

# WIRELESS & TELEVISION REVIEW

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*By John Scott-Taggart, M.I.E.E., F.Inst.P., Fel.I.R.E.*

EVERY MONTH

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VOL 3 NO 15  
FEBRUARY  
1936



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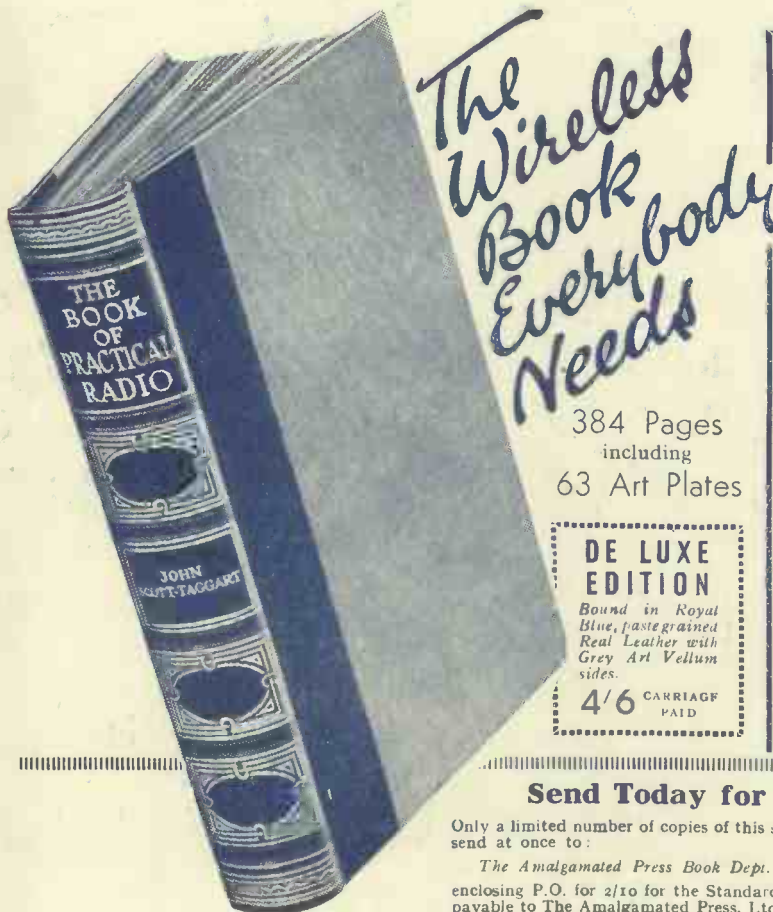
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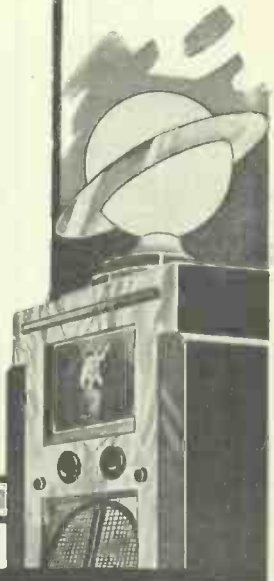
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As some of the arrangements and specialties described in this Journal may be the subjects of Letters Patent the amateur and trader would be well advised to obtain permission of the patentees to use the patents before doing so.

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# WIRELESS *and* TELEVISION REVIEW

Editor : G. V. DOWDING

Assistant Editor : A. S. CLARK

## *The Increasing Importance of Short-Wave Broadcasting*

IT does not require much courage to predict that 1936 will go down in the annals of broadcasting as the year in which short-wave reception became domesticated. Even now the all-wave receiver is beginning to displace those in which the medium and long wavebands only are represented. At the Radio Show firms who do not include all-wave models in their range of receivers will, without doubt, be the exception. Even the least technical of listeners can be heard discussing the short waves nowadays.

On every side there is evidence that the short waves are fast becoming an everyday part of broadcasting, that they are no longer of mere academic interest simply to the technically interested experimenter. Short-wave listening is now of interest on the strength of *what* can be heard, and not merely because of *the way* it is heard.

### *Invaluable to Thousands*

The Empire Broadcasting service is indicative of the change which has occurred in short-wave broadcasting. In certain parts of the Empire, where the nearest medium-wave station is too far away for useful, or even reliable reception, the Empire service provides both entertainment and a contact with home affairs.

Some would have us believe that too much is made of the romantic aspect of "exiles in the outposts of the Empire being able to keep in touch with the Mother Country by means of radio." But one has only to discuss the question of suitable receivers with listeners home on leave from the colonies to realise the importance they place upon the reception of short-wave broadcasting.

But to return to the listener at home. The consistent reception of American programmes on short waves offers advantages which will be demanded as a matter of course as soon as they are a little more widely realised among the hosts of ordinary listeners.

Some of the most thrilling running commentaries are to be heard from American stations—International sports events, motor-car racing at the Indianapolis track, a broadcast from the stratosphere. Only very occasionally can one hope to have such items relayed by the B.B.C.

And then there is the question of news. Due to the difference in time between this country and America, one can often hear items of news overnight which would otherwise not be seen before the morning papers, or even later.

But America is not the only country of special interest to short-wave listeners. It is surprising the number of European countries which include news in English amongst their short-wave programme items.

### *Many Will "Listen" to Television*

Television is another instance of the increasing importance of short-wave broadcasting. Even the ultra-short waves will be demanded by some buyers of sets in the future, so that the "sound" side of television may be heard, although a television receiver is not possessed.

As a matter of fact, it is probable that all the publicity which television has had during the last twelve months or so has done much to turn the attention of listeners to the possibilities of short waves. Previously it seemed just about as big an impossibility as there could be, to convince the casual listener that a short-wave receiver was not just a scientific toy.

### *A Special Feature This Month*

Now, everybody seems to be thinking "short waves," and WIRELESS lives up to its policy of giving readers what they want and of helping them to get the utmost benefit from their radio receivers, with a special eight-page feature this month, telling "All About Short-Wave Adaptors and Converters."

For those who prefer a separate short-wave receiver, W.L.S., our short-wave expert, describes his 1936 Empire Super. Not only is this an ideal set for S. W. loud-speaker work, but it should appeal specially to overseas readers who, as already mentioned, rely far more on short-wave broadcasting than we do in this country.

Finally, if there is anything concerning the reception of short waves on your receiver which puzzles you, don't forget to write to us. Remember, WIRELESS has a special Query Service available for all readers, and we will always do our best to help you out.



*A novel radio shop. The enterprising owner of this radio store in America has had the entrance built to resemble a giant radio receiver.*

# WHEN TO LISTEN

## During February

**S**HORT-WAVE listeners are beginning to realise that they can waste a lot of time unless they choose with some intelligence the waveband on which they are going to listen.

Most of the important short-wave stations may be heard at some particular time of the day, since it so happens that they are mostly transmitting—if only for a short period—in the waveband that happens to be most favourable for that time.

The amateur stations, of course, are distributed all over the face of the earth, and there are always a lot of them on the air. The amateur bands are therefore likely to yield quite a good bag of "DX" signals at any

Time (G.M.T.)	16 m.	19 m.	20 m. (amateur)	25 m.	31 m.	40 m. (amateur)	40-50 m.
00.00—02.00	---	---	---	---	---	DX	N. & S. America
02.00—04.00	---	---	---	---	---	do.	do.
04.00—06.00	---	---	---	---	---	do.	do.
06.00—08.00	---	---	Australia and N.Z.	Europe	Australia	do.	Europe
08.00—10.00	---	Europe	do.	do.	do.	Europe	do.
10.00—12.00	---	do.	DX	do.	Europe	do.	do.
12.00—14.00	---	do.	do.	do.	do.	do.	do.
14.00—16.00	North America	DX	do.	do.	Australia and Asia	DX	do.
16.00—18.00	do.	do.	W. Coast America	America	America	do.	Africa
18.00—20.00	---	Europe	---	do.	do.	do.	DX
20.00—22.00	---	---	---	do.	do.	do.	do.
22.00—24.00	---	---	---	---	do.	do.	do.

"DX" signifies long-distance transmissions from any part of the world

and scores of stations may be logged between those hours.

The listener who prefers early bed will do best to confine his attention to the shorter wavelengths. Listening on the 40-50 metre band is apt to be a waste of time unless one is prepared to make a late night of it.

The accompanying table has been drawn up with a certain amount of reference to the hours at which the better-known stations are actually transmitting. The fact that "America" does not appear against a certain band at a certain time may merely mean that none of the big stations are on at that time—not that conditions are not favourable for reception of America. **W. L. S.**

us to predict with considerable accuracy nowadays, always with the exception of the 10-metre band and shorter wavelengths still, which continue to be a law unto themselves!

### An Interesting Band

Generally speaking, the man who is interested in the reception of short-wave broadcast will find 40-50 metres the most interesting band, especially if he has no objection to stopping out of bed until 2 a.m. This band is at its best between midnight and 3 a.m.,

### FINDING YOUR POSITION ON THE SHORT WAVES

*When first listening on short waves, or when using a new short-waver for the first time, it is not always easy to tell what wavelength you are on. The stations listed below, being easily received, should help you to "place" the various broadcasting bands on your dials.*

□.....□

#### FOR YOUR INFORMATION

Try tuning to 30 metres one night between 9 and 10 p.m. On 30-43 you should hear Madrid, who gives a most interesting English news bulletin round about 9.30.

If you miss a rather special sporting running commentary one Saturday afternoon try the Empire short-wave stations on Sunday morning about 10 a.m. It is not unlikely that you will hear that commentary being relayed from a record to the Empire.

On Sunday, too, between noon and 12.15 you can pick up very easily an English news bulletin from Zeesen on 16-89 metres. Quite a lot of Abyssinian war news is usually included and some most interesting internal German political news.

□.....□

time during which the bands are "alive."

The table on this page gives a rough idea of how to plan a day's listening, together with a hint as to what one may expect to hear in each of the bands. It has been compiled partly from last February's results and partly from the general trend of conditions this winter. Twelve years of short-wave listening have enabled

STATION	Wave-length	STATION	Wave-length
Kharbarovsk R V 15	70.2	Huizen P H I	25.57
Moscow R W 59	50	Daventry G S D	25.53
Zeesen D J C	49.83	Zeesen D J D	25.49
Daventry G S A	49.59	Rome 2 R O	25.4
Cincinnati W 8 X A L	49.5	Daventry G S E	25.29
Zeesen D J M	49.35	Pittsburg W 8 X K	25.27
Bound Brook W 3 X A L	49.18	Radio Colonial F Y A	25.23
Daventry G S L	49.1	Moscow R W 59	25
Pittsburg W 8 X K	48.86	Daventry G S F	19.82
Radio Nations H B P	38.48	Zeesen D J B	19.74
Daventry G S B	31.55	Pittsburg W 8 X K	19.72
Schenectady W 2 X A F	31.48	Daventry G S I	19.66
Zeesen D J N	31.45	Zeesen D J Q	19.63
Zeesen D J A	31.38	Schenectady W 2 X A D	19.56
Daventry G S C	31.32	Zeesen D J E	16.89
Lisbon C T I A A	31.25	Bound Brook W 3 X A L	16.87
Rome 2 R O	31.13	Daventry G S G	16.86
Zeesen D J I	31.01	Daventry G S H	13.97
Madrid E A Q	30.43	Daventry G S J	13.93
Radio-Colonial F Y A	25.6	Pittsburg W 8 X K	13.93

# "I'm Sorry It Happened"

THERE is always something—in fact, usually a great many things—which afterwards we wish hadn't happened. It may be an incident, an accident, or some error we have made. It may be trivial or soul shattering. I was interested to see how some of my radio acquaintances would respond when I asked the question, "Will you tell me about something you are sorry that happened?" In practically every case I was told an incident that had occurred when the victim was very young. I suppose that as we grow older we become more philosophical—or harder!

