build yourself in an evening and listen to the world!

Calling the BRITISH EMPIRE!



DURING the past few years the B.B.C. has spent hundreds of thousands of pounds in developing the technique of short-wave broadcasting, so that the programmes which for the last two years have been radiated on short waves from Daventry are now heard each day by listeners in the furthest corners of the Empire. Each month the B.B.C. receives nearly 2,000 letters of appreciation from listeners in all parts of the world. Next year two of the highest powered transmitters in the world will be opened at Daventry, which will result in a still further improvement in reception in the more distant parts of the Empire.

The Empire programmes are divided up into six transmissions daily, spread over the twenty-four hours. Each transmission is designed to coincide with an evening period in that part of the world in which reception is intended, and radiated from aerials and on wavelengths which are favourable for reception in that part of the world.

Transmission 1 is radiated during the early morning hours in England

From the Empire Broadcasting Station set in the heart of a peaceful English countryside at Daventry, programmes are broadcast night and day to the furthest outposts of the British Empire.



for evening reception in Australia, New Zealand and the Pacific Islands.

Transmission 2 takes place normally from approximately 11 a.m. to 2 p.m. G.M.T., and is primarily intended for evening reception in

Malaya and the Far East, where the difference in time is from seven to eight hours fast of Greenwich Mean Time.

Transmission 3 is timed approximately for the period between 2 p.m. and 5 p.m. G.M.T., and provides a daily evening programme for listeners in India, Burma and Ceylon.

Transmission 4 takes place daily between 5.15 p.m. and 10.45 p.m. G.M.T., and is designed for reception in the African Continent and Mediterranean Countries. The programmes in this transmission are also well heard in the West Indies and certain parts of South America.

Transmission 5 in which programmes are radiated between 11 p.m. and 1 a.m. G.M.T. is designed to serve Canada, Newfoundland, the West Indies, and British listeners generally in North and South America.

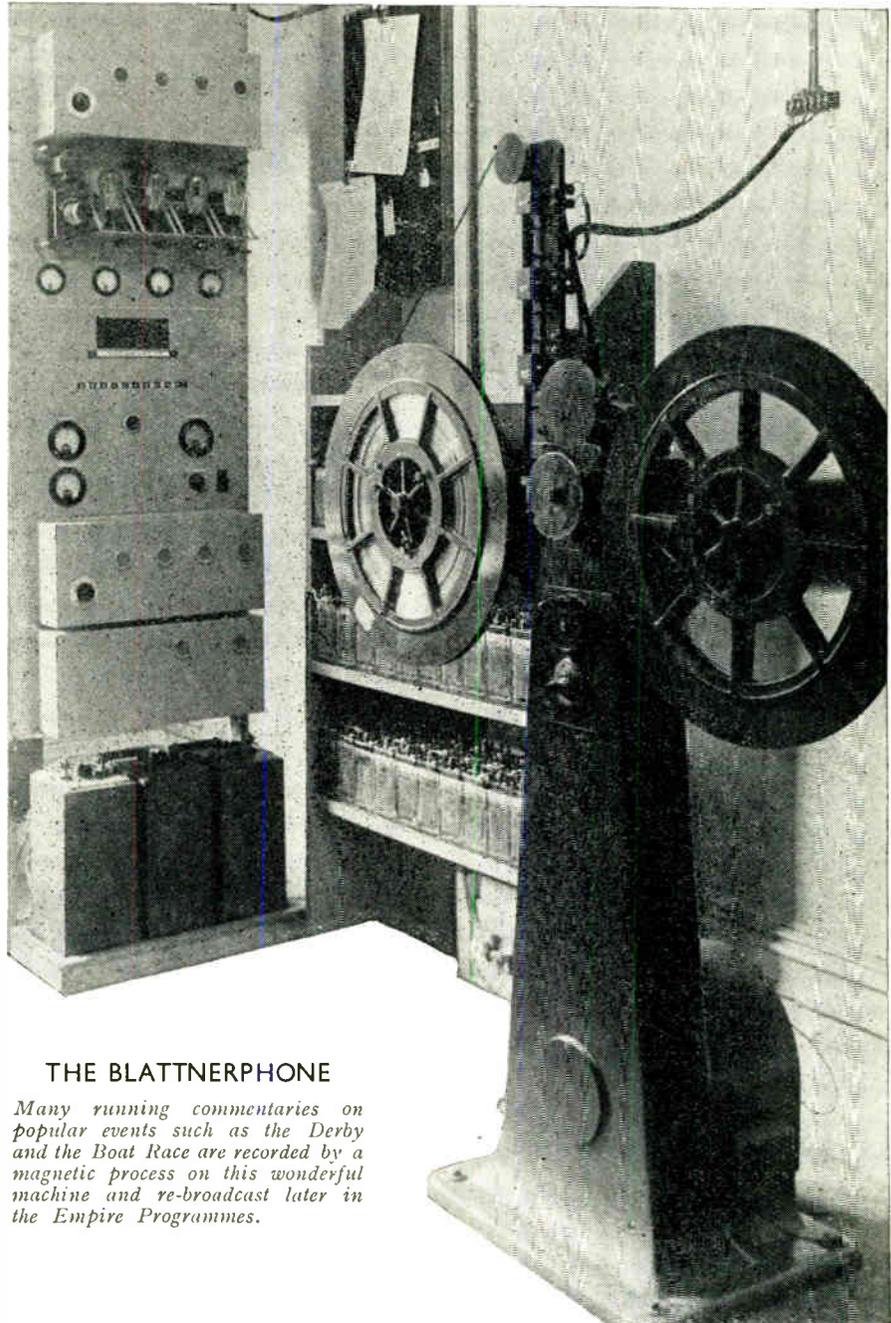
Transmission 6, which is of short duration, takes place between 3 a.m. and 4 a.m. G.M.T., and is intended specifically for reception by listeners in Western Canada.

While it can be seen that each transmission is thus designed for reception in specific parts of the world, it should be clearly understood that listeners in all parts of the globe can receive other transmissions which are not specifically designed for reception in their area, although not always at a convenient local listening time and with the same degree of volume and clarity.

Empire Programmes

All the Empire transmissions open with the chimes of Big Ben which are also used at appropriate intervals during the periods of transmission. News bulletins are broadcast daily in each transmission, each bulletin being designed to cover the events of importance which have taken place throughout the Empire and the world during the twenty-four hours preceding its transmission. As a supplement to the bulletins in certain transmissions weekly market notes on dairy produce and fruit, supplied by the Imperial Economic Committee, are broadcast, and have proved extremely popular with Empire producers.

Broadcasts in connection with public events and ceremonies of all kinds are regularly transmitted. While the actual event is broadcast simultaneously in the British programmes, and in the particular Empire transmission which coincides with



THE BLATTNERPHONE

Many running commentaries on popular events such as the Derby and the Boat Race are recorded by a magnetic process on this wonderful machine and re-broadcast later in the Empire Programmes.



the time of the home broadcast, electrical recordings are made which are reproduced in other Empire transmissions, so that they may be heard by listeners in all parts of the world at a convenient local listening time. The same principle of direct broadcasts and recording is observed in the case of sporting events, such as the Grand National, the Boat Race, Football and Cricket Matches.

In certain transmissions which take place during evening hours,

Greenwich Mean Time, considerable sections of the programmes radiated from the home medium and long-wave stations are broadcast simultaneously from the Empire transmitters. The great time difference, however, between Great Britain and certain sections of the Empire means that some transmissions take place early in the morning and late at night in England when such home programme material and facilities are not available.



B.B.C. Empire Orchestra.

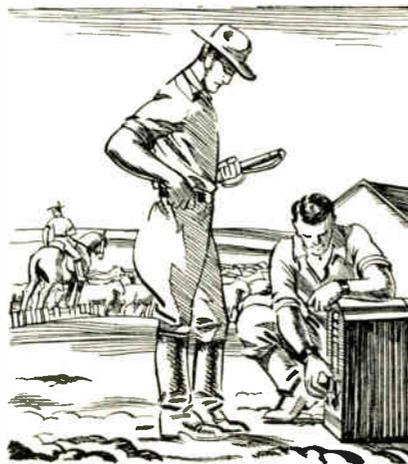
Programmes of music, drama, light entertainment, and variety are, however, provided in all Empire station transmissions. There is a B.B.C. Empire Orchestra which works under its own Musical Director, who is also responsible for the supervision of all music in Empire programmes. This orchestra contributes frequently to late night, early morning, and afternoon transmissions, for which other regular B.B.C. orchestras are not available. There are also many other programmes of a special character designed by the staff of the Empire Department to meet not only the requirements of an overseas audience but also the technical conditions of propagation on short waves, which are different from those experienced in broadcasting in Great Britain. The process of electrical recording referred to above is also employed for the purpose of making many of these special programmes available for radiation in all Empire transmissions.



A religious service is broadcast in each main transmission on Sundays. Due regard is given to the inclusion of services representative of the various denominations. In addition to the Sunday broadcasts, Evensong is relayed once weekly in afternoon transmissions, either from Westminster Abbey or York Minster. On special anniversaries appropriate services are provided from the Empire Station.

Empire Talks.

Talks are a regular feature of all transmissions from the Empire Station. The speakers include statesmen, distinguished visitors from overseas, and leaders in various walks of life. There are also individual and serial talks by authors, critics, travellers, and people in touch with



current events in every part of the world. These talks aim at representing all aspects of life and activity not only in the home country but in the Empire overseas. Of a more informative nature are the very short topical talks of five minutes' duration which, on many occasions, supplement the news bulletins. These are descriptions of anything of particular importance which happens to be taking place in England at the time—an exhibition, a race-meeting, some interesting event, or even a word-picture of some place which is figuring in the news. The process of electrical recording brings to all Empire listeners at a convenient listening time talks which are of general entertainment value.

DOTS *and* DASHES

Remember that all U.S.A. broadcasting stations announce their own call-signs and situations at least every half hour and generally the announcements are made at the clock dimensions of the hour and the half-hour. So that if you think you have "bagged" an American station you won't have long to wait before you can make sure!

* * *

If you decide to take up learning Morse as a hobby during the long winter evenings, Columbia Record Morse Code No. 3260 is worth buying. Playing it over and over again at various speeds will help you greatly to obtain a high degree of efficiency.

* * *

The first message transmitted by Morse code read: "What hath God wrought?" It was despatched from Washington to Baltimore on the world's first telegraphic line in 1844.

* * *

Not so long ago hundreds of owners of short-wave sets listened to Arctic explorers telling them how they were getting on and what it felt like to be thousands of miles nearer the Pole than they will ever go. Some reports were received direct, others through relays from American stations.

* * *

Every day there are interesting things happening all over the world and there are interesting things to be picked up from somewhere and you cannot afford to miss them. Always keep the Lissen Short-wave map of the world (presented free with this issue) beside your set for reference.

What ENTERTAINMENT can the WORLD OFFER TO-NIGHT ?



TWO hundred short-wave stations transmit programmes of varied character at all odd times of the day. Over 120 of these stations actually publish definite programmes which can be obtained weeks in advance. Most of the original programmes come from America, where all important stars from variety, stage and film broadcast quite regularly. In a single week one can hear twenty or thirty of the major American film stars and variety artists broadcast quarter-hour programmes *via* the more important short-wave stations.

Regular short-wave listeners get to know just what time these stars radiate, for in America one feature is kept going for weeks at a time until everyone knows that at 7.15, for example, Paul Whiteman will be broadcasting over W2XAD.

Another good example is Amos 'N Andy, the famous black-faced comedians, who have advertised tooth paste over W8XK in Pittsburgh every night for at least three years. Advertising is not overdone and is generally limited to about three minutes in fifteen. Amos 'N Andy can be heard on the 25 and 48 metre channels at midnight every night.

Short waves to-day have a definite Programme value and this article by a regular listener on the short-wave band gives you an idea of the sort of items you will be able to hear.

Those who have heard the Street Singer broadcasting from London probably did not realise that he broadcasts at least twice a week from wherever he happens to be in America and that his programmes are relayed throughout the N.B.C. chain and can be heard through Boundbrook on 49 metres.

Lovers of martial music who are already short-wave minded listen to the American naval band which broadcasts from Chicago at 3 p.m. on Saturday afternoons through Boundbrook on 16.87 metres. If you want to impress friends as to the superiority and efficiency of your all-wave or short-wave set, this is the station and the time to choose.

Serious minded listeners who are interested in International affairs should listen to Lowell Thomas, the world - famous journalist - traveller, who is the official "News Reeler"



for the Pittsburgh station. His transmissions at 11.45 every night including Sunday on both 25 and 48 metre channels are worth picking up. He comments on the world's news of the day and does give a good idea as to the real feelings of the American people. In addition the news he gives is generally very up-to-date while the English version can be seen in the following day's newspaper. So don't forget Lowell Thomas from Pittsburgh.

Many compare Ronald Novis with Bing Crosby. As he has only made one or two films English fans cannot have had many opportunities of making a comparison. Why not listen to him broadcasting from Schenectady. He is on at various times, on either the 19 or 31 metre channel. Stations W2XAD and W2XAF.

Coming nearer home, if you want to obtain a really good lesson in how





Bing Crosby—well-known to the public in this country as a "talkie" and gramophone record star broadcasts frequently in American programmes. Here he is seen crooning into a microphone. His son, it appears, does not show the same appreciative spirit as his thousands of "fans" all over the world.

to comper a broadcast programme, listen to some of the special programmes sent out from Zeesen, the Berlin short-wave station. These programmes are sent out on wavelengths and times that make them suitable for reception in one particular area. For example, it may be intended for North or South America, Asia or Australia, or different parts of Africa. These programmes are intimately compered and can be heard in this country *via* the ground wave at almost any time of the day. Once you have heard these programmes you will appreciate just why our colonies prefer German programmes. They really are good.

Ray Noble seems to have migrated permanently to America and conducts his own orchestra over the Philadelphia station W3XAU on 31.28 metres. He does not come on until 11.30 at the earliest, but surely this is not too late to stop up to listen to such a popular band leader. Paul Whiteman is another regular broadcaster and those who have seen him in films will find considerable enjoyment in listening to him through W3XAL, the Boundbrook station. He comes on at all odd hours—sometimes during the after-

noon session from 3 to 5 or occasionally during the evening from 3 to 10.

Many say that the Lang Sisters can compete with the Boswell Sisters. Unless you have a short-wave set you may never know, for they have not made films, neither have they been in this country. You can, of course, listen to them over W8XAL the Cincinnati short-wave station, which broadcasts on 49.59 metres from midnight onwards. Rudy Vallee and his Connecticut Yankees are a very popular show in America, at least judging by the number of times they broadcast. Although he is mainly in Los Angeles, he broadcasts over the Columbia Chain and can be heard regularly from Pittsburgh. Although I have only mentioned Pittsburgh in this case, don't forget that such popular stars are often linked up so they can be heard through ten or more American stations at once. If conditions are bad on one channel then there are plenty more to try.

If you hear a singing bird making a most awful noise you will know that you are listening to the interval signal from Sydney.

Although the programmes consist of gramophone records there is a distinct thrill in hearing the announcer say in his Australian brogue "Good-morning, good afternoon and good evening to the entire world." The Sydney station has a world-wide audience so that when it is afternoon in England it's morning in America and the following morning in Australia. A very complicated affair.

Tango bands are very nice, but very rarely do we hear a genuine orchestra. One cannot fail to pick up the Rio de Janeiro station, call sign PRF5 which radiates on 31.58 metres from 11.30 p.m. One of the most consistent items is the Argentina Tango Band which plays for half-hourly periods. Talking about tango bands, on Sunday afternoons from Chicago they broadcast a Latin Marimba orchestra, the equivalent of which is rarely heard in this part of the world.

So far most of the items mentioned are of American origin, mainly because they are so different from anything you are likely to hear in England. Programmes are also

available from Rome. This short-wave station on 31.13 metres with a call sign of 2RO often provides a better signal than the medium-wave station radiating the same programme. Looking at my programme for the next week I find that on one evening Pagliacci is being broadcast in its entirety from the Scala Theatre, Milan. The next evening there is an hour's film music which is bound to be amusing. A talk on international problems follows that. It should be good for it gives us a different angle on what is happening in Europe. And so it goes on, all of the 120 stations have something good to radiate, even if you only like a small percentage of what they have to offer, there will be more than enough programmes to give you something to think about.

Entertainment can be obtained from all continents including National music from Morocco, Fiji, and Java, propaganda and industrial talks from Russia, quaint, semi-oriental programmes of music from Japan and so on. Let it never be said that there is a scarcity of programmes on the short-waves. The time has now come when everyone should have some means of picking up at least a few of these original programmes.



up. There are only two basic units in Morse—the dot (short) and the dash — (long). Because you will find it far easier I would like you always to think and speak of these dots as “pips” and of the dashes as “peeps.” Now every letter in the alphabet has been given a certain number of these units. Some letters have one, some two, some three, but no letter has more than four.

In my opinion the simplest way to master Morse is to start by learning the single-unit letters of which there are two—then tackle the four two-unit letters, the eight three-unit letters and finally the twelve four-unit letters. I have set out a table here which shows the alphabet in that order.

Nearly everyone has their own pet method of learning the Morse code—you may be able to improve on mine. I can only recommend it to you from personal experience. And I estimate that studying it 30 minutes each day it will have taught you the Morse alphabet pretty thoroughly by the end of a week.



“Thirty minutes each day.”

Numerals.

You will see that underneath the alphabet I have set out the signals for numbers from one to ten. Don't bother about these until you know the alphabet. They are not used a tremendous amount in Morse signalling—frequently operators spell figures out. But in any case it won't take you more than a few minutes to learn them. Every numeral is a five-unit combination. From one to five the “pips” increase by one at a time. From six to ten the “peeps” increase in exactly the same way.

Methods of Morse Signalling.

You must not expect to be able to read Morse signals immediately you master the alphabet. That takes a certain amount of practice.

I expect you know that Morse signals can be transmitted by lamp or by flag, as well as telegraphically by “buzzer.” The signals you hear through your radio are, of course, all telegraphic. So this is the only method of Morse signalling you need trouble to practice. In reality it is the easiest. That is because the ear does not tire so quickly as the eye, and usually too, it registers a fraction faster.

What I suggest you do to make yourself proficient in receiving Morse signals is to purchase from any electrical store an inexpensive “buzzer” and practice transmitting and receiving Morse on that. Or you can make your own quite simply. You will find the code becoming very familiar after the first day or two. But naturally the more practice you can put in, the more proficient you will become. By the way please don't think me very rude if I ask you to polish up your Morse in some little-used corner of the house. I am only saying that for the peace of your family or friends.

I must not mislead you to think that after learning the code and a week or two's practice you will be able to decipher all the Morse you hear. You won't. Wireless operators aboard ship frequently transmit at a speed of 25/30 words a minute. It will take you quite a while to take down signals even at 12 words a minute. But don't be disheartened. There is a great deal of Morse sent out at a speed of only 6/7 words a minute and you should get hold of all that quite easily.

When you are receiving Morse and you miss a letter, don't stop to puzzle out what it might be. Leave it. At the end of the message the sense of the sentence always enables you to fill in the gaps. That is the one golden rule when you are receiving Morse—never to get behind the transmitter. You are lost if you do.

S.O.S.

In addition to the Morse alphabet there are quite a number of special Morse signals—mostly combinations



“One of the most fascinating hobbies.”

of two or more letters. AAA for instance is a full stop or end of message. FI precedes all numerals (figures intended). But you needn't trouble yourself about these. I am only mentioning them here as a matter of general interest. I suppose the most famous of these special signals is the universally known “SOS” distress call. There are very severe penalties for the misuse of this signal. It is always preceded by the signal “peep/peep/peep/—peep/peep/peep/ (TTT.TTT). Immediately an operator hears that signal he must cease transmitting. The “SOS” signal has priority over all Morse transmission. After the “SOS” has been sent out, the position of the ship or plane in distress follows and then any further particulars there is time to send. I don't think there is anything more dramatically thrilling than picking up an “SOS” message. Your imagination just runs riot as to what is happening to some unfortunate plane or vessel.