## "My First Show"

Stanelli was quick to respond. "I remember my young life was nearly blighted at the age of sixteen," he told me, "over my first professional engagement. I was thrilled at getting a job in variety, and after a lot of thought chose a long classical violin solo which I practised beforehand for weeks. Of course, it was quite unsuitable for an audience who had come to see a music-hall show, and when I was half-way through it began to show that it was bored. First of all the gallery began to clap rhythmically—two slow, then three quick—and soon after the pit and upper circle joined in.

## "The Bird"

"It was agonising, and all the time I went on playing feverishly. I knew that a wealthy patroness of mine—a friend of my aunt's—was sitting in the stage box, and when I took an anguished glance at her, to my horror she had joined in and was clapping vigorously! Finally, several minutes before I had finished, the curtain was rung down. I had got 'the bird'!

*Some Unusual Adventures related to*

*Ruth Maschwitz*

*(Sister of the B.B.C. Variety Director)*

by

**Broadcasting Personalities**

\*\*\*

"I rushed to my dressing-room and was sitting there almost on the verge of tears, when suddenly the door opened and my patroness rushed in and seized me by both hands.

"My dear!" she cried. "You were marvellous! I was delighted. The audience was so appreciative that it couldn't contain itself till you had finished before it started to applaud, and so, of course, I joined in!"

"I ought to have been thankful that she took it that way, but at the time it only added to my misery!"

Philip Thornton, who is well known for his talks and plays, has a very

gruesome recollection which he told me about. "When I was seventeen I took up journalism and got the job of being a reporter on a Bristol paper. A story came in one day that a man had been found drowned in the Avon, and I was sent to investigate. I shall never forget seeing this horrible inert body being fished out of the river, and farther down a leg was found floating! The part that shocked me even more was the attitude of the people who brought it to land. They seemed to regard the whole matter as a complete joke, rifled the pockets of the corpse, and took all they happened to fancy!"

\* \* \*

Another broadcaster who is well known for his talks, "On the Road," is Philip Allingham, the Gentleman Cheapjack, and his regrets fortunately touched a lighter note. He has spent a great deal of his time travelling from fair to fair, and in this particular instance he was engaged in selling hair wavers. Standing on a box he was expatiating on the virtues of his wares until a large crowd collected, when he suggested that if one of the audience would kindly pose as a model he would give a free treatment.

## "No Sale"

A young woman with bobbed hair stepped up and offered her services, and Philip set to work. He treated her hair with a waver, undid it, and to his horror, instead of a soft wave, a frizzy curl stood up on top of the girl's head, and nothing that he could do had the slightest effect on it! The crowd roared with laughter and dispersed, while the young woman was almost in tears. Needless to say, (Continued on next page)

DR. PHILIP THORNTON AND HARRY HEMSLEY



Dr. Philip Thornton (left) "has some gruesome recollections," and Harry Hemsley "recalls a sad occurrence."

## BEWARE THE CRYSTAL SET!

**Y**ET another source of interference seems to have been added to the many others which daily play havoc with our enjoyment of the wireless programmes—in cases where the crystal set comes into popular use as a stand-by set.

Many people rig up an indoor aerial on a crystal set, in order to listen to the late dance music, thus obviating the necessity of having a loudspeaker going which might irritate other members of the household. This is, of course, in addition to the ordinary aerial for use with the valve set which operates the loudspeaker.

As many readers will doubtless remember, the cat's-whisker type of crystal detector is particularly susceptible to shakes and jars, and even the so-called "permanent" detectors will respond to mechanical shock, such as a cart or lorry passing the door. The user of the crystal set says that the crystal has "gone off," and finds a fresh spot.

But our listener to the late dance music will doubtless have almost forgotten the existence of the crystal set when, early the next evening he switches on the mains set and curses loud and long about the "man-made

static," blissfully unconscious that somewhere upstairs there is a crystal which has "gone off," and is vibrating at the mercy of every vehicle that passes the door.

And, believe me, although there is no actual connection between the crystal set aerial and the valve set aerial, the former will cause intense interference if it is tuned to the same or adjacent stations as the valve set, the interference taking the form of a scratching or frying noise, very difficult to diagnose.

### A Simple Remedy

The remedy is to fit a switch to cut out the crystal contact, or, if the crystal detector is of a type which permits the moving arm to be lifted back, this should be done at the conclusion of the evening's listening.

This may seem like a council of perfection, but if any readers who have recently installed crystal sets in addition to their usual valve sets are troubled by intermittent crackling noises, it would be well if they looked to the crystal before seeking elsewhere for the cause of the trouble.

W. N.

## RECOGNISE HIM?



Here is the popular Stanelli, with two of his "Stanelliphones," xylophones with piano action.

wanted to be an artist. His great ambition was to join the Langham, which is an artists' club—but to gain an entrance three drawings had to be presented for consideration by a committee. To produce these, for months Harry slaved to put in every spare moment. At last the fateful day arrived, and with joy in his heart he leapt into a 'bus, the masterpieces under his arm. He reached the Langham, bounded up the steps, and suddenly came to a halt. He had left the pictures in the 'bus!

## ACCUMULATOR CARE

**S**URPRISING as it may seem, quite a lot of accumulators meet their fate through carelessness on the part of their owners, rather than through age or overwork.

Perhaps the accumulator has three little balls floating (or sinking) in it. Maybe one of them has become jammed. Out comes a piece of wire to dislodge the recalcitrant object. Copper, iron or any other kind of wire except lead is fatal. It does not matter how short a space of time the wire has been in the acid, or whether it has gassed or not, the harm has been done.

And what about topping up? How many people still use tap water? The change in this case is much more gradual, but there can be little doubt that much of the "hard" negatives and "treeing" which take place on the plates is due to this cause. If you break down the strong acid yourself don't be tempted to use the commercial sulphuric acid. This contains impurities.

Finally, it is a fact that a pretty good guess at the condition of a cell (not the state of the actual charge) can be obtained by smelling it. If it has a pungent smell, all is not well.

In a frenzy he rushed to the Lost Property Office, but no trace of the missing drawings could be found. What was he to do? He had no time to produce three fresh efforts.

### The Situation Saved

Standing outside a public-house in Peckham he had noticed an old man of remarkable appearance, and at the time had thought the man would make an interesting study. He rushed back. The man was still there. In a fever he flew to the Peckham Art School and explained his case to the headmaster, borrowed materials and hurried back to the pub. In a remarkably short space of time he made charcoal drawings of the man's head, and for the second time that day went to the Langham Club—but this time with his heart in his boots. The committee took one look at his drawings and he was at once elected a member!

"All the same," said Harry, "though it turned out all right in the end, I was sorry it happened. It was terrible to lose those pictures."

## "I'M SORRY IT HAPPENED"

—continued from previous page.

Philip did not sell any hair wavers!

\* \* \*

Physical discomfort is always unpleasant, and my question conjured up a picture of cold and wet misery before Ronnie Hill's eyes. When he was a schoolboy, in company with thirty-nine others, he was taken for a trip round the world. Imagine the excitement of a crowd of youngsters landing after a long sea trip! Ronnie was thrilled to the core, and, armed with an enormous suitcase, leapt from the boat on to the gangway. Unfortunately, the gang plank was not properly adjusted—and, splash! he and the case fell headlong into the water!

\* \* \*

Harry Hemsley recalled a sad occurrence which happened to him years ago.

From early childhood he had always



# All about S.W. ADAPTORS & CONVERTERS

NOT everybody is prepared to go to the expense of a separate receiver for short waves; nor, as a matter of fact, is it everybody who has convenient accommodation for two separate outfits.

The DX enthusiast who is after weak signals from all parts of the world, will find a small independent receiver working a pair of telephones ideal for his purpose. But most listeners, used to nothing but powerful loudspeaker results on medium and long waves, will expect the same from their short-wave listening.

Both loudspeaker results and the use of your ordinary receiver for short waves are possible with the aid of a short-wave adaptor or converter. What is more, there are really no difficulties in the use or connecting up of either of these two units.

## The Difference

Perhaps it would be as well, first of all, to explain the significance of the difference between the two terms, "Adaptors" and "Converters," and the principles on which they work.

The essentials of a short-wave adaptor are the same as those of a good single-valve short-waver, which it is, in fact, except that it stops short at the anode circuit of the detector valve. This detector circuit is so coupled up to your "broadcast" receiver that it employs the L.F. stages only and cuts out any "H.F." that may be used in it.

The converter also is a separate unit to which the short-wave signals are fed, and which, in its turn, passes them on to the main receiver. The chief distinction is in what the unit does and the fact that the whole of the "broadcast" receiver is usefully employed.

## It Makes a Superhet

The converter is the first stage of a short-wave superhet. It contains the mixer and oscillator, often combined

With the increasing popularity of short-wave listening more and more readers are becoming desirous of adapting their existing "broadcast" sets for short-wave work. Every aspect of the subject is dealt with in this special section. An explanation of the principles concerned are given in this first article.

By A. S. CLARK.

in one valve, which turn the short-waves of all frequencies into the same beat frequency for "I.F." amplification.

In a straight type of "broadcast" receiver the H.F. stages are employed as intermediate-frequency amplifiers.

If the "broadcast" set has no H.F. stage it is unsuitable for use with a converter unless the latter is a special one incorporating one stage of I.F.

On the other hand, there is no drawback to the "broadcast" set itself being a superhet. In this case a double "supering" effect is employed.

With a converter, since the tuned stages (that is to say, those tuned by the normal tuning control) of the "broadcast" set are to act as I.F. stages, their tuning should be set to one wavelength and left. This wavelength can be either one on the medium waves or one on the long waves. The wavelength which gives best results depends upon the particular converter employed.

## Several Advantages

The converter has certain definite advantages over the adaptor. Chief among these is the fact that normally it is not necessary to get at the inside

*An inside view of the A.C./D.C. superhet converter which is marketed by Messrs. Peto-Scott, Ltd.*

of the "broadcast" receiver at all. This is assuming the converter is of the type which incorporates its own components for the purpose of supplying power from the mains, unless it is battery driven.

Undoubtedly the "All-In" type described above is the best form of converter to buy. Usually a heptode is employed for frequency changer.

There is, of course, the rectifier as well. Apart from the fact, just referred to, that the "innards" of the broadcast receiver do not have to be touched with this type of converter, it has another very good point.

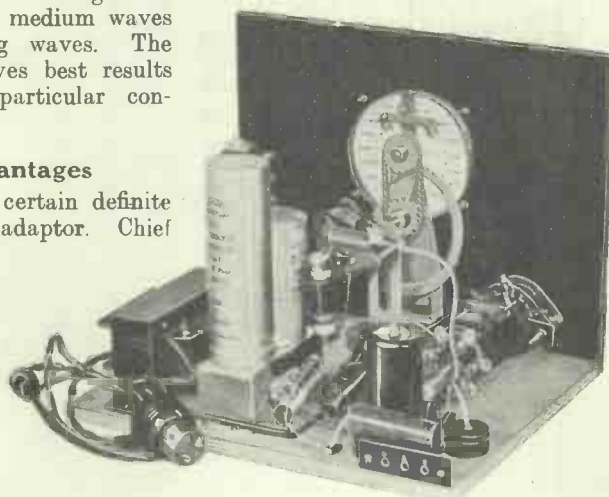
In view of the method of connection, it becomes possible to provide a switch which instantly connects the aerial straight through to the "broadcast" receiver for ordinary reception. This switching is often arranged as one point of the short-wave wavechange switch.