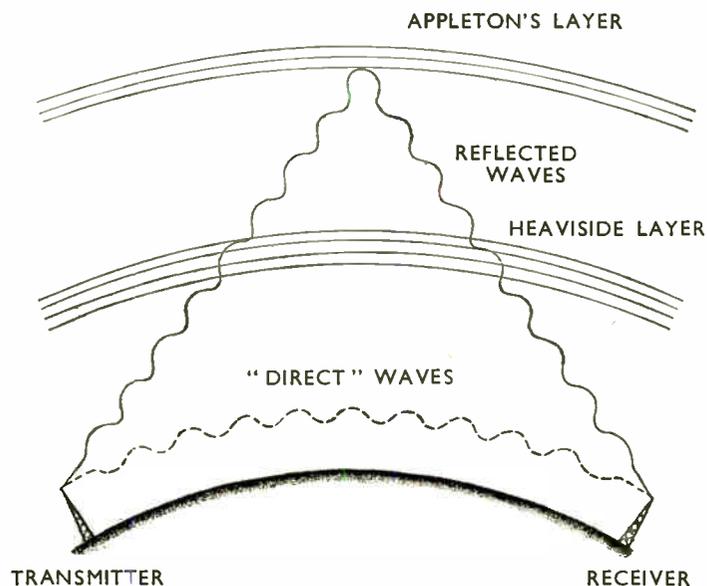
Incidentally you sometimes hear people arguing what the initial letters “SOS” actually stand for. They don't stand for anything. The simple explanation of this signal is that it is the easiest and most distinctive combination of Morse units to transmit and to receive—three pips, three peeps, three pips.

Well I hope in this outline of Morse I have interested you sufficiently to make you want to learn the Morse code. Because I can assure you if you do you will not only have added to your general knowledge, but you will have placed at your own disposal one of the most fascinating hobbies.

Why SHORT WAVES?

A QUESTION you are sure to ask is: Why must short waves be used for long distance listening? Why cannot all stations transmit on the ranges the ordinary receiver is already made for?

Taking as an example an ordinary B.B.C. medium wave station, two distinct sets of waves are radiated from the aerials. The first of these is known as the ground wave because it follows the surface of the earth. It becomes gradually weaker since its energy is taken in overcoming resistance and by absorption over the



THE WAVE BANDS AND THEIR CHARACTERISTICS

Long Waves, over 1,000 metres.

Wide coverage both by day and night with very little variation in volume at the receiving end. But very few stations can be accommodated in these wavebands, and exceptionally high power is required to cover even reasonable distances.

Medium waves, 200-550 metres

Particularly suitable for local services, but the night range is far greater than the day range. Many more stations can use these wavelengths without interfering with each other, and the power required to cover a given area is not too great.

Short waves, 28-80 metres

Of no value for local services owing to the 'skip' distances, explained on this page, but have exceptional powers for carrying thousands of miles during the hours of darkness. Require only a small power and hundreds of stations can be accommodated on the waveband.

Ultra Short waves. Below 30 metres.

Exceptional daylight range, use comparatively minute power and thousands of stations can be accommodated within the band without interference.

ground that it travels. However, it remains usually sufficiently strong up to 75 miles to provide good reception. The second wave known as the sky-wave travels outwards and upwards. High above the earth this sky-wave encounters an ionised belt known as the Heaviside Layer. During daylight the medium and long wave transmissions that reach this layer are almost completely absorbed so we have to rely on ground wave reception. This accounts for why ordinary broadcasting stations are comparatively weak until after dark. After dark the layer reflects instead of absorbs the waves, so widely increasing the range of any given station.

Now on short-waves although two waves are again sent out, the ground wave is very rapidly absorbed, so need not be considered. The sky-wave penetrates the Heaviside Layer and is reflected back by a second layer 150 miles up. This layer (called Appleton's Layer) reflects most of the waves back to earth at such an angle that the signals come back many thousands of miles away from the transmitter. As there is no ground wave, reception depends entirely on the sky-wave and if this comes down at a great

distance from the transmitter, it explains quite simply why it is so easy to hear American and other long distance stations on a small set.

A phenomenon known as skip-distance must also be considered. The area between the transmitter and a point where the reflected wave comes back to earth is almost without signals at all. This accounts for the fact that the English Empire transmitters can rarely be heard in this country while the New York transmitters are louder in England and Africa, for example, than they are actually in and around the State of New York.

They haven't time for breakfast, but—

Hundreds of short-wave enthusiasts get 'on the air' before they leave for business in the morning and pick-up pieces of news from all over the world. The news of the two great air-ship disasters in America was first received in England by these short-wave listeners.

The **LISSEN** *Bandspread*

FREE

with this issue to every Short-Wave reader

BLUE PRINT

AND COMPLETE POINT TO POINT WIRING INSTRUCTIONS

Tell your Wireless Friends!

Short-Wave 3

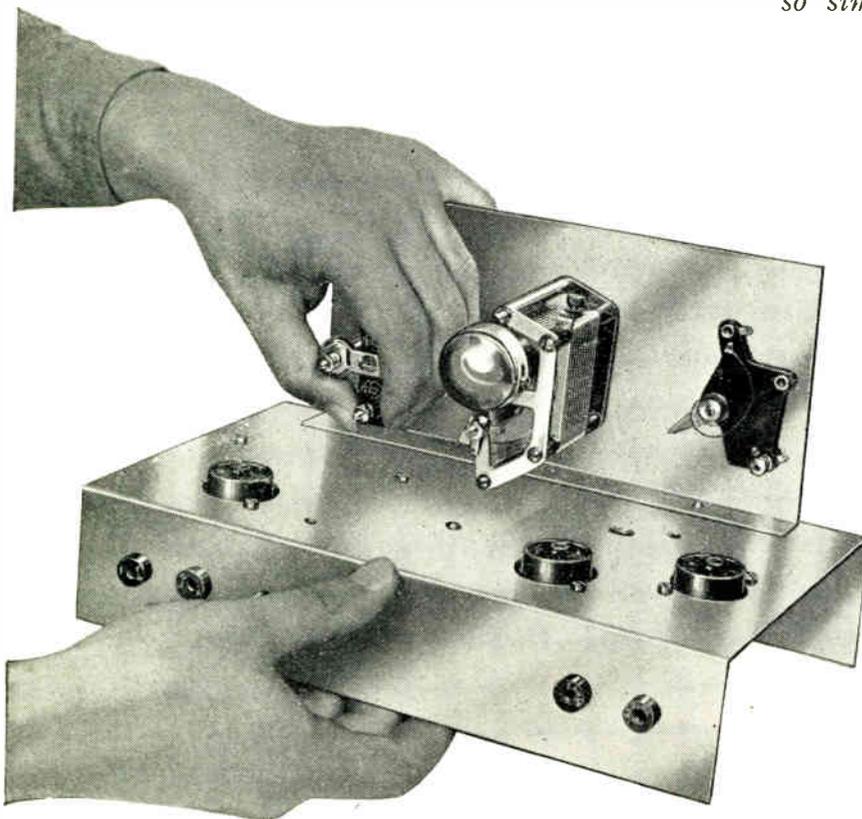
*T*WO hours after your radio dealer has handed you your Lissen Bandspread Short Wave Kit over the counter you can be listening to programmes from the farthest corners of the earth. Never before has a short wave kit been produced that is so simple to build and easy to operate.

All you need to construct the amazing Short wave kit is a pair of pliers or a small spanner and a screw driver. If you follow the blue print carefully, there can be no possibility of error.

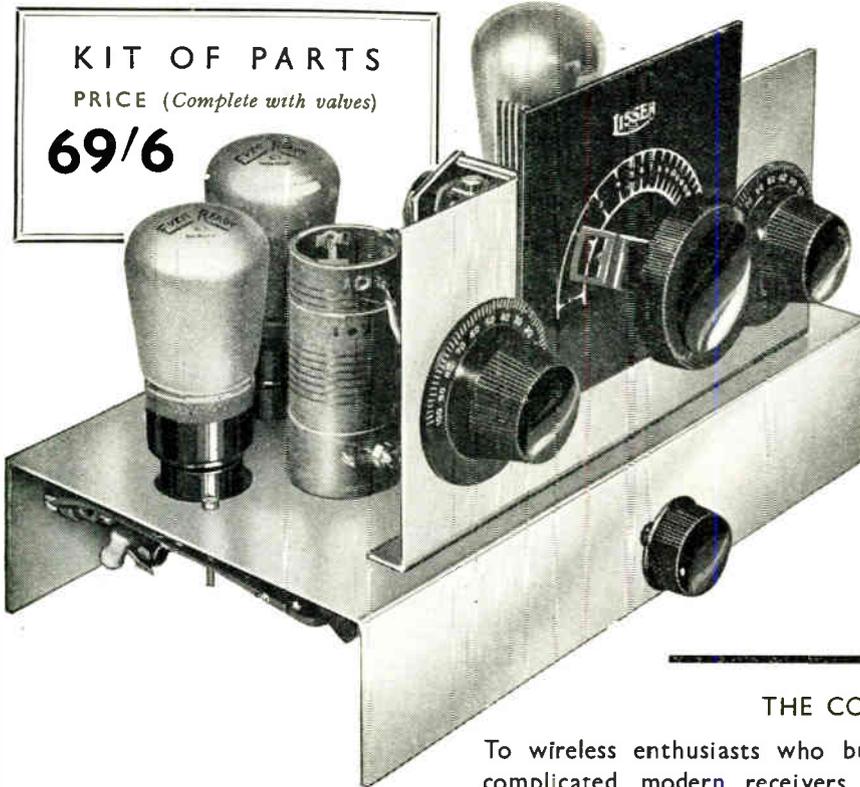
First of all when you get home, check over the component parts in the kit and see that they tally with the list on page 13. Every kit is, of course, carefully checked before it leaves the factory, but it is amazing how easily some of the smaller components can get lost in the excitement of unpacking.

Mounting the Components

The chassis and condenser panel are already drilled and the first operation is to bolt these together, as shown in the photograph on the left. Next fix the combined on-off and wave-change switch to the chassis and then the three valve holders. Fix these so that the terminals point the same way as those on the blue print, as these are arranged in such a fashion so as to reduce the length of wiring to a minimum. The transformer should be bolted down and the Earth, Aerial and Loudspeaker sockets screwed down on the back of the chassis.



The first part of the assembly completed, most of the wiring can now be finished before the tuning coil is mounted.



any of the wires on it be moved from their original positions, this would make enormous differences to the wave-ranges of the receiver.

The wires from the coil are of different colours to avoid any possibility of mistake, and all of these wires except two are connected to components on the underside of the dial fixing chassis. As you will see from the blue print, these two wires are connected up to the variable condensers. Don't be dismayed at this point to discover that only one connection is made on each of the condensers. The moving vane connections were automatically made when the condensers were bolted to the panel!

Fixing the Tuning Pointer

Turn the condenser spindle round until the moving vanes are "all

The three variable condensers are now fixed on to the condenser panel, and some of the wiring can be commenced. The filament connections to the valves should be wired up first of all. You will notice from the blue print that L.T. negative is 'earthed' to the chassis and that this is done by connecting L.T. negative on the valve-holder to one of the holding-down screws. The L.T. positives are connected to the switch.

The resistances supplied in the kit are of the metalised type with wire ends, and these are 'colour-coded' according to the plan now adopted by most wireless manufacturers in the world. It is important that you should not get the values of these resistances confused, and the illustration on page 12 should be kept in front of you for guidance when you are connecting these up.

The small fixed condensers can also be connected at the same time, and the rest of the wiring completed as far as possible before fixing the tuning coil.

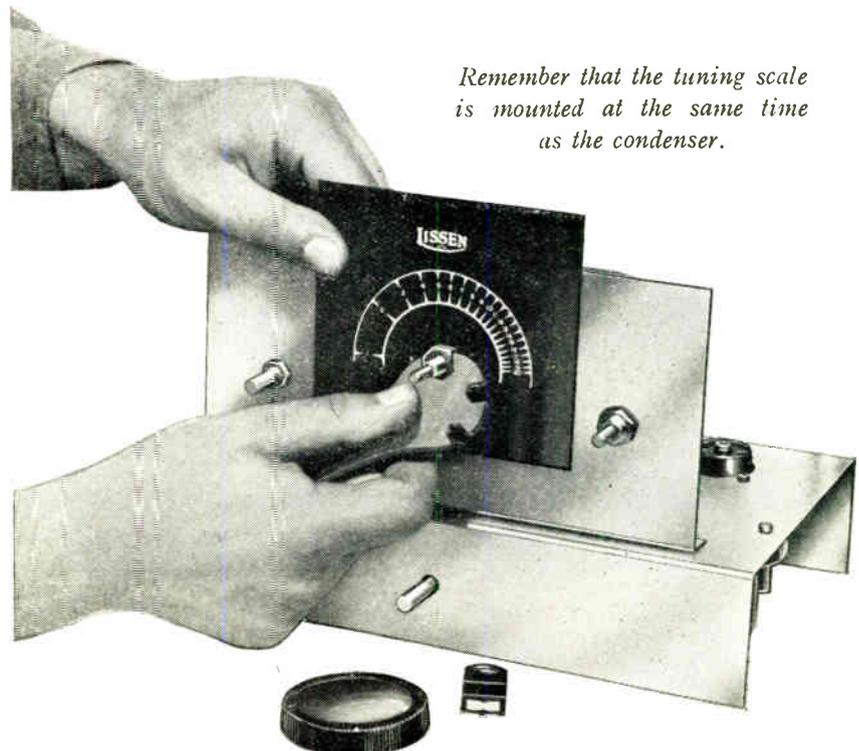
The Coil Last

Maybe you've been wondering why this hasn't been fixed before. But it has been deliberately left until last, because it is actually a very delicate component, and should

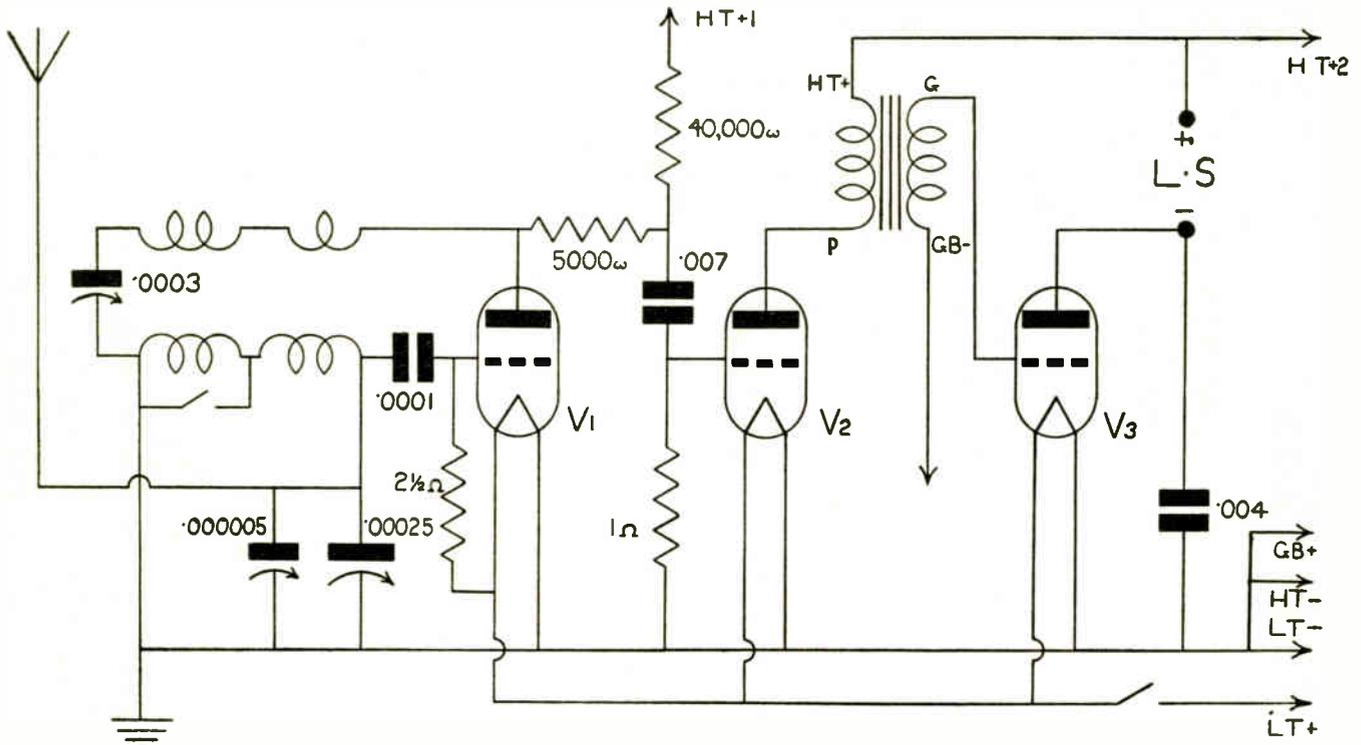
THE COMPLETED CHASSIS

To wireless enthusiasts who build complicated modern receivers for ordinary broadcast wave-bands the Lissen Bandsread 3 will seem a very simple affair. But on short waves, simplicity is the key-note of design and a short-wave set that

will give really excellent results is still as simple as the kind of receiver you used to build in the early days of wireless. The designers of the Lissen Bandsread 3 claim, without exaggeration, that it will bring in the world.



Remember that the tuning scale is mounted at the same time as the condenser.

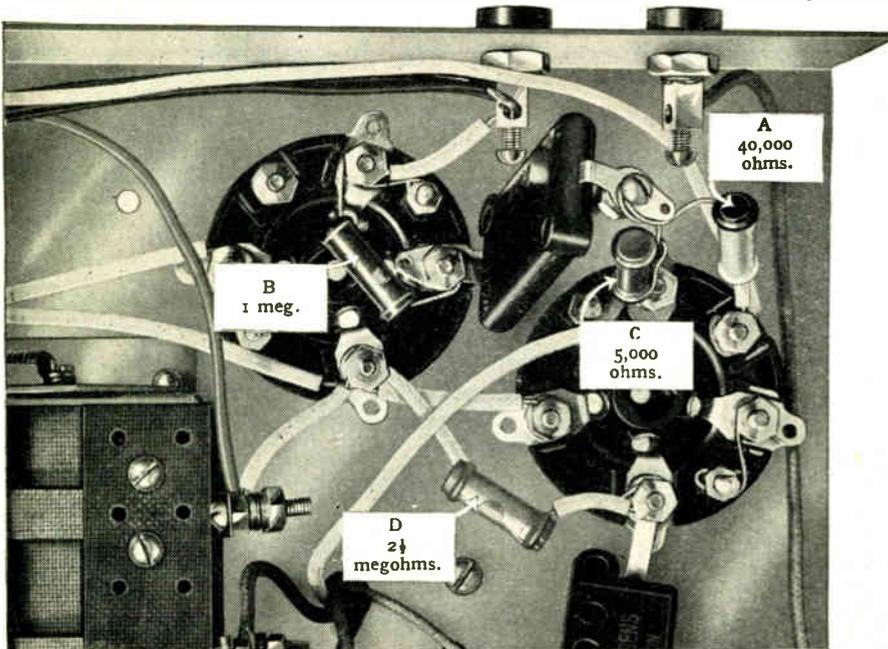


The Theoretical Circuit Diagram

out" and clear of the fixed vanes. Take one of the two fixing nuts provided for the pointer and screw

it on to the inner spindle until it just clears the end of the short main spindle. Slip on the pointer

over the spindle and adjust it so that it indicates "1" on the scale. Now slip your fingers behind the pointer and nut and hold them both firmly together in this position with your left hand (taking care that the condenser vanes don't move in the meantime) and screw down the other condenser nut, locking it as tightly as possible.



The battery leads are now connected up according to the detailed instructions on the blue print and the set is finished.

But don't be too hasty to 'put it on the air'! Of course you will be excited to discover what this receiver can 'pull in,' but it is better to be sure than sorry, and a few minutes spent in a careful checking of the wiring might save hours of puzzling and scratching your head.

This illustration shows how the resistances are wired up. Keep it in front of you when wiring in order to make sure that you don't get the values mixed up!

- A Yellow body, orange spot, black tip.
- B Brown body, green spot, black tip.
- C Green body, red spot, black tip.
- D Red body, green spot, green tip.

When you are absolutely sure that everything is O.K., plug in the valves, connect up the battery cable to the batteries and everything is ready for the first try-out.

Don't ignore INSTRUCTIONS!