## Only External Connections

Also, on some converters, putting the switch into this position automatically switches off the power to the converter. It thus, to all intents and purposes, really does convert your receiver into an all-wave outfit.

The connection alterations for joining up such a converter are entirely

MADE BY PETO-SCOTT



external to the receiver. Apart from mains supply connections they consist simply of removing the aerial from the "broadcast" set and taking it direct to the unit instead, joining a wire from the unit to the aerial terminal thus freed, and joining another terminal on the unit to the earth terminal of the "broadcast" set.

**Rapid Switching**

When the converter is out of circuit, the aerial is switched straight through to the "broadcast" receiver.

If the power supply components are not included in the converter, the method of connection is similar, but leads for H.T. and L.T. have to be joined to appropriate positions in the "broadcast" receiver.

And now for the adaptor type of unit: This obtains its name from the fact that a plug with pins arranged as on a valve is plugged into one of the valve holders on the set, normally the detector valve.

It is usual to place the valve that is removed to make room for the plug into the adaptor itself, where it continues to act as detector, but now on the short waves. Most adaptors of this kind can also be used as a form of converter. That is why they are sometimes designated adaptor-converters.

**Received off Tune**

Since the detector valve can be made to oscillate by means of its reaction control, it becomes possible to use it as an autodyne arrangement. The valve is made to oscillate at just the right frequency, while the signals come through on a circuit that is slightly off-tune.

There are sometimes definite drawbacks to this scheme when compared

**THE OPERATION IS SIMPLE**

with a "full-blooded" converter, but since it is provided in addition to the adaptor scheme, nothing can be said against the instruments as adaptor-converters.

When used in this way the unit is plugged into the H.F. valve holder of the set, or it may go into one of the

**WITH METAL RECTIFIER**



*A Unit Radio Heptode Converter of the type which incorporates its own mains power supply components. A Westinghouse metal rectifier is used for H.T.*

intermediate frequency stages of a superhet. The plug is so arranged that the valve can be replaced on top of it and still be working in its normal position in the circuit. An extra valve is, of course, required for the adaptor.

One of the other articles in this section gives a review of the adaptors and converters available to readers. Some are in kit form for those who like to assemble their own apparatus.

It will be seen, too, that a few of them are available with an H.F. stage in front of the mixer. There is considerable advantage in this. For one thing

selectivity is increased to a valuable degree, and there is little chance with this extra selectivity of any station images being present.

Operation of an adaptor or converter is as simple as an ordinary short-wave receiver using similar controls. But there are two points which would not "crop up" with the ordinary receiver.

In the first place, the sensitivity can be increased when a "broadcast" receiver of the straight type is in use, by employing the reaction control on it. The other point concerns the tuning of the autodyne circuit already described.

**The Intermediate Frequency**

Sometimes small variations of tuning are best carried out by means of the normal control on the receiver itself. What this amounts to is altering the frequency of the intermediate stages to suit the beat frequencies, instead of varying the oscillator frequency to maintain the same intermediate frequency the whole time.

There is one other way in which a commercial receiver, either mains or battery, may be used for short waves. It will appeal to some constructors, and is therefore mentioned.

The idea is to build a separate and complete single-valve short-waver and to connect its output to the receiver's pick-up terminals. When the "broadcast" set is a battery-driven model, separate batteries will naturally not be required for the short-waver.

Before rounding off this article there are just one or two items which deal with things to be avoided.

**Keep the Lead Short**

First of all concerning the aerial lead from superhet converter to "broadcast" receiver. This should be kept as short as possible, since otherwise there is a chance of its picking up interference due to a station working on the same wavelength as that chosen for the intermediate frequency, namely, on the wavelength to which the "broadcast" receiver is tuned.

Finally, when an AC/DC converter is used in conjunction with an A.C. mains receiver, you should look to the grub screws on the controls of both, to see that they cannot make contact with the hands. Failure to do this may result in a shock being received when one hand is on a converter control and the other one, say, on the volume control of the "broadcast" set. If a shock should be received, a recurrence can be avoided by simply reversing the mains plug supplying power to the converter.



**SORTING Q. S. L. CARDS**



*This picture hails from Germany, where a central organisation deals with Q. S. L. cards. They are not handled by the Post Office in the usual way, but are dealt with in batches.*



ADAPTORS AND CONVERTERS

# The Choice of a Circuit

AN EXPLANATION OF THE SCHEMES THAT CAN BE USED IN SHORT-WAVE SUPERHET CONVERTERS, AND A DISCUSSION OF THEIR VARIOUS MERITS.

By W. L. S.

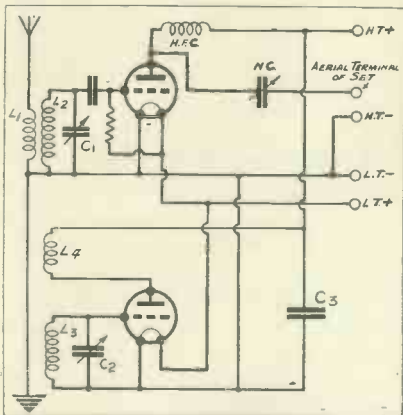


Fig. 1. A simple circuit using two triodes—one as mixer and one as oscillator.

THE modern broadcast receiver, employing one or two stages of H.F. amplification and incorporating all sorts of refinements like automatic volume control, is such an admirable piece of apparatus that it seems a pity not to use it for our short-wave reception as well.

I am afraid that the average home-built, complete short-wave receiver falls a long way short of the ready-purchased broadcast receiver, both technically and practically. The short-wave listener who is an out-and-out "DX hound" will, of course, build his own short-waver complete—and he'll know how to do it.

The broadcast listener who wants to extend his broadcast listening down to the extremely fascinating short-wave bands cannot do better than build a good converter and use it with his existing receiver.

### A Simple Device

Basically, a short-wave converter consists simply of a short-wave detector and a local oscillator, beating with the detected signal at some convenient frequency. Suppose we arrange for the beat-note to be something of the order of 600 kilocycles. Then all that we need to do is to feed the "mixed" output of these two into a good broadcast receiver tuned to 600 kc. (500 metres), and we should have a very effective short-wave receiver.

Fig. 1 shows a simple short-wave converter, in which the signals are detected by a simple triode, and the beat is produced by another triode,

coupling between the two being provided simply by the stray coupling between the two sets of coils.

The Fig. 1 circuit may, however, be reduced to a single-valve job by using one of the many valves designed specially for use as frequency-changers. Fig. 2 shows the triode-hexode arranged as a very straightforward single-valve converter which should give perfectly satisfactory results.

Practical points to be considered are the adequate separation of the two sets of coils ( $L_1-L_2$  and  $L_3-L_4$ ), with screening between them if necessary; and the laying out of the two tuning condensers in such a way that each is as near as possible to its own coil.

All initial tuning can be done on the oscillator condenser  $C_3$ , the detector tuning control,  $C_1$ , being very flat in operation.

Such a simple arrangement naturally has its disadvantages. Imagine a short-wave transmission on 6,000 kc. (50 metres). Our oscillator is tuned to, say, 6,600 kc., giving the necessary 600 kc. beat for handing on to our broadcast receiver. The selectivity of the input circuit  $L_1-L_2$  may not be

### THE TRIODE-HEXODE

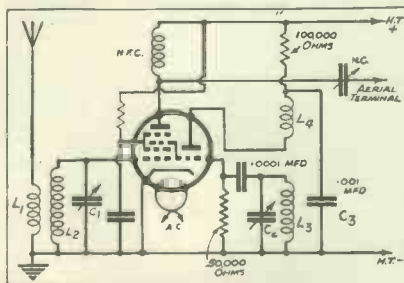


Fig. 2. In principle this circuit is similar to Fig. 1, but the triode-hexode enables one valve only to be used.

sufficient to keep out another signal on 6,120 kc., and if there is such a signal the oscillator will also be sufficient to interfere with each other in the I.F. circuits and in the output.

To obviate this possibility we must use some form of pre-selection on the short waves. A perfectly straightforward H.F. stage is adequate, although a really excellent converter, in my opinion, would use two.

### Separate Oscillator Tuning

To save drawing the whole of the triode-hexode circuit again, I have shown, in Fig. 3, just the initial H.F. stage and the detector portion of the short-wave converter. The two tuned circuits shown are both tuned to the signal-frequency, and may therefore be ganged without any trouble whatever. The third control, not shown in the diagram, is that of the oscillator, and I recommend personally that this be left as a separate control. Owing to the sharpening up of the input circuits, tuning will now be a slightly more critical matter, and it may not be possible to hear signals by just rotating the oscillator control—the

### ADDING A PRE-STAGE

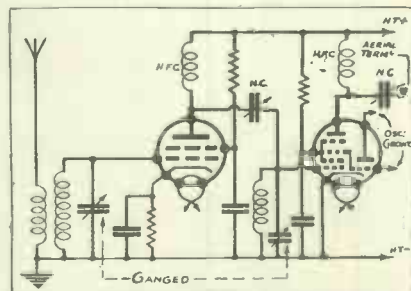


Fig. 3. Selectivity is greatly enhanced by the addition of a pre-mixer H.F. stage, as shown here.

two-gang control of the H.F. and detector circuits will have to be somewhere near resonance before things begin to sound "live."

The main practical point to watch in such a converter concerns the oscillator part of it. It is not always too easy to maintain a state of oscillation all over the wavelength range without having the valve oscillating too hard in some parts and not

hard enough in others. If it breaks into an audible "squigger" at any points, it will be quite useless from the station-getting point of view.

The H.T. on the oscillator should be kept as low as possible, and the grid leak should also have quite a low value. In some cases it is worth while to substitute a semi-variable condenser for the fixed condenser  $C_3$  (Fig. 2), so that the oscillator actually has a "reaction control" which can be touched up from time to time.

If it generates a signal that is uniformly too strong for the actual signal in the detector circuit, it is a good plan to use the oscillator on its second harmonic. This merely means that one leaves, say, the 40-metre coil in the oscillator circuit when one is receiving 20-metre signals. Very often it will be found that a single coil for the oscillator will cover all waveranges, thus reducing the amount of coil-changing necessary.

### An Added Stage

In all the foregoing I have assumed that the broadcast receiver to which the short-waver is coupled has a reasonable amount of H.F. amplification—preferably two stages, unless of course, it is a superhet. If it has only one it may sometimes be advisable to introduce another one between it and the converter.

This is not, of course, in any sense a "signal-frequency" stage. It may be built into the converter itself, and

Incidentally, if your broadcast receiver is a superhet, then the whole outfit will become a "double superhet." You convert your short-wave signal (imagine one of 6,000 kc. again) to 600 kc., at which frequency it is amplified. Your broadcast receiver then probably converts this signal to the new frequency of 110 kc. or there-

### AN EXTRA "I.F."

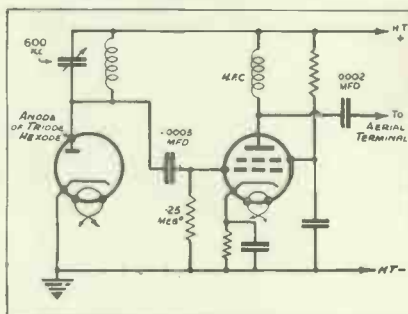


Fig. 4. When there is insufficient H.F. amplification in the broadcast set, an I.F. stage can be added to the converter.

abouts, after which it is detected and amplified at low frequency.