Don't forget that skilled radio engineers designed the Lissen Bandspread Short-wave 3 very carefully, and that the value and position of every component has all been carefully thought out. "Don't make shift" with components but build from the complete kit of parts as supplied.

* * *

Don't forget that the difference in technique between handling a short-wave set and the set designed for the ordinary broadcast bands is as great as the difference between riding a bicycle and driving a motor car.

* * *

Don't search vaguely over the tuning dial for stations or you will be disappointed. Refer to the chart on page 15 and pick out the "zones" containing the wavelengths on which you know there are actually transmissions.

* * *

Don't get worried and think there is something wrong with your set if you can't "pull in" that American station to-night as loud as you had it last night. The reception conditions vary from night to night on short waves; this is just one of those things that cannot be helped.

* * *

Don't forget that short-wave stations change their wavelengths quite frequently and that even what might seem like a small change of one metre is actually a large change in terms of kcs. Keep up to date with the revised wavelengths by occasionally reading the technical and semi-technical periodicals.

* * *

Don't forget that most of the Atlantic liners keep an almost continuous contact with shore stations and use a wavelength of either 33 or 66 metres. These transmissions are amusing and are so totally different from the general transmissions one hears on the medium waves.



Essential Components for the Lissen Bandspread Short Wave 3

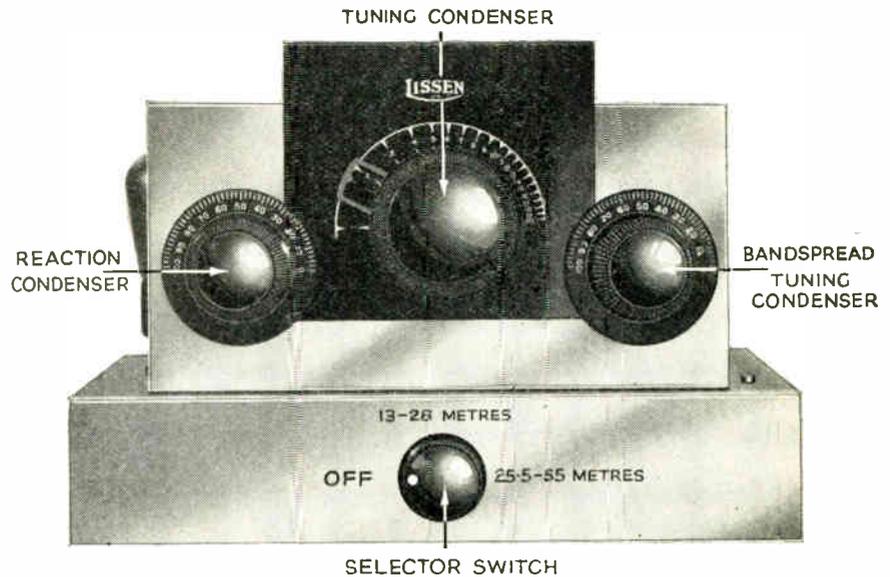
- | | |
|---|---|
| 1 chassis, ready drilled. | 1 $\frac{1}{4}$ watt resistor 5,000 ohms. |
| 1 condenser plate, ready drilled. | 1 $\frac{1}{4}$ watt resistor 40,000 ohms. |
| 1 wave-change and off-on switch. | 4 sockets and plugs marked Aerial, Earth, LS-, LS+. |
| 1 Lissen dual-range S.W. coil. | 5 wander plugs marked H.T.+1, H.T.+2, H.T.-, G.B.+ , G.B.-. |
| 1 .00025 mfd. slow-motion S.W. condenser. | 2 spades marked L.T.-, L.T.+. |
| 1 .000005 mfd. bandspread condenser. | 1 Lissen Bandspread dial. |
| 1 Lissen .0003 mfd. reaction condenser (with long spindle). | Knobs, bolts, wire, sleeving, etc. |
| 1 Lissen "Torex" L.F. transformer. | 3 Ever Ready valves. Types: 2 K30C, 1 K30G. |
| 2 4 pin valve-holders for sub-chassis mounting. | |
| 1 5-pin ditto. | |
| 1 .0001 mica-fixed condenser. | |
| 1 .007 mica fixed condenser. | |
| 1 .004 tubular fixed condenser. | |
| 1 $\frac{1}{4}$ watt resistor 2.5 megohms. | |
| 1 $\frac{1}{4}$ watt resistor 1 megohm. | |

Recommended Accessories.

- 1 Lissen Standard H.T. battery (L.N. 3027) 120 volts. price 7/6.
- 1 Lissen "Leader" accumulator. (L.N. 2012) 2 volt 45 amps hrs. price 4/6.
- 1 Lissen Grid Bias battery (L.N. 180) 9 volt. price 10d.

Some useful hints on operating the SHORT WAVE 3

Before you SWITCH ON—



NOW for the great thrill of tuning in your first station on the Lissen Bandspread Short-Wave 3! Everything has been connected up. Aerial, earth, loud-speaker, accumulator, H.T. and G.B. batteries. Your fingers are probably itching to start twirling the knobs.

But at this point a word of advice! If you have never handled a short-wave receiver before, it is only fair to warn you that a certain amount of patience and what might be called tuning *finesse* are necessary to begin with, although no extraordinary skill is required. Up to now you have been accustomed to manipulating wireless receivers on the 200—550 metres waveband, and with this type of receiver you switch on and you hear station after station coming in all the way round the dial. But if you were to try the same procedure with the Bandspread Short-Wave 3, you might be disappointed at first, because on short-waves the broadcasting programmes are bunched together on definite and widely separated sections of the dial. To be precise on wavelengths around 13, 16, 19, 25, 31 and 49 metres.

The Lissen Bandspread Short-Wave 3 will tune from 13 to 55 metres and in the gaps between broadcast wavelengths, you will be

able to pick up many commercial, and amateur transmissions.

All About "Bandspread" Tuning.

Now, let us take a look at the controls on the front of the set. There are four: Tuning condenser, Bandspread condenser, reaction condenser and selector switch.

Possibly the design of the tuning dial surprises you! It is quite unlike any other dial you have ever seen. Instead of being divided in degrees or marked in wave-lengths, it is divided into 20 sections of apparently unequal sizes—large at the left-hand side of the dial and getting smaller and smaller as you move the pointer round to the right-hand side. There seems to be no sense in it when you look at it at first, but actually it is designed for a very ingenious purpose.

It enables you to divide the wavebands covered by the set into exactly 20 "zones"—each of which in turn can be slowly and accurately "searched" by the Bandspread condenser on the extreme right of the set. For instance, if you turn the main tuning knob so that the pointer is on No. 12, and the Bandspread condenser knob at zero—you can tune over the whole range of "zone" 12 by tuning the Bandspread knob through from 0 to 180 degrees! It amounts to the

same thing as tuning the pointer from the beginning of "zone" 12 to the end of "zone" 12, but gives you much finer and smoother tuning than could ever be possible with one slow motion tuning condenser, no matter how fine the slow motion control.

The actual wave-lengths covered by these "zones" will vary as much as a metre or two in sets built up by different people. This is unfortunate, but quite unavoidable and is due to variations in the wiring.

The left-hand knob on the set controls the reaction, and this is a very important control on a short-wave set—much more important than on a receiver for the ordinary broadcast bands. It is so important, indeed, that it has a dial all to itself so that the settings can be calibrated when you are preparing a "log" of stations received.

(You'll hear more about this log later on. At the moment you must be getting impatient to put your newly built set on the air!)

The only control we haven't dealt with is the selector switch, and a glance at the illustration on this page will convey to you what this knob does quicker than words. It serves a double purpose—Not only does it alter the wave-range, but it switches the set on and off.

Now you know which knob is which and what it does! Let's consider on which part of the wave band we should start searching for stations.

Where to Start Tuning.

If you are trying out this set in the evening, the best reception conditions will be found round about 31 metres, and about this wavelength there are several powerful German stations, notably, Zeesen (DJA) and Zeesen (DJN).

On referring to the chart below you will see that these wavelengths are in "zones" 5 or 6 with the switch in the second position. Turn the tuning knob until the pointer is at the beginning of "zone" 5, then take you hand off this knob altogether. With your left hand turn the reaction control slowly in a clockwise direction until the set is just below oscillating point. You can easily tell when it has reached this stage by a "liveliness," which takes the form of a slight hissing, rushing noise. Now with your right hand turning the Bandspread condenser very very slowly in a clockwise direction, keep the set "lively" by very gently increasing the reaction with your left hand.

When you have tuned in the station a slight adjustment of the reaction control might be necessary in order to obtain maximum volume. Do not allow the set to oscillate unnecessarily. And what is even more important—do not leave it in a state of oscillation—or you will spoil other people's enjoyment for some distance around. You must remember that the tuning will be sharper than you have ever known in an ordinary broadcast receiver, and at first you will probably pass over stations without even hearing them, but with a little patience you will soon acquire the knack of bringing in the most elusive and distant stations.

"Direct" Wave Reception.

While you are searching through the wavelengths you might possibly hear the Daventry Empire Short-wave Transmitter on the air. This station works on some 7-10 different wavelengths, varying between 49.58 metres and 13.9 metres, and is very difficult to receive in this country. In fact, on the lower wavelengths you will never hear it at all, but with luck you will be able to pick it up on the higher wavelengths.

This phenomenon is due to what

is called "skip distance," which is explained very fully in another article in this magazine. If you pick up the Daventry Empire short-wave transmitter you will be receiving what are called "direct" waves and not the short-waves proper, which are projected upwards, reflected and ultimately received in long distance reception.

But these "direct" wave broadcasts are very useful as they enable you to fix a number of important wavelengths of the tuning scales of your set. For example, on the 31 metre band, Daventry GSB on 31.55 metres fixes approximately the position of Schenectady, New York, W2XAF on 31.48 metres while Daventry GSL on 49.10 metres fixes approximately Boundbrook W3XAL on its wavelength of 49.18 metres, and so on.

After you have got into the way of working the controls very slowly and learnt to keep the set below oscillating point, you will soon begin to get a "bag" of stations.

And what a thrill there is getting those long distance ones! You will hear all the famous American Broadcasters. You will listen to Australia, Canada, South America. The whole world is at your finger tips!

Keep a Log.

Keep a log, showing station names, wavelengths, position of controls and time received. Keeping a log adds much to the pleasure of listening and makes identification of new stations easier and easier as your "bag" increases. It also enables you to tune in again quickly to any particular station you have received before.

LISTENING THE CLOCK ROUND.

Do you remember only a few years ago when the sole transmission available to British listeners lasted for half-an-hour and that only once a week?

Now there is a 14 hour service every day, except Sundays, either on the long or medium wave-bands, an eighteen hour service of Continental transmissions included. And if you own a short-wave set a full 24 hour service is provided for your entertainment by the short-wave stations of the world!

POSITION ON TUNING DIAL	WAVELENGTHS IN METRES (APPROXIMATELY)	
	Selector Switch (dot at top) 13 — 28 metres	Selector Switch in second position (dot right hand side) 25.5 — 55 metres
1	13	25
3	14	27.5
5	15.5	30.5
7	17	34
9	19	37.5
11	21	40.5
13	23	43.5
15	25	46.5
17	—	49.5
19	—	52.5

Getting the last ounce out of it!

HOW to erect a SHORT WAVE AERIAL

Of course, your Lissen "Band-spread" Short-Wave 3 will produce excellent results on any reasonably good aerial, but if you are one of those enthusiasts who are satisfied with *nothing but the very best*, these instructions will be of great use to you.

This method of erecting a non-directional short-wave aerial has the advantages of cheapness and simplicity.

The following parts can be acquired for a few shillings and possibly you will be able to supply quite a few of them out of your junk-box.

- 60 feet of 16 or 14 S.W.G. enamelled soft copper wire.
- 6 Egg Insulators.
- 1 "Lead-in" tube.
- 1 Earth tube.

(These you can buy from any wireless shop.)

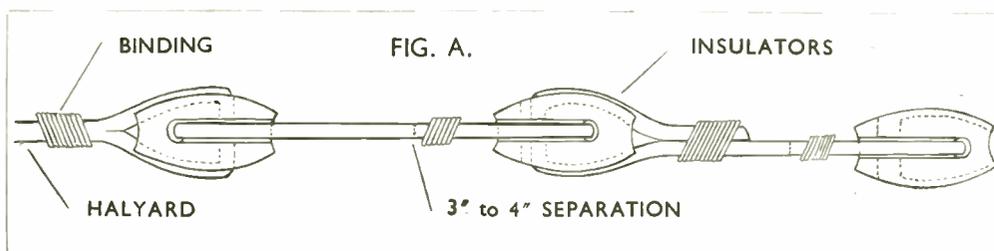
- 2" strong shelf brackets with legs at least 18 inches long.
- 1 small galvanised pulley block which should be well oiled before use.

A length of aerial rope or halyard (not wire), twice the aerial height.

(These latter articles are easiest procurable at an iron-monger's.)

The first operation is to cut the following lengths of wire:—

- One 10 foot length for earth wire.
- Four 12 inch lengths to join the insulators.
- One 12 inch length to bind the halyard to the top insulator.
- One 12 inch length to secure



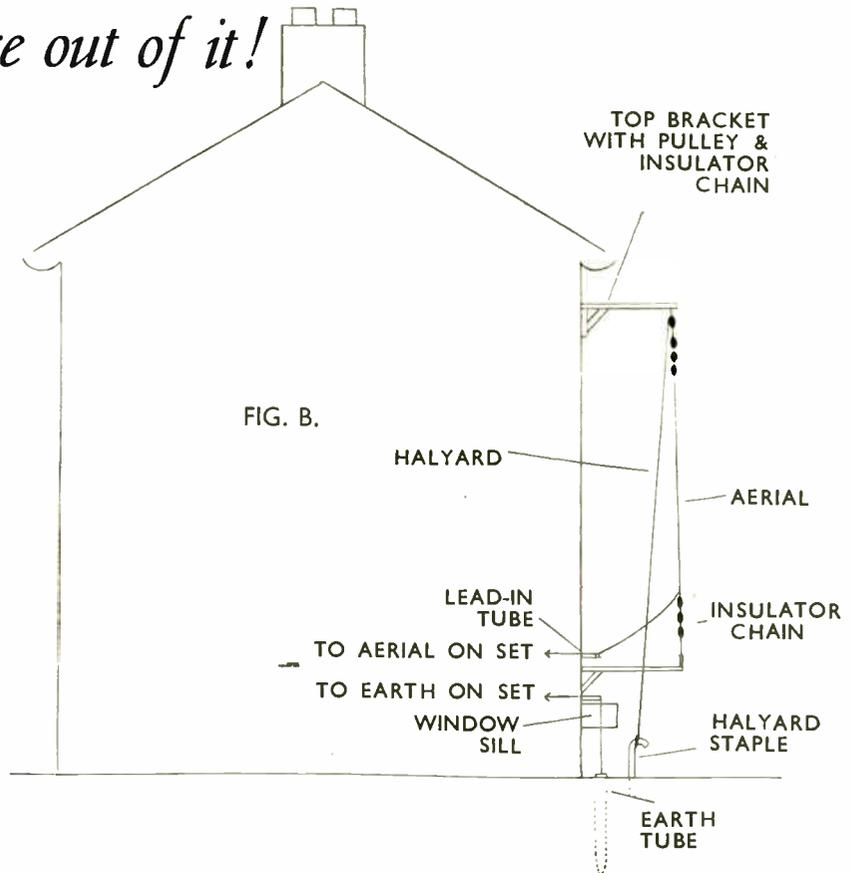
the bottom insulator to the lower bracket.

The next thing to do is to fix the brackets, remembering that the aerial should have the *greatest possible vertical height and must be well clear of all guttering or water-pipes.*

The method of linking the insulators into "chains" is clearly shown in figure 'A'. One of these "chains" is secured to the bottom bracket at one end and to the aerial proper at the other. The other end of the aerial is bound in turn to the second "chain."

At this stage, the pulley block should be fixed securely to the top bracket and the rope drawn through it so that both ends of the rope are on the ground. To one of these ends bind the free end of the second insulator chain (taking care not to let go of the other end of the rope, which should really have been tied down before you started this!).

Now, the aerial can be hauled up, carefully so that it does not snake about and tangle. When it is fully
(continued on page 19)



There are over 1500 Broadcasting stations in Great Britain!

THE interest which is now being shown in ultra short wave (or ultra high frequency) work can be directly attributed to the radio amateurs of the world, many of whom have been investigating the phenomena surrounding these frequencies for the past 15 years. In fact much of the commercial progress which has been made in regard to long distance communication during the past decade, can be traced back to the original work of the radio amateurs carried out during the years 1921—1925.

Up to that period wavelengths below 200 metres had been regarded as almost valueless from a commercial point of view, but those views rapidly changed when it was learned that the Atlantic and later the whole world had been spanned by amateurs using small transmitters and working on wavelengths between 120 and 80 metres.

The great increase in commercial radio services necessitated, during 1928, the allocation of definite wave-bands to the world's amateurs and at present, the British allocations are as follows :

*Approximate wavelength
(in metres).*

174.4	—	150.4
42.83	—	41.12
21.43	—	20.83
10.71	—	10.00
5.357	—	5.004

In addition to the above, certain amateurs are permitted to operate

ON your Bandsread Short Wave 3 set you will often hear amateur broadcasters on the air. In this article, Mr. John Clarricoats, Secretary of the Radio Society of Great Britain, tells you something about these enthusiastic transmitters and when to listen for them.



A typical British Amateur Transmitting Station. Note the Q.S.L. cards on the wall.

in a band of frequencies between 85.6—80.4 metres. Authority to use this band and the 10 and 5 metres bands, is only granted under special circumstances, and for special experimental work.

When to Listen for Amateur Broadcasts.

British amateurs and, to-day there are over 1,500, are authorised to

work in these bands at any hour of the day, but for the benefit of those not fully acquainted with radio conditions on short waves, these are the times when maximum activity takes place on the six bands.

160 metre band. Sundays and evenings after 10 p.m.

80 metre band. Sundays and evenings from 8 p.m.

40 metre band. From 6 a.m. to midnight.

20 metre band. During daylight hours.

10 metre band. Spasmodic, usually during daylight in summer.

5 metre band. Sundays during the summer, evenings during the winter.

There are, of course, well known characteristics associated with each amateur band, but in the space allotted to this article, it is impossible to give more than a very rough indication of the type of communication work which is being conducted by amateurs in Great Britain.

Here, however, is a summary of the countries that can be "worked"

on the different wavebands:—

160 Metre Band

Summer: local up to 200 miles. *Winter:* Europe and occasionally North America.

80 Metre Band

Summer: local up to 200 miles, and occasionally Europe. *Winter:* All Europe, North Africa, North America, and occasionally Oceania.

(continued on page 19)

CHOOSE

your time and

CHOOSE *your wave-length!*

STATIONS can be heard on medium waves any time of the day, for time and wavelength have little bearing on the strength of signals. A little more intelligence must be used when it comes to tuning in short-wave stations if you are going to obtain worth-while reception.

First of all the short-wave broadcast bands are split up with a definite purpose in view. Commercial programmes can be heard on the 13, 16, 19, 25, 31 and 49 metre bands, so it is a waste of time looking elsewhere unless you wish to hear amateur stations or ships speaking to shore stations. It is quite a good idea to remember that the earlier the hour the lower would be the wavebands to give best results.

For reception of long distance stations when both the transmitter and the receiver are in daylight, always remembering the difference in time between other parts of the world and Greenwich, the 13-metre band is the one to use. This band will give reception of the American station W8XK at Pittsburgh, on a wavelength of 13.93 metres between the hours of 12 noon and 3 p.m. On the same waveband are the two Daventry Empire stations, GSH and GSJ which give News Bulletins at lunch time for the benefit of colonial listeners. These bulletins are very up-to-date and should not be missed if any important news is expected. In bad weather or during the winter months the 16-metre band takes the place of the 13-metre band with the exception that it is not of much use until 2 o'clock in the afternoon.

It is quite safe to say that the New Jersey Station W3XAL on 16.87 metres can be tuned in five days out of seven on this waveband. Signal strength is always good enough to feed a loud-speaker but the peak period is usually between 4 and 5 o'clock. On that same waveband programmes can be heard from Huizen in Holland on a wavelength of 16.88 metres and Zeesen in Germany, which relays the Berlin programmes on 16.89 metres. Zeesen sends out special programmes of a very high character for the benefit

FOR reception of long distance stations during *broad daylight* search the 13-metre band. On dull days or during winter months pay more attention to the 16-metre band until about 5 p.m. From 4 p.m. until the middle of the evening the 19-metre band becomes more productive, culminating in the 25 and

31 metre bands from middle evening until the early hours of the morning.