But the operation of the short-wave part will be precisely the same, whether your B.C. receiver is a superhet or not. The only point worth making is that in the case of a straight set it may be best to switch it over to the long-wave side, tuning to about 2,000 metres (150 kc.) and using this as the intermediate frequency. If, on the other hand, it is a superhet with an

It may be incorporated with the converter itself, i.e. built on the same baseboard. Straightforward tuned-anode coupling is used, and a pre-set condenser and a home-made coil of about 60 turns of 2-in. diameter (for 600 kc.) may be used. The condenser coupling across to the aerial terminal should then be quite large—say .0002 or .0003. In the ordinary course of events it should be a small pre-set, adjusted to give something rather less than .0001.

### A Common Earth Employed

Incidentally, the broadcast receiver and the short-wave converter must have a common earth connection for this coupling to be effective. The actual form of the input circuit to the broadcast receiver need not worry one at all. The aerial is simply removed and hitched on to the converter, the output of which couples into the broadcast set in precisely the same manner (whatever that might be) that the aerial did formerly.

In all these experiments with converters, it is important to realise that the broadcast receiver used for the job is a self-contained unit which requires no adjustment or meddling with. Apart from using its volume control and setting its tuning control to the desired frequency, you should do nothing else to it.

Now for some practical points about operation: If your converter is an ideal arrangement, operating perfectly, you should not hear any squeals or whistles whatever. Stations should come in smoothly, with a slight hiss as the carrier-wave is tuned-in. Squeals will generally denote some form of image interference.

### Eliminating Interference

If you are using a tuned H.F. stage in the converter, only the very strongest of the unwanted signals will have any effect upon the "wanted" ones. If one of your stations is badly interfered with, you can try two things. First, leave the H.F. and detector controls exactly where they are, and rotate the oscillator control until the same station comes in again. You are now supplying the beat-note on the opposite side of the wanted station, i.e. above it in frequency, instead of below, or vice versa—and the chances are that it will now be clear.

Alternatively, you can change your intermediate frequency by shifting the tuning control of the broadcast receiver, re-tuning on the short wave to bring the same station back.



should be regarded purely as the first I.F. stage of a superhet, the broadcast receiver supplying the rest. It must, of course, be tuned to whatever frequency you decide on for your I.F., and the broadcast receiver must always be tuned carefully to that same frequency when short-wave listening is being carried out.

I.F. of the conventional 110 kc., your results will most likely be better if you make the first conversion to a higher figure—somewhere at the top of the medium-wave range.

Fig. 4 shows an extra I.F. stage ready to be interposed between the short-wave converter and the aerial terminal of the broadcast receiver.

• • • • •

### IN GERMANY

Many amateurs as well as broadcasting stations will be heard by the user of a short-wave adaptor or converter. The German amateurs, one of whom is seen here, have recently been officially recognised, and now enjoy the patronage and leadership of the Reichs Propaganda Minister.

• • • • •

ADAPTORS AND CONVERTERS**MODERN INSTRUMENTS***A Review of the Various Makes Available*

**T**HE BENNETT TELEVISION COMPANY of Redhill, Surrey, make a Converter-Adaptor of the universal type. That is to say, it can be used with battery or mains-driven receivers, and will function as either a straight-detector stage or as a superhet unit. The receiver with which it is used may be of either the superhet type or straight-circuit type with H.F. amplification.

The power supply is obtained from the broadcast set by means of an adaptor plug. The price, without extra valve, but including cabinet, is 30s. (postage paid), and the range 16 to 50 metres.

**British Radiovision Corporation**, of 56, Hazel Road, London, N.W.10, have one instrument on the market of what we may term the "All-In" converter pattern. This indicates that it contains its own rectifier and components for obtaining all the necessary power from the mains direct. It is simply connected in the aerial lead to your set.

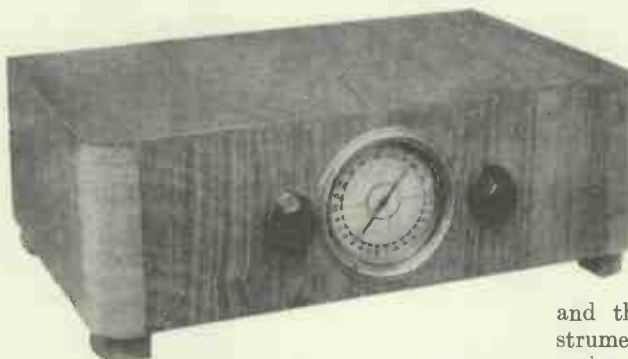
**Wide Wavelength Range**

This attractive-looking instrument is contained in a metal case measuring 9 by 8 by 9 inches, and finished in black, mahogany, or walnut. It will work equally well on A.C. or D.C. mains of voltages between 200 and 250.

The range is 13.5 to 200 metres in three steps. A fourth point on the wavechange switch turns off the converter and puts the aerial straight through to the set for medium and long waves. A triode hexode acts as frequency changer, and the price is 8 guineas.

**Wm. F. Brown Radio, Ltd.**, of Ossillo Radio Works, Brierley Hill, Staffs., have recently completed the design of a new converter. At the time of writing we have not full details, but the following points will serve to indicate the interesting nature of this instrument.

The range is 5 to 80 metres. It is claimed that a very stable oscillator is employed, which is a compensated Dynatron. This marked stability enables the



*A feature of this B.T.S. superhet converter is that a consolette receiver may stand on it.*

instrument to be accurately calibrated, so that the user can find a required station by setting the dial to the correct reading. We gather that the instrument is for use on A.C. mains.

**B. T. S.** Two distinct types of instruments are made by British Television Supplies, Ltd., of Faraday House, 8-10, Charing Cross Road, London, W.C.2. One of these is of the universal pattern, the meaning of which we have already given, while the other answers to our "All-In" description.

We will deal with the second-named one first. This costs, together with the two valves, £6 12s. 6d., and has one genuinely unique feature.

The feature to which we refer is its shape, which is 17 ins. wide by 11½ ins.

**FOR K.B. SETS**

*The K.B. instrument is specially designed for use with sets of the same make which are provided with a socket for the plug visible to the left.*

deep, and only 6 ins. high. The idea of this is so that any consolette type of broadcast receiver may be stood on top of it. This excellent feature makes it unnecessary to "find room" for the unit, and aids the appearance of one's radio.

One of the valves is a heptode frequency changer, and the other, a rectifier. The instrument will work on A.C. or D.C. mains.

The range is 13-74 metres, and for those without mains, a battery-operated model is available for £5 5s. 0d. Either the mains or battery models can be obtained on attractive hire-purchase terms.

The price of the universal adaptor is £2 12s. 6d., and its range normally 13-52 metres. Additional coils to take the range up to 190 metres can be obtained, and for 10s. extra a special tropical model is available in teak cabinet.

**Tuned H.F. Stage**

**Dynatron.** This instrument is made by H. Hacker & Sons, of Perfecta Works, Ray Lea Road, Maidenhead, and is primarily intended for use with their own "broadcast" receivers, but will give very satisfactory results with any good receiver with two or more H.F. valves.

An outstanding feature is the fact that it has a fully-tuned H.F. stage prior to its oscillator valve. The instrument has a magnificent specification and should prove well worth the 9 guineas asked for it in chassis form. An A.C. power unit is available for it when required for 4 guineas.

**Eddystone.**—This is the name given to the instruments designed by Stratton & Co., Ltd., of Eddystone Works, Bromsgrove Street, Birmingham, 5. These instruments, of which there are two, are of the kit type for assembly by constructors. Clear details for this work, and lists of parts required, are contained in the Eddystone Short-Wave Manual, which costs 6d.

There is a heptode super-heterodyne converter, which works on A.C. mains and obtains its power from the broadcast set, and there is a one-valve

superhet short-wave converter for working from batteries. The range of the first is 14.6 to 56 metres, and of the second, 13.5 to 85 metres.

**Farrex Radio**, of Drayton House, Gordon Street, London, W.C.1, supply an instrument of the universal type for use as an adaptor or a converter. Five- or seven-pin plugs are available, and there is switching for going straight to "broadcast" reception if desired. A valuable point is the provision of approximate calibration for the coils supplied with the instrument. The price is 3 guineas.

**Hyvoltstar**.—The makers of Hyvoltstar instruments are the Universal

### SUITS ANY SET



*This Farrex adaptor-converter can be used with practically any set, either mains or battery driven.*

High Voltage Radio, Ltd., 28-29, Southampton Street, London, W.C.2. The chief feature of these is that the valves are of high-voltage type, namely, of the same voltage as the mains for the heaters and H.T. supply. This, of course, does away with the necessity of any mains transformer or voltage regulating resistance.

The Hyvoltstar instruments are for A.C. or D.C. mains, an H.T. rectifier being incorporated. There are two valves in the converter, the rectifier and a pentagrid frequency-changer.

### "Single-Signal" Tuning

The wave-range is 12.5 to 93.5 metres in three stages. Owing to the fact that a high intermediate frequency is used, and the aerial circuit tuned, it has been possible to provide "single-signal" tuning.

The price is 6 guineas, and a cabinet can be supplied for an extra guinea. Another model has been produced with an H.F. stage, and is particularly suited to certain types of receivers.

## "UNIVERSAL" AND "ALL-IN" TYPES

For those who like to assemble their own instruments, there is a two-valve kit designed on similar lines to the two-valve unit described above. It costs £4 10s. This includes valves, but not cabinet.

**K.B.**—The converter manufactured by Kolster-Brandes, Ltd., of Cray Works, Sidcup, Kent, is mainly of interest to owners of certain "broadcast" receivers made by this firm. The K.B.427 and K.B.428 models are supplied with sockets into which a plug on the K.B.432 converter is fitted.

By means of this plug the necessary H.T., L.T., and G.B. are fed via the set to the converter. The range of the instrument is 15 to 80 metres, and the price, including valves, is £4 10s. Deferred terms are also available.

The frequency-changer is an H.F. pentode, and a wavechange switch divides the wave-range into two distinct bands. This switch can also be utilised to throw the converter out of circuit without disconnecting from the receiver when it is desired to revert to the long or medium wave-ranges.

### Complete or Kit Form

**Peto-Scott Co., Ltd.**, 62, High Holborn, London, W.C.1, have two models. One is of the universal type for almost any set, and the other is an "All-In" converter for A.C. or D.C. mains.

The second of these instruments is available in complete form or as a kit of parts, and both the kit and complete models may be purchased with the aid of deferred terms. Both types of instrument, the universal and the "All-In," have a range of 13-80 metres, and the external appearance is the same in both cases.

The universal adaptor-converter takes only about two hours to assemble with the aid of the full-size blue print and detailed wiring and assembly instructions which are given with every kit of parts. It incorporates a triple-range coil, 100:1 slow-motion drive, aeroplane dial, slow-motion reaction condenser and aluminium panel.

The price of the kit is £1 19s. 6d. less cabinet, which costs 10s. 6d. Deferred terms are available.