The 49-metre band, which takes in about twenty reliable stations, is only suitable for attention after 10 p.m. during the winter or about 1 a.m. in the summer, but it does give good programmes right round to breakfast time.

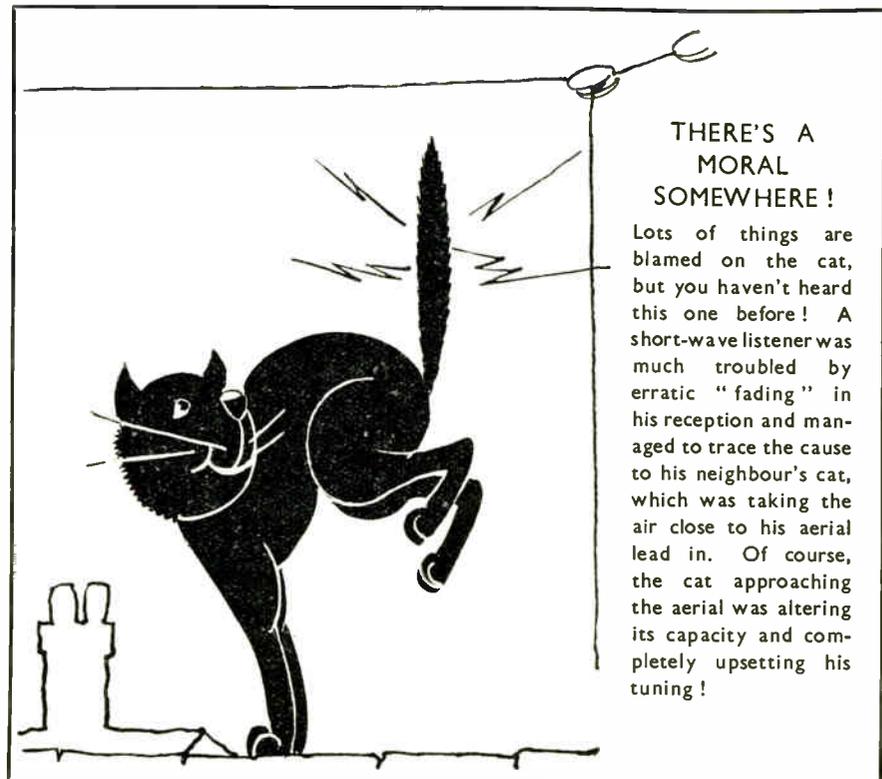
of their colonials in various parts of the world. If anything these programmes are better than those heard on medium waves.

All of these short-wave stations have three or four wavelengths, or in some cases there are three or four stations on several wavelengths but with the same call-sign. The idea of this is to make quite sure that the programmes will be heard all the world over.

Assuming that you wish to hear an American programme from lunch-

time then tune in to Pittsburgh on 13.93 metres. By 3 o'clock this station will probably have weakened in strength so that it is no longer suitable for entertainment. The same programme will be found on the second Pittsburgh station on 19.72 metres which comes into operation when the first station begins to deteriorate. Similarly after about 9 o'clock in the evening it is advisable to tune in Pittsburgh

(continued on page 19)



40 Metre Band

Summer: local up to 50 miles, Oceania mornings, North America late evenings. Asia afternoons. *Winter*: Local during day and long distance at night or early mornings.

20 Metre Band

Summer: local up to 20 miles at any time. Long distance usually after mid-day. Asia in afternoons, and America at night. *Winter*: local up to 20 miles. Occasionally good spells for Australia, America and Asia. Mostly during daylight.

10 Metre Band

Summer: local up to 1,000 miles during afternoons and evenings but conditions usually spasmodic. *Winter*: No reliable information, probably as in summer.

5 Metre Band

Summer: Local up to 200 miles. *Winter*: No reliable information, probably as in summer.

The average amateur transmitter is interested in the strength and quality of his transmissions, and as a consequence appreciates receiving reports from listeners, providing these contain information of value to him. It is not, however, recommended that local listener reports be sent to British amateurs.

HOW TO ERECT A SHORT-WAVE AERIAL.

(continued from page 16)

hauled up, stretch it as tightly as possible, and secure the free end of the halyard to some convenient water-pipe or projection. As wire will stretch quite an amazing lot, it is advisable to tighten up the aerial again after a few weeks.

Figure 'B' shows the general arrangement of brackets and pulley, and this is the simplest form the aerial can take. If, however, you live in a bungalow and require added height for the aerial, it can easily be attached to the top of the chimney stack. The bracket would then be used to fend the aerial off from the gutter.

The earth connections are simple; the only point to remember being that this lead should be kept as short as possible. It is definitely an advantage to install the receiver as close to the aerial as possible, too.

Q. S. L.

Some people collect cigarette cards and others collect postage stamps, but "hams" (amateur transmitters) collect Q.S.L. cards!

Q.S.L. is a Morse abbreviation meaning "will you give me confirmation of —?" so that Q.S.L. cards are really confirmation cards.

When an amateur transmitter in this country "works" an amateur transmitter in say Canada, he writes

to him confirming that he has received his transmission at such and such a time on such and such a day, and receives in return a Q.S.L. card.

W.B.E.

One of the most eagerly sought after honours amongst "hams" in this country is the W.B.E. certificate, issued by the Radio Society of Great Britain. W.B.E. means "Worked the British Empire" and in order to qualify for this an amateur transmitter has to produce one Q.S.L. card from each of the five continents.

Above are illustrated a series of five Q.S.L. cards confirming 2-way connection with stations in Africa (SU1SG), America (VE4KA), Asia (VU2DX), Europe (ZB1F) and Oceania (VK5SU) and thus qualifying for the W.B.E. certificate.

The enthusiasm of "hams" in this country is indicated by the fact that the Radio Society of Great Britain handles more than 250,000 Q.S.L. cards per year.

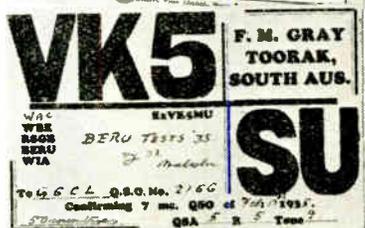
CHOOSE YOUR TIME.

(continued from page 18)

to its third station on a wavelength of 25.27 metres. After midnight reception from this station becomes erratic, so to provide entertainment during the night a fourth station comes into operation about 1 a.m. on a wavelength of 48.86 metres.

I have indicated how the American and other long distance stations are received but conditions are slightly different when it comes to receiving Sydney or Melbourne. The Australian stations only have one wavelength so that they can only be received at a certain time.

VK2ME, that well-known Sydney station—broadcasts on Sunday afternoons on a wavelength of 31.28 metres. As a general rule it transmits for two-hourly periods of which the period between 3 and 5 in the afternoon is the most suitable for English listeners. Any all-wave set of the 1935 vintage will bring in Sydney at this time. When it comes to reception of Melbourne, listen during the week around 12 o'clock mid-day for a good hourly programme.



Short Wave Broadcasting Stations

(Correct at time of going to Press.)

THIS log sheet has been specially prepared for use with the Lissen Bandsread 3 and contains all the well-known transmitters you will be able to hear, together with a space for marking the positions of reaction, and tuning controls.

Wavelengths of short-wave transmitters are altered slightly from time to time and you will find it very helpful to keep up-to-date with these by watching the complete lists of short-wave transmitters which are published frequently in "World Radio" and the "Wireless World."