The cost of the A.C./D.C. short-wave converter as a complete instrument is £6 6s. 0d. and the kit, less valves and cabinet, £3 10s. 0d. The coil, drive and dial are similar to the instrument

just described, while a pentagrid is employed as detector-oscillator. It is a very compact and neat instrument.

**Union Radio Company, Ltd.**, of U.R. Works, Campbell Road, Croydon, Surrey, make two outstanding instruments. The first, costing £8, is of the "All-In" converter type, and is for operation on A.C. mains.

The range of the instrument is from 13 to 55 metres, and is covered in two steps. There are three valves, an H.F. pentode in a tuned pre-selector stage, a pentode frequency changer, and the mains rectifier.

### For Television "Sound"

A converter suitable for the reception of television "sound" transmissions is also made by this firm. It has a range of 2½ to 10 metres. It is a single-valve instrument with its own power pack. Details of price may be had on application to the above-mentioned firm.

**Unit Radio**, whose address is 347, City Road, London, E.C.1, have fine instruments in their range. First of all there is the De Luxe "Micro" Model.

This is of the universal adaptor-converter type for all kinds of sets, mains or battery driven. The wave-range is 12-70 metres. An extra coil for taking the range up to 100 is available. A changeover switch for short to "broadcast" is fitted. The price complete is 50s.

The second instrument works as a converter on A.C. or D.C. mains and incorporates its own power compon-

### FIFTY SHILLINGS



*A Unit Radio instrument costing £2 10s. and having a range of 13 to 70 metres.*

ents. A Westinghouse metal rectifier is used with a heptode frequency changer. The range is 13 to 85 metres, and the price with valve £6 15s. 0d.

A unit with a similar specification, for battery operation, costs £4 5s. 0d.

(Please turn to page 191)

ADAPTORS AND CONVERTERS

# PRACTICAL POINTS

By  
G. T. KELSEY

The construction of short-wave apparatus, and particularly adaptors, is not a difficult matter. But there are certain pitfalls which must be avoided if success is to be complete, and the most dangerous of these are explained in the following article.

A SHORT-WAVE adaptor is a very happy solution to the problem of short-wave reception, in that it enables all the worthwhile short-wave stations to be received on an existing broadcast set without having to change over the batteries and, with one exception, the valves, and with the minimum amount of inconvenience and trouble.

It is all very simple and satisfactory. But there are pitfalls—pitfalls which, to the listener unused to reception on short waves, are apt to be very mystifying and perhaps, in some cases, even disheartening. In all cases such as this which have been brought to my notice, I have almost invariably found that the inability to obtain satisfactory results has been due to one of three things. First, a lack of understanding of the essential requirements of a short-wave adaptor design; secondly, failure to operate the unit correctly; and lastly, the misconception that an adaptor is a sort of magic box which will miraculously transform any old "junk-box" set into a magnificent short-waver!

### Set Must be Good

Concerning the last of these three points, it doesn't seem necessary to say very much, for it will be very obvious to the thoughtful reader that not even the most elaborate adaptor in the world will put more into a set than is there already. The function of an adaptor is to receive the stations, and the degree of amplification to

which they are subjected after reception is dependent entirely upon the efficiency of the L.F. stage or stages in the set with which the unit is being used.

In bringing to light what I believe to be pretty generally the common snags, I am most anxious at the same time to make it quite clear that there is nothing very difficult about short-wave reception. To those who go about it in the right way, and with some rough idea of what they are attempting to achieve, it is as simple as A B C, and the chances of success are ninety-nine to one. But there are points to watch out for, both in connection with construction and operation, and it is with those points that I am proposing to concern myself in this article. But where short waves are concerned, I do not believe that much progress can be made by theorising, in my opinion, which method of making contact with the rotor vanes is also of considerable importance. It must be one of the several schemes such as, for instance, the internal pigtail, which obviate noise. To rely upon a spring between the rotor spindle and the condenser end-plate is rarely satisfactory, and for that reason few condensers are made that way.

It is practice, in counts every time, following observations will, it is hoped, be of interest to all who are contemplating the construction of an adaptor, or who have built one and have failed to obtain satisfaction, the main object will be to show, stage by stage, component by component, how very simply and inexpensively an adaptor can be made.

The two most important components in any straightforward adaptor design are the coil and the condenser and

drive—the coil because it is of such paramount importance to have the size of the windings and the degrees of coupling absolutely correct; and the condenser and drive because, well, upon the design of this component depends, to a very large extent, the ease with which stations can be tuned-in.

### Moving-Vane Connections

There are several excellent short-wave condensers on the market, and although in my references above I have grouped the condenser and drive as one component, the majority of short-wave condensers at present available require a separate drive.

In the condenser itself, low-loss construction is, of course, the feature to look for, in order that the minimum capacity may be as low as possible, but the method of making contact with

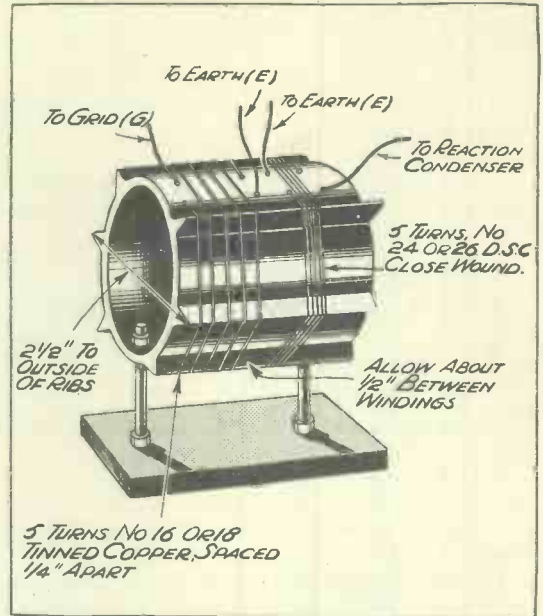


Fig. 1.—Full details for making a short-wave coil are contained in this diagram.

### A SHORT-WAVE CHOICE

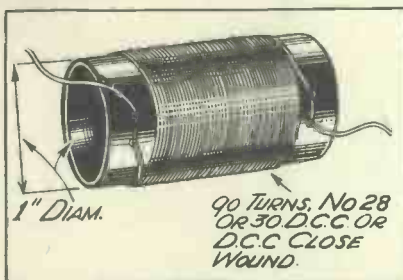


Fig. 2.—A simple but effective H.F. choke can be made as shown above.

### TAKING TAPPINGS

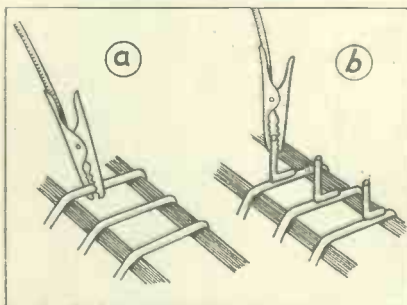


Fig. 3.—Two methods of taking tappings off a short-wave coil.

one or one hundred to one is possible. In any case, I do not think that any drive is to be recommended for short-wave work with a reduction ratio of less than seven to one.

**INSTEAD OF A CONDENSER**

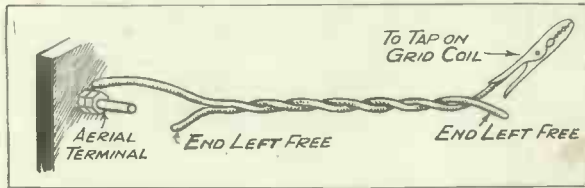


Fig. 4—When the aerial coupling has to be very loose the simple expedient indicated above can be employed.

Although there are many very efficient types of short-wave coils available for those who do not care to construct their own, the requirements of a coil for short waves are so simple that the job is one that can easily be undertaken at home. Just how simple it is will be apparent from Fig. 1, in which full constructional details are given of a coil which, when used in conjunction with a tuning condenser of .00015 or .00016 maximum capacity, will cover the majority of the important short-wave broadcasters.

The exact range of a coil wound in accordance with the details given will naturally depend upon the associated circuit in which it is being used, but the average range will probably be from about 20 to 50 metres.

**Those Aerial Taps**

With a coil of this type, it is usual to tap the aerial on to a turn of the grid coil (the spaced winding) by means of a crocodile clip as shown in Fig 3a, and whereas, so far as efficiency is concerned, that method is quite satisfactory, the crocodile clip is rather inclined to slip round, in which case, of course, it shorts one fifth of the coil out of circuit!

To obviate any possibility of a short, therefore, it is best to arrange small L-shaped taps on each of the turns of the coil as shown in Fig. 3b. Incidentally, while on the subject of aerial coupling, if the aerial is inclined to be above average or even, in many cases, when it is only of average dimensions, it will not be found possible to tap it directly on to a turn of the coil. The "damping" caused by the aerial prevents the detector valve from oscillating, and in cases such as this it is necessary to use a small series aerial condenser.

Such a condenser is easily "manufactured" by joining a length of insulated flex to the aerial terminal, and the tapping clip to a separate

length of insulated flex, and by twisting the two together as shown in Fig. 4. The number of twists will determine the degree of coupling, and the "condenser" is therefore "variable."

In practice, this coupling should be kept tight, that is to say, there should be as many twists as possible consistent with the attainment of satisfactory reaction effects. Once the right number of twists has been determined (a matter for experiment), the coupling should remain reasonably constant, although when what are known as "dead spots," i.e. places in the range where the unit ceases to oscillate over a narrow band, are encountered, it may be necessary slightly to alter the number of twists.

Another rather essential short-wave component, the construction of which can easily be undertaken at home, is the short-wave H.F. choke. Such a component, built in accordance with the details given in Fig. 2, will work entirely satisfactorily, and it should not cost more than a few coppers to make.

The only other components which are required for the construction of a simple adaptor are the reaction condenser, the grid condenser and leak and the valve holder, all of which are inexpensive.

**How to Build One**

An adaptor of the type to which I am referring is shown in theory and practice in Figs. 5 and 6 respectively, and it will work with any battery set which has one or more L.F. stages. It is so very simple to build and to install that it makes an ideal jumping-off ground for all who have not previously experienced the joys of short-wave reception.

The panel and baseboard can both be of wood so long as it is well seasoned, but I do advocate the use of copper foil on the inside of the panel to minimise hand-capacity effects. The foil, by the way, must be "earthed," that is to say, it must be connected to a point at earth potential, and a convenient way of doing that is by means of the tuning condenser bush,

**A ONE-VALVER**

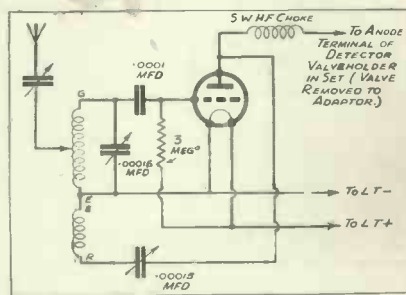


Fig. 5.—The circuit of a straightforward single-valve adaptor.

providing the rotor vanes are not insulated from the framework. If there is any doubt about it, make a separate connection from the foil to the moving vanes terminal.

If you do undertake the construction of an adaptor on the lines suggested, take particular care with your wiring. Avoid long leads in the grid circuit particularly, and be certain to tighten up all the fixing terminals with pliers. Otherwise, you may be wondering where the crackles are coming from when your adaptor is in use!