13-55
metres

Wave-length	Name of Station	Country	Dial Readings	Wave-length	Name of Station	Country	Dial Readings
13.92	Pittsburgh W8NK ...	United States	.....	31.55	Daventry (Empire) GSB	Great Britain	.....
13.97	Daventry (Empire) GSE	Great Britain	.....	31.55	Melbourne VK3ME	Victoria	.....
14.49	Buenos Aires LSY	Argentina	.....	31.55	Caracas YV3BC	Venezuela	.....
15.92	Bandoeng PLE	Java	.....	31.58	Rio de Janeiro PSA	Brazil	.....
16.36	Lawrenceville (N.J.) WLA	United States	.....	31.6	Skamlebaek	Denmark	.....
16.38	Rugby GAS	Great Britain	.....	31.7	Havana	Cuba	.....
16.5	Drummondville (CFA8)	Canada	.....	31.71	New Brunswick WKJ	United States	.....
16.56	Bandoeng PMC	Java	.....	31.9	Bandoeng PLV	Java	.....
16.56	Buenos Aires LSY3	Argentina	.....	32.71	Lawrenceville WNA	United States	.....
16.81	Bandoeng PLF	Java	.....	32.79	Maracay YVQ	Venezuela	.....
16.85	Kootwijk PCV	Holland	.....	32.88	Budapest HAT	Hungary	.....
16.86	Daventry Empire GSG	Great Britain	.....	33.26	Rugby GCS	Great Britain	.....
16.878	Boundbrook W3XAL (WJZ)	United States	.....	33.59	Rocky Point (N.J.) WEC	United States	.....
16.88	Eindhoven PHL	Holland	.....	34.68	London VY9BY	Canada	.....
19.47	Riobamba PRADO	Ecuador	.....	36.65	Rio de Janeiro PSK (PRA3)	Brazil	.....
19.52	Budapest IAS3	Hungary	.....	37.04	Quito HCJB	Ecuador	.....
19.56	Schenectady W2XAD (WGY)	United States	.....	37.33	Rabat (CNR)	Morocco	.....
19.61	La Paz CP4	Bolivia	.....	37.41	Suva VPD	Fiji Isles	.....
19.64	New York W2XE (WABC)	United States	.....	38.07	Tokio JIAA	Japan	.....
19.66	Daventry (Empire) GSI	Great Britain	.....	38.47	Radio Nations HBP	Switzerland	.....
19.67	Coytesville N.J. W1XAL (WEET)	United States	.....	38.65	Kootwijk PDM	Holland	.....
19.67	Tashkent (Rim)	U.S.S.R.	.....	39.34	Tashkent RIM	U.S.S.R.	.....
19.68	Radio Coloniale FYA	France	.....	39.76	Moscow RKI	U.S.S.R.	.....
19.72	Saxonburg W8XK (KDKA)	United States	.....	39.82	Riobamba PRADO	Ecuador	.....
19.74	Zeesen DJB	Germany	.....	40.3	Radio Nations HBQ	Switzerland	.....
19.82	Daventry (Empire) GSF	Great Britain	.....	40.5	Bogota HJ3ABB	Colombia	.....
19.84	Rome (Vatican) HVJ	Italy	.....	40.54	Rocky Point WEN	U.S.A.	.....
19.88	Moscow (RKL)	U.S.S.R.	.....	41.55	Bogota HKP	Colombia	.....
19.93	W8XK, Saxonburg (KDKA)	United States	.....	41.6	Las Palmas EA8AB	Canary Isles	.....
20.27	Rocky Point WQV	United States	.....	41.67	Singapore VSIAB	Sts. Settlements	.....
20.31	Rocky Point N.Y. (WEB)	United States	.....	41.84	Grenada YN6RD	Nicaragua	.....
21.43	Cairo SUV	Egypt	.....	41.9	Manizales HJ4ABB	Colombia	.....
21.53	Rocky Point WIK	United States	.....	43	Madrid EA4AQ	Spain	.....
21.58	Rocky Point WOP	United States	.....	43.86	Budapest HAT2	Hungary	.....
21.605	Rocky Point WOT	United States	.....	44.61	Rocky Point WQO	United States	.....
21.83	Drummondville CJA8	Canada	.....	44.96	Maracay YVQ	Venezuela	.....
22.26	Rocky Point WAJ	United States	.....	45	Constantine FM8KR	Tunis	.....
22.48	Santa Rita YVQ	Venezuela	.....	45.02	Guatemala City	S. America	.....
22.684	Zeesen (DEB)	Germany	.....	45.38	Guayaquil HC2RL	Ecuador	.....
23.39	Radio Maroc (Rabat) CNR	Morocco	.....	46.53	Moscow RV72	U.S.S.R.	.....
24.41	Rugby GBU	Great Britain	.....	46.59	Barranquilla (HJ3ABB)	Colombia	.....
24.9	Kootwijk PDV	Holland	.....	46.7	Boundbrook W3XL (WJZ)	United States	.....
25	Moscow RNE	U.S.S.R.	.....	47	Boston W1XAL	United States	.....
25.25	Radio Coloniale, Paris (FYA)	France	.....	47.5	Caracas	Venezuela	.....
25.27	Saxonburg (Pa.) W8XK (KDKA)	United States	.....	47.8	S. Domingo HIZ	Dominican R.	.....
25.28	Daventry (Empire) GSE	Great Britain	.....	48.75	Domingo HIAA	Dominican R.	.....
25.34	Wayne W2XE (WABC)	United States	.....	48.78	Winnipeg CJRO	Canada	.....
25.4	Rome 2RO	Italy	.....	48.80	Caracas YV3RC	Venezuela	.....
25.45	Boston W1XAL (WEET)	United States	.....	48.80	Saxonburg (Pa.) W8XK (KDKA)	United States	.....
25.49	Zeesen DJD	Germany	.....	48.94	Moscow (RKK)	U.S.S.R.	.....
25.532	Daventry (Empire) GSD	Great Britain	.....	48.94	Jeløy	Norway	.....
25.63	Radio Coloniale FYA	France	.....	49.02	Bandoeng (YDA)	Dutch E. Indies	.....
26.83	Funchal CT3AQ	Madeira	.....	49.02	Wayne W2XE (WABC)	United States	.....
27.65	Nauen DFL	Germany	.....	49.08	Caracas YV2RC	Venezuela	.....
27.86	Rugby GBP	Great Britain	.....	49.1	Daventry (Empire) GSL	Great Britain	.....
27.88	Marapicu PSG	Brazil	.....	49.18	Boundbrook W3XAL (WJZ)	United States	.....
28.28	Rocky Point (N.J.) WEA	United States	.....	49.22	Chicago W9XF (WENR)	United States	.....
28.5	Sydney VLK	N.S. Wales	.....	49.26	Bowmanville VE9GW (CRCT)	Canada	.....
28.98	Buenos Aires LSX	Argentina	.....	49.26	St. John VE9BJ (CFBL)	N. Brunswick	.....
29.03	Bermuda ZFD	West Indies	.....	49.3	La Paz CP5	Bolivia	.....
29.04	Ruyssede (ORK)	Belgium	.....	49.34	Chicago W9NAA (WCFL)	United States	.....
29.35	Marapicu PSH	Brazil	.....	49.35	Zeesen (D9M)	Germany	.....
29.59	Leopoldville OPM	Belgian Congo	.....	49.39	Maracaibo V5BMO	Venezuela	.....
29.64	Marapicu PSI	Brazil	.....	49.4	Vienna OER2	Austria	.....
29.84	Abu Zabel, Cairo SUV	Egypt	.....	49.43	Vancouver VE9CS (CKFC)	British Columbia	.....
30	Radio Excelsior LR5	Argentina	.....	49.47	Nairobi YQ7LO	Kenya Colony	.....
30.1	Rome IRS	Italy	.....	49.5	Pernambuco	Brazil	.....
30.4	Lawrenceville WON	United States	.....	49.5	Skamlebaek	Denmark	.....
30.4	Tokio JIAA	Japan	.....	49.5	Philadelphia W4XAU (WCAU)	United States	.....
30.43	Madrid EAO	Spain	.....	49.5	Cincinnati W8NAL (XLW)	United States	.....
30.77	Lawrenceville WOF	United States	.....	49.586	Daventry (Empire) GSA	Great Britain	.....
30.9	Rugby GCA	Great Britain	.....	49.6	Bogota HJ3ABI	Colombia	.....
31.23	Mexico City XETE	Mexico	.....	49.67	Boston W1XAL (WEED)	United States	.....
31.25	Lisbon CTIAA	Portugal	.....	49.69	Priok (YDA)	Dutch E. Indies	.....
31.26	Radio Nations HBL	Switzerland	.....	49.83	Zeesen DJC	Germany	.....
31.28	Philadelphia W3XAU (WCAU)	United States	.....	49.96	Drummondville VE9DN (CFCF)	Canada	.....
31.28	Sydney VK2ME	N.S. Wales	.....	50	Moscow RNE	U.S.S.R.	.....
31.32	Daventry (Empire) GSC	Great Britain	.....	50.8	Barcelona EA3AB	Spain	.....
31.34	Jeløy	Norway	.....	50.26	Rome (Vatican) HV	Italy	.....
31.35	Millis W1XAZ (WBZ)	United States	.....	50.42	Domingo HIX	Dominican R.	.....
31.38	Zeesen DJA	Germany	.....	50.6	Medellin HJ4ABE	Colombia	.....
31.45	Zeesen (DJN)	Germany	51.28	Maracaibo	Venezuela
31.48	Schenectady W2XAF (WGY)	United States

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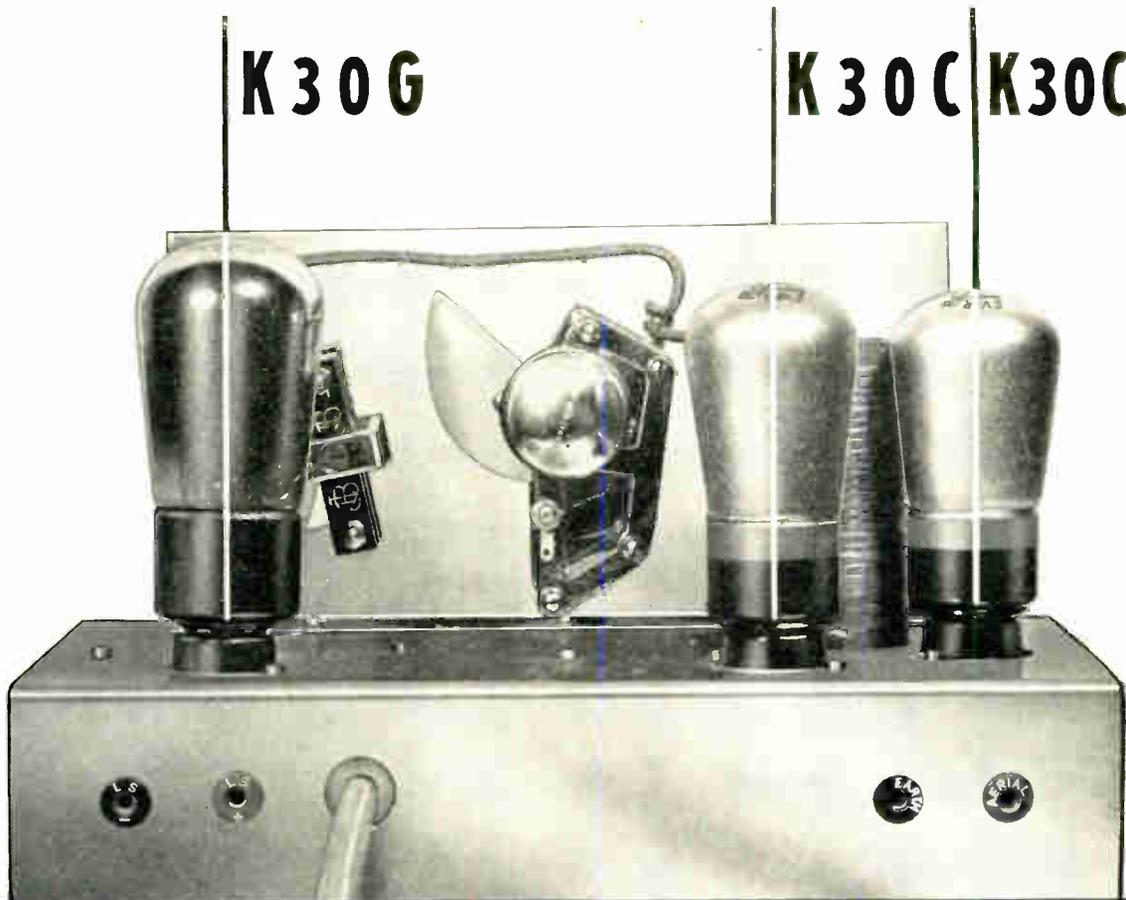
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