**Connecting Together**

The method of attaching the adaptor to your existing set is very simple. Transfer the aerial and earth leads from the set to appropriate terminals on the adaptor, remove the detector valve from your present set and place it in the valve holder in the unit, and join the two adaptor leads marked L.T. + and L.T. - to the terminals so marked on your present accumulator. The only other connection which has to be made is from the short-wave H.F. choke to the anode terminal of the valve holder in your set from which you have removed the detector valve.

**IN PRACTICAL FORM**

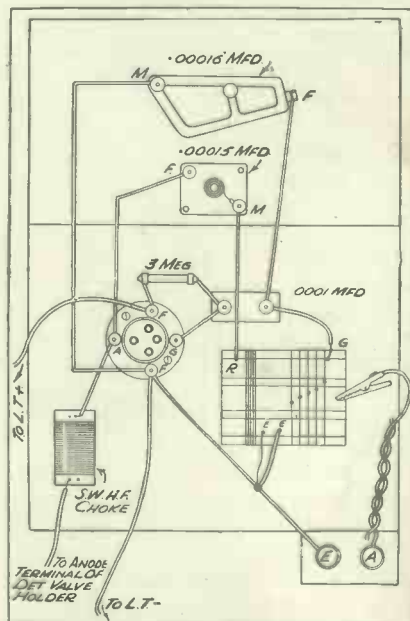


Fig. 6.—The circuit of Fig. 5 in practical form. Keep all tuning circuit leads as short as possible.



WHAT I should like to know is how many hundreds of thousands of pounds the B.B.C. is spending in the provinces just now on new transmitters, studios, and staff—but B.B.C. finance has always been the closest of mysteries. It must be an immense figure, for there's not a region where important expansion schemes are not afoot. And in my opinion, after personally visiting the scenes of this activity, the B.B.C. is not spending a penny too much; on the contrary, they might well go a good deal farther.

Visiting Bournemouth, for instance, it was pathetic to see the poor little transmitter there, in its dingy wooden hut on an eminence behind the town, and to think of the day when this was one of the B.B.C.'s "main stations," with its own studios and orchestra, when there was enough space in the ether for 6 B.M.'s voice to be heard certainly all along the South Coast, and sometimes much farther (I used to listen to it in Yorkshire).

Now with so many kilowatts jostling in the European ether, poor little Bournemouth, having to share a wave with Plymouth, and with only its original kilowatt of power, can only make itself heard in a strictly local area.

### No Reliable Alternative Programme

The South Coast, from here right round to Margate, lacks a reliable local programme as an alternative to National; London Regional fades, and most people when they don't like the National switch over to the roaring Frenchmen just across the water.

\* \* \*

Of course, it's not only a question of money to cover Britain adequately with alternative programmes, but also of wavelengths.

As it is, with four new transmitters on the stocks and others projected, there will have to be a good deal of synchronising wavelengths, and to that end research engineers of the B.B.C. have lately been carrying out elaborate tests to find out exactly what you can (and can't) do with a number of transmitters on a common wave.

### The North Ireland Regional

The first of the new stations, North Ireland Regional, is to be launched with a great to-do. None of your modest "sliding-in" à la Droitwich, but a slap-up inauguration by the Duke of Abercorn, Governor of Northern Ireland, on March 20th—and quite right, too. The opening of a new high-power station is an occasion worth making much of. And this station especially so. With 100 kilowatts it is the heftiest medium-wave transmitter we have; and its technical design is revolutionary, from the mast-aerial (an effort to combat fading) at one end to power-from-mains at the other (it is the first B.B.C. trans-

*A picturesque view of the B.B.C. studios and offices at Bangor in North Wales.*



# The B.B.C. in the Provinces

By Leslie Bailly

mitter for ten years to rely on mains, in preference to generating its own power).

Next for launching will be North Scottish Regional, then the North Wales relay, then North-east Regional.

The outlook in the provinces, in fact, is bright, not only on the technical side, where these developments are going to bring "quality" reception to enormous tracts of country where it has never been known; "quality" is also to be the 1936 watchword on the programme side. The Regional directors have wrested increased allowances from the moneybags in London, not with the idea of extending the amount of local programme activity, but of improving the standard.

□.....□

**There is a tendency to overlook the importance of the Provinces in broadcasting, and to subjugate these regions to the London programmes. This is an entirely erroneous attitude, as our contributor strongly emphasises in these provincial broadcasting notes.**

□.....□

### Rivalry is Essential

To the same purpose, staffs have been augmented, though in some places the provincial studios are still

understaffed, but perhaps this will be remedied.

Now all this upward tendency is enormously important in the history of British broadcasting. Three or four years ago there was a downward tendency—certain officials at London headquarters made a dead set for "centralisation"—provincial orchestras were disbanded—and so on. All that was very bad, not only because the surface of the provincial goldmine of programmes has only yet been scratched, and not only because of the appalling ignorance of too many London B.B.C. officials concerning the provincial listener's mentality (and therefore his needs), but also because the B.B.C. is a monopoly, and the best way to get the stimulus of competition driving among its workers is to set London and the provincial stations all at rivalry with one another.

For instance, if I were asked which was the most successful innovation in the realm of "feature" programmes during 1935—and on this topic I speak with some intimate knowledge, having been organising "features" myself for ten years—I should say not any London production, but the North Region's series of "Harry Hopeful" tours. The last of these, when "Harry Hopeful" visited the Border Country on New Year's Eve, was the least successful, but in the predecessors D. G. Bridson had set himself a high standard difficult to maintain.

The "real life" in these programmes was the most

across the seas like to hear not only London calling, but the voices and songs, news and views from their own native heaths. So to-day February 1st a Warwickshire programme, which the Birmingham studios are producing for an "All Regions" Children's Hour, is being taken by the Empire—but owing to the exigencies of world time, the Empire Director wants it at the odd hour of 12.45 p.m. So Birmingham will produce it twice in the same day, once for home consumption, once for Empire.

\* \* \*  
"And don't forget the provinces, Baily, will you?"

Three years ago that appeal was addressed to me by Percy Edgar, when he heard that I was leaving to take up abode in the metropolis; the words recur to me now as I write this, the first of a series of articles on provincial broadcasting, which the Editor has asked me to undertake—and which I do undertake gladly, because I have not forgotten the provinces.

### A Stiff Fight

For years, as a provincial journalist, I fought for better recognition by the B.B.C. bosses of the needs of the provinces, and I can tell you that the fight was a stiff one. Returning now to write on this subject, I rejoice to find the situation so much improved. Three years in London, much of it spent preparing programmes for the National microphone, has not changed my view of the importance of provincial broadcasting.

On the other hand, such success as my programmes have had owes a great deal to my years in the real England that lies beyond the boundaries of London. And I think my "Scrapbook" colleague, Charles Brewer, would agree that his apprenticeship at Birmingham under Edgar, and at Cardiff under Appleton, was of incalculable value. Provincial experience gives a broad outlook; the narrowly sophisticated smart Mayfair "slant" on entertainment may have its place in the field of broadcasting, but, I suggest, only a minority place.

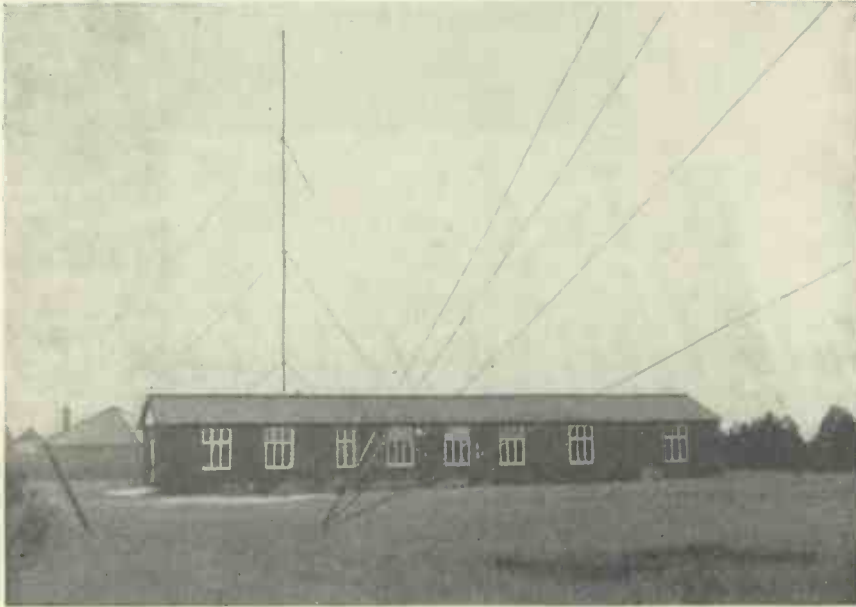
### The First "Scrapbook"

No, I haven't forgotten the provinces. I haven't forgotten that Belfast paid me my first cheque for broadcasting rights (one play—3 guineas!) back in 1924. Or that it was at Leeds that I first ventured into this magic art. Or that it was Edward Liveing, now North Regional Director, who encouraged me to make the first "Scrapbook," and his then Drama Producer, Victor Smythe, who first introduced me to the dramatic control panel. I can see Victor now, his stocky figure like a ramrod before the panel, a cigar stuck aggressively between clenched lips, a gleam of joy in his eye as he put over some favourite stunt which (he would contend) London hadn't yet even thought of!

I hear that Smythe, who has for years been swallowed up in the enormous job of organising outside broadcasts in the North, is coming back to produce a play—his old favourite Lancashire classic, "The Younger Generation"—on February 11th.

That's grand. It will be just like old times.

## THE B.B.C.'s BOURNEMOUTH TRANSMITTER



"Visiting Bournemouth, it was pathetic to see the poor little transmitter there, in its dingy wooden hut on an eminence behind the town, and to think of the day when this was one of the B.B.C.'s 'main stations,'" writes Leslie Baily.

natural realistic stuff I've ever heard. Not a shadow of that stiffness which so easily overcomes strangers to the microphone.

This must be due largely to the preliminary pains Bridson takes to familiarise his people with the mike. He even has travelling auditions! A motor-car fitted with amplifiers and loudspeaker drives to, say, a farmhouse in the "wilds" where one of Bridson's discoveries lives, a mike cable is run into the living-room, and while Bridson sits listening in the van, the rustic makes friends with the mechanism of broadcasting in his own home surroundings.

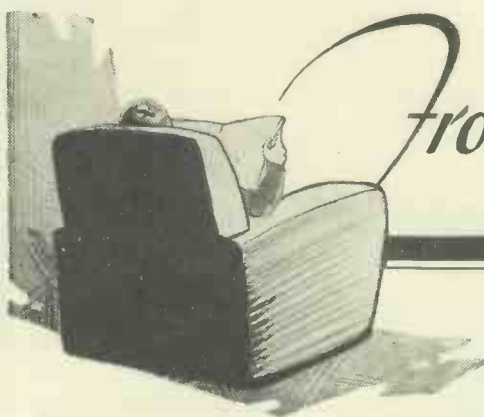
### "Yorkshire Pudding" from Leeds

On February 3rd this Manchester producer (who I am told has never been to London) is to put out rather a different kind of show from the Leeds studios—"Yorkshire Pudding," a concoction of sketch and verse.

\* \* \*

At Birmingham the doyen of the Regional directors, Percy Edgar, though himself a radio veteran, shows that he believes in youth, by practically re-staffing the Midland studios with new blood. One of these young men, James Ludovici, will, with ex-announcer David Gretton, produce the next of the popular "Microphone at Large" series. This is on February 7th, when the microphone visits Market Drayton, in Shropshire, an old market town with associations with Clive of India.

The Empire Department in London has its eye on provincial developments. It finds that Britishers exiled



# From My Armchair



*Writing in an atmosphere of Turkish delight and mistletoe, Mr. Scott-Taggart amusingly reveals his resolutions for 1936 and also introduces us to a new "complaint" which he thinks may possibly afflict television "lookers" of the future.*

I WRITE this filled with the Spirit of Geneva, the Spirit of Locarno and the Spirit of Christmas. At my side is a box of Turkish delight and above my head a sprig of mistletoe. The first is smothered with Turkish characters, pictures of billowy pillowy harem beauties of uncertain age but very certain waist-line, and innumerable crescents, scimitars and other easily recognised symbols of the Ottoman empire. Patriotic pride swells as I see, on a closer examination, that this delicious sweetmeat is made in England.

### Left in Peace

As regards the decoration above my head, this seems to lack all potency. At any rate, I am left completely in peace to pen my monthly causerie.

\* \* \*

The above human touch is merely prefatory to wishing you all a very prosperous New Year. It is too late to hope you will have a happy Christmas as most of you will now have con-valesced from that "glorious time of much-too-much."\* In fact, you will have already broken all those New Year resolutions nobody ever makes. What are mine? Well, here is a string of them—some with a kick in them, others smeared with sickly sentimentality and unctuous blah, and some really genuine. You can take your choice.

### Resolutions

1. To answer (by return post) every reader's letter, however stupid or rude.
2. To strive to inject life

\* The only reason this is in inverted commas is to make you think it is a quotation.

into those who have fallen by the wayside and deserted the glorious company of the radio enthusiasts.

3. To be even more sparkling, trenchant, characteristic and inimitable than the Editor would have you believe I am.

4. To give greater service to my great public (s.s. and u.b.).

5. To avoid using the first person singular.

6. To go to Setubal and really find out what is troubling Carlos and, while there, to devote a day or two to hunting the wild inkstrain.

7. To design receivers which will help forward the amateur radio movement and which will give better and better results.

8. To persuade the Editor to give me less personal publicity which does me no good in professional circles not learned in the ways of enterprising technical journalism.

### The Way to Success

9. To disagree with nearly everybody else's ideas about set design as this has in four years been the certain way to success.

10. Especially to quarrel with the Editor on all technical matters whenever possible as I always write best when extremely annoyed and do my best design work to rub his nose in the fact that I was right after all.

11. To "blow the gaff" and reveal the low-down on all exaggerated claims for new radio developments.

12. To give all death-rays the cold shoulder—even at the risk of having it scorched.

13. To pour cold water on laughing jackasses as a source of entertainment.

14. To continue seeing how television can be brought within the grasp of the home-constructor.

15. To accept criticism with humility and the meek resolution to profit therefrom.

16. To get "fascinated" by the short waves.

17. To spend Easter at Papplewick.

### A Feast

18. To eat all the sardines Carlos has sent me.

19. To clear my system by telling a reader now and again to go to Hellifield (where conditions are bad), and to tell the Editor I don't care two hoots whether he does thereby experience a drop of one in the circulation: that to lose one reader of ill-will is better than that

### A RECORD AND RADIO STAR



Webster Booth, the tenor, is well known to many listeners and record enthusiasts. He is here seen at the H.M.V. studios making a record of songs from the film "Heart's Desire."

my whole outlook and life should be blasted and embittered by faking a mock geniality and affecting a sweet gentleness to the lasting detriment of my psychological processes and the blackening of my unconscious ego.

Which reminds me that I hope you, "X" of Ponders End, will have the most disastrous New Year since statistics were compiled. As for you, "Y" of Paisley, I wish you the most appallingly catastrophic New Year you could imagine in a nightmare after having gorged yourself with underdone Christmas pudding and raw haggis.

### Direct Relationship

Why editors should always want one to slobber over readers I don't know. After all, you people are no better than I am and no one slobbers over me—except occasionally the Editor who does it to make you think you are getting your money's worth.

All this sentimental humbug about stroking readers the right way, flattering them, making them "like" you! Why should their heads be patted when often it is their other ends that invite treatment?

After all, I am only a single humble contributor to the technical Press—a tiny cog in the vast machinery for collecting shillings and threepences. Surely if I offend a reader or two here and there it will not ruin the magazine?

Personally I am all for the honest direct relationship between author and reader—with hard knocks taken and given on both sides. I loathe hypocrisy and the smeary mealy-mouthed holding of buttercups under the chins of "our dear readers." There are at least a dozen "gentle readers" who deserve not buttercups under their chins but daisies over their heads.

### Still Buying It!

Each has repeatedly informed me that he will no longer buy the paper, but no sooner do I touch his raw spot in a later article than once again he bombards me with abuse, showing that he has been buying the paper on the sly.

How many of you, I wonder, have read the recent opinions of Mr. G. Parr of Edison Swan—a firm whose tie (1919 class) I wear myself—on television? They are rather startling. He thinks no one will want to "look

## EYE TROUBLES AND TELEVISION

for more than a couple of hours a day and that half-an-hour's looking, even at the excellent "quality" obtainable nowadays, is a strain and so fatiguing that one is glad to have a rest.

It is an odd thing, but very little is said about this aspect of television. As Mr. Parr's company is in the forefront of television progress, making cathode-ray tubes, we can assume that he is not exaggerating. Moreover, he is assuming the "picture" is very good. A poor picture subject to distortion, "interference" or merely

### THE FAMOUS "INKSTRAIN"



*This is the famous inkstrain referred to by Mr. Scott-Taggart in his New Year's resolutions. Readers will remember that this "gift" was originally sent to Mr. Scott-Taggart by Carlos, with the request that in return he should receive a reciprocal gift of an S.T. 300 kit complete with accessories.*

"flat," would be an even greater trial to watch.

To follow a dramatic but technically flawless "talkie" for an hour involves considerable concentration and two hours a day twice a week is about as much as even the most ravenous celluloid-hound can stomach. Contrast this with the twenty-five-hour week of even a casual radio dilettante.

There are many homes where the radio is as eternal as the terms on which it was purchased and as all-pervading as the ether on which it relies. It is a background for every domestic activity from washing-up to repelling a vacuum-cleaner canvasser. It soothes the hungry husband and drowns the baby's cries. It is a proud boast that "we have it on from morning till night." Many a marriage is kept happy because the spouses can no longer hear each other. The rich

pattern of sound that emanates from the B.B.C. has no room for unworthy jangling which, at worst, would be but a gentle modulation of the main triumphant theme, be it Addis Ababa or Ali Baba.

When television is universal, we may become a nation of pop-eyed cods. Television "glaze"—with its symptoms of pupillary immobility, permanently open mouth and stiff neck—may become as general as the common cold.

### Patent Antidotes

The medical profession will spend half its life telling us to keep the windows open (which will make our necks stiffer than ever), to do neck-twisting and eye-rolling exercises before breakfast, to feed a "dazzle" but to starve a "glaze."

Patent medicines will thrive. Anti-glaze pills will be as popular as those which cater for unfortunates suffering from dizziness, palpitation, unsuspected this or that, sick-headache, coated tongue—which roughly means everybody, especially at this season.

The trouble, of course, is that no one has really looked for long at television. We really do not know for what period we can rivet our wandering wits to this wonderful witchery. Experimenters enjoy relaxation by making adjustments; they do not mind missing the crucial bits—when the poison is swiftly slipped into the elderberry wine. But if your pupils give a tired flicker, you might just as well switch off your fifteen valves

and try it again to-morrow on the Regional.

J. S.-T.

**DON'T MISS  
MR. SCOTT-TAGGART'S**

**New Set Design**

**NEXT MONTH**

**This Year's S.T. 100**

An up-to-date reflex receiver which is a modern version of the most successful of Mr. Scott-Taggart's early home-constructor designs.

*The town of Sarajevo in Jugo-Slavia. Check by jowl with the ancient mosque and minaret, from which the muezzin calls the faithful to prayer four times daily, are the modern buildings, each equipped with its radio installation.*



## WIRELESS IN THE WILDS

By Julia Chatterton, M.B.E., F.R.G.S.

**T**RAVELLING over the face of the globe in quest of folk songs leads one into many little-known corners of the world, where men and women are still living unsophisticated lives, uninfluenced by the passage of time.

In the most unlikely spots one is apt to come face to face with wireless, as, for example, in Jugo-Slavia, where I soared thousands of feet high on a mountain railway between Sarajevo and Skoptje, when a journey of twenty-nine hours took one through veritable fairylands of virgin forests.

It was only possible to obtain a meal by telegraphing from one station to another your time of arrival some hours ahead, and when one did arrive at the station, the meal was rushed along all ready served on an enormous plate, and delicious it proved, for Jugo-Slav mutton is the best in the world, especially when the appetite is sharpened by many hours of travel.

### Radio But No Restaurant Car

In such a long and lonely journey I was somewhat amazed to find that a train which did not boast a restaurant car was most up-to-date in its arrangements for wireless listening.

Soon after we had started at midnight from Sarajevo, the guard came along, and in immaculately clean white paper covers were wrapped earphones ready to attach to the plug at ear-level in the carriages.

"Do you wish wireless?" he asked in Serbian. "The price is ten dinars." (About two shillings.)

The world anthology of folk songs by Julia Chatterton has acquired an international standing. She visited Egypt, North Africa, Jugo-Slavia, Macedonia, the northern shores of the Mediterranean, Italy, Austria, and finally made an extensive tour of Morocco.

I readily agreed, and soon the choice of Prague and many other stations was at my bidding.

The hours sped quickly along thanks to the excellent programmes of operatic and

other music which were forthcoming. While listening to the world's best music it somehow struck an incongruous note at times, when one gazed out at a field of flax where the harvesters, in all the glory of their vivid national costumes, were hard at work gathering in their harvest, placing the flax to dry on the great racks, which are such familiar objects all over the countryside, in exactly the same manner they have adopted for centuries.

### A Communal Receiver

In the small towns of Northern Greece, bathed in golden sunshine, I found wireless installed in a most popular fashion. The people of all hot countries indulge in a midday siesta, and work, as well as shops, closes down at midday until two and often three o'clock in the afternoon. Having arrived at a village over the Greek border from Jugo-Slavia just at noon, I saw a large crowd of workers and shopkeepers assembled in the main street around what looked like a large post with a circular variant of a Belisha beacon. It turned out to be the ever-popular wireless receiver, to which the populace was listening delightedly, free of charge. Some were standing, some sitting, and others undoing the large blue handkerchiefs in which reposed the garlic sausage and black bread which constituted their lunch.

(Please turn to page 184.)



EFFIE ATHERTON

## STORIES OF RADIO STARS

# She Ran Away from Home

The story on this page, telling of the rise to fame of Effie Atherton, and those on the following pages have been specially obtained for "Wireless & Television Review"

By ALAN HUNTER

WHEN Effie Atherton was learning dancing at her academy in Edinburgh she was invited to take part in a local "panto" show—but mother objected. When Effie explained that other girls were also going into the show her mother was finally overruled. That little incident had a big bearing on what happened afterwards.

Effie was bitten with the stage. So much so that the next move was when she put herself on a train for London—bound for one of her aunts. She wired her mother as she left, explaining that the call of the stage was too great to resist.

The aunt was sympathetic, fortunately. So Effie got into touch with a girl she knew doing stage work. Cheek got her in to an audition with André Charlot. Her obvious ability got her a job with Charlot soon after.

She was with him for a year. Came a brief interval in the States, and then three more years with Charlot. Cabaret turns followed. Many readers may remember that very chic act "Just We Three"—Ed. Cooper, Queenie Leonard and our Effie.

## On Her Own

Cochran claimed her next. Then more cabaret. "Words and Music" with Cochran gave her a lot more experience. Then Effie thought it was time to launch out on her own—and she did, with cabaret at the Ritz and the Café de Paris.

So that when she gave John Watt an audition for broadcasting she was by no means the poor starving artist—not by a long chalk. John told her she would have to "clean up" some of the sophisticated bits of the act—at that time the B.B.C. was not quite so broadminded as the Monthly

Reviews have since made it. Impossible, said Effie, and that, for the time being, was that.

Then she met Denis Freeman, who induced her to go into the first broadcast of the recently revived "Castle On the Hill." In her own words Effie adds: "This was such a roaring success that I did not broadcast again for a year!" But then Effie has a sense of humour peculiarly indigenous to Edinburgh.

Meanwhile she married Leslie L. Landau, the Fox film producer. She played in some films after that, in England and France. She was, as a matter of fact, in the film version of "Bitter Sweet."

## Special Empire Act

Cecil Madden, the Empire producer, saw her in a cabaret act and asked her to put on a three-quarters of an hour show for the Empire stations. She

cast, born of Madden's ability to spot a star in cabaret, was a turning point in Effie's career.

She began to think about broadcasting seriously. When Brian Michie launched his now very popular "Air-Do-Wells" radio concert party, Effie was invited to play a star part—and she accepted.

## Born Radio Artist

Since then she has been in all the "Air-Do-Wells" shows and has proved that she has a born microphone technique. Her rather deep voice comes over the air with a clarity that cannot be denied. She can act too.

When I parted company with Effie at the "Big House" she was considering an offer to go to Chicago for three months. The Americans are pretty quick to snap up talent when they hear it. And Effie has gone to Chicago. She is bound to go right ahead in her broadcasting career.

She says she does not smoke, nor can she be persuaded to drink. In fact, she is a very unaffected star.

But she did run away from home, didn't she?

While we were talking Effie suddenly remembered she had to rush away to ask her husband whether she could accept that offer to star on the American air.

"It is all very worrying," she confided. "When the offer first came from Chicago, I thought I would

be able to avoid it by asking for three times the money they mentioned. Not a bit of it! They actually accepted my demands!

"Then I thought perhaps the matter would be finally squashed by my telling them I could come at the most for only three months, and, do you know, they actually said that would be 'okay' too!"

Well, here's good luck to her.



THE "AIR-DO-WELLS." In the front row, from left to right, are Ronald Hill, Brian Lawrence, Wilfred Thomas, and Claude Gardner. At the back are Queenie Sherry, Effie Atherton and Eve Becke.

got together two pianists—Ronnie Hill and Denis Van Thal, both of whom have made big names for themselves.

Eric Maschwitz heard the Blattnerphone record of this show and was impressed. Enough to book her for half an hour on the home programmes with Greta Keller.

And so, this time, she was well and truly launched on the air. Indeed, it seemed that that odd Empire broad-

## STORIES OF RADIO STARS



A recent photo of Mr. Rumbold, right, with Mr. Hanson, the B.B.C. producer.

SOME three years ago Gilbert Rumbold was in a fair way of living as what might be termed an industrial artist. He worked for a well-known firm of advertising agents. Bowed his artistic soul before the moloch of industry. Tacitly agreed to Give the Public What It Wants.

It paid handsomely. Gilbert's salary ran well into four figures. No struggling artist about him. Not, that is to say, in the purely mundane sense. The struggle was the spiritual struggle of the artist against—well, call it the exploitation of his art.

Came the crisis. Gilbert Rumbold's artistic soul cried out "Enough!" Either the artist has to die and the man to live—or what? He decided that the artist ought to be given at least a chance. So he threw in his hand as a commercial success to see what happened to the artist.

He had saved a little money. Not very much, admittedly. Enough to eke out a bare living for, say, six months. After that the artist would have to earn his living.

### Supreme Confidence

Only a supreme confidence in his artist's soul could have prompted him to take such a step. Only supreme spiritual suffocation could have implemented the decision. The die cast, Gilbert disappeared from his accustomed haunts in the "Street," where he was well known, and emerged as an artist living a hermit's life in a little cottage nestling between Channel and Downs at Rottingdean, in Sussex.

# The Artist In Him

Art and industry are supposed in these modern times to have been reconciled to each other, if not—as some would glibly have it—wedded. Yet the eternal struggle of the artist goes on—the rebellion against inartistic limitations imposed upon him by the captains of industry.

Occasionally the artist wins, which is, paradoxically enough, very good for industry, for commerce, for "business." The real artist seeks to express truth in his medium as he sees it. And truth has a way of appealing to the very people industry strives to sell things to—the masses.

What had been just a week-end escape from the commercial world whose wheels revolved from Monday to Friday became a complete way of living. What had been a sanctuary of fleeting happiness became a permanent abode of artistic self-expression.

It all happened rather suddenly. Gilbert was walking across those lovely Downs one Sunday evening, thinking of the drudgery to be faced on the morrow. Perhaps, as he said, the night was a little too lovely. The moonlight on the Downs a little too seductive. Anyway, the setting was perfect for an expansion of the spirit.

"Why shouldn't I give my art a chance?" he asked himself. "I will be an artist! I'll starve, perhaps, but

I'll be myself. I'll give myself a year of—this." And one can imagine his feeling of exultation at having broken free from the shackles of an uncongenial existence.

A year? It passed magically. Gilbert lived with his art, lived as an artist. Alone in that tiny cottage. Roamed the Downs by day and by night. The Downs insinuated their magic into his artistic make-up, in the subtle way those Downs have. (I live under their shadow myself, so I know.)

### Two Years' Freedom

What was to have been a year's freedom spun out into nearly two years. It seemed to Gilbert as though he had spent all his life that way, painting when the fancy took him, wandering—even running—over the Sussex Downs, returning to his lone cottage by the sea.

Came catastrophe. A run of bad luck. No money left. Landlord unable to see that art comes before

such a mundane thing as rent. The idyll was shattered almost overnight. And now, thought Gilbert, the reckoning. For assuredly he thought he would have to pay for such a respite from care.

And pay he did. A month later he was walking down Oxford Street, having had practically nothing to eat for weeks, jingling in his pocket his last threepence. Desperate, he knew that he had come to what seemed to be the end. How to go on? Putting aside the obvious way out of all life's troubles—the grand exeunt itself—he thought of the newspapers. They, surely, would pay for such a story as his? And yet, on reflection, what good would even a handsome fee do him—ultimately? It would read like a story of failure.

### An Inspiration

Then he had a flash of inspiration. The B.B.C.! He 'phoned up A. W. ("Bill") Hanson with his last coppers and explained that he was a starving artist at the end of his tether. Could he broadcast his story? Bill Hanson, ever on the alert for human interest

(Please turn to page 158)



## STORIES OF RADIO STARS

IF I tell you the story of Alec McGill and Gwen Vaughan, you will have a cross section of the odd way in which double acts come into being. I have met "The Wireless Chatterers," as they aptly call themselves, specially for your benefit—and a very good story they have hatched out.

"I was born at a very early age," began Alec, all smiles. "It was at Forest Hill—but so far as I know there is as yet no tablet erected anywhere to commemorate the event. My father, a Scot, was in shipping—but his great love was music. I well remember sitting at the top of the stairs in my nightgown listening to the old songs being sung down in the drawing-room when I was supposed to be in bed!

## Artistic Leanings

"My mother was a Devonshire woman, from Tavistock. Her family was closely associated with Robert Southey, the Poet Laureate, who was keenly interested in my great aunt, Mary Maria Colling—a poetess of no little ability.

"I mention these facts only to show that somewhere in my make-up was an artistic ability. And yet, as often happens, I started my career at the Union Castle Line offices—following in father's steps.

"I stayed there until I was eighteen, and then the urge to write gripped me. I am afraid when I ought to have been doing the victualling sheets of a Royal Mail steamer I was often as not working out plots of violence in mediæval times!

## Writing Romances

"I left the office life and wrote 'sword and cloak' romances for a long time since defunct paper called 'The Regiment.' You may be amused to know that one of my fellow contributors in those days was a young man named Edgar Wallace.

"Then I became musical and dramatic critic, if you please, for the 'Southend Echo.' I expect you are wondering what all this has to do,

## A FAMOUS RADIO PARTNERSHIP

—And How It Happened

Alec McGill and Gwen Vaughan, known to millions of listeners as "The Wireless Chatterers," are actually man and wife—as they explain in this amusing interview with Alan Hunter.

even remotely, with my present rôle as an entertainer. Well, I think it has quite a lot to do with it.

"As a matter of fact my entry into stage life was quite unexpected. At that time I was writing short stories, articles, criticisms, and so forth, but I still hankered after my first love—the piano. I played, strangely enough, classical stuff, and was very fond of accompanist work.

"That is actually what led me into Concert Party work. I had a friend who owned a music shop—and whenever he had a new stock of songs in

Happy Valley at Southend—now called the Floral Hall, of course. I naturally jumped at the chance. Next thing I knew was that I was a Jovial Card!

## Early Encouragement

"During this season I blossomed forth as an entertainer at the piano. Oh, how awful I thought I was—and I am sure most of the audience shared that opinion. But Lyell wouldn't have it that I was a 'flop'—and if he should read these lines, I want him to know I still remember him and am still grateful to him for his encouragement.

"When war broke out I was with Ben Lawes and his 'Purple Poms' concert party. But for the next four years I was only a very unimportant unit in the Royal Naval Air Service. On being demobbed, I had to pick up the threads again. I joined up with the 'Gaieties'—a famous old concert party, and in that did my first double act.

## A Double Act

"Young Archie Clifford—who died about three years ago, I am sorry to say—was fooling

about at the piano with me during a rehearsal when I said quite casually: 'What about doing a double act, Archie?' He was keen, so we got hold of one or two songs, learned them up and went ahead. I kept interrupting the act with bits of sheer nonsense—not part of the rehearsed act at all.

## "THE WIRELESS CHATTERERS"



Here are the partners of that popular act on the radio called "The Wireless Chatterers." They have had very varied experiences and were, from an early age, both interested in singing.

I used to go round and play them over for him. One day I was doing this kind of thing when a customer walked in. He was Lyell Johnston. We chatted, and suddenly he asked me if I would like to join 'The Jovial Cards'—his concert party.

"They were due to open at the

We came back from Jersey with the idea that the music halls would be at our feet from that moment onwards!

"And now I really do approach my entry into the broadcasting game: I had fixed up a year's contract up North for another concert party, and on my return went into a music publisher's. While I was there, my old friend of the 'Gaieties' days, Wilson James, came in and suggested I might like to broadcast with him.

### At Savoy Hill

"And so it was that in 1924 I first went on the air. That was at Savoy Hill, of course, but later on we went round the provincial studios, where at that early stage in the proceedings they ran their own programmes.

"I well remember Newcastle studio; it was nothing more than a large room, while the station director was a cheery soul in plus-fours! We used a hanging mike, which was much too high for little Alec. The announcer's wife, I remember, sat by the fire doing some knitting!

"Happy days, those were! Even though we did get into trouble sometimes, it was great fun. One day I was a bit short of time and pushed in a song from the concert party show called 'How's Your Poor Old Feet?' Unfortunately, the second verse took the form of a conversation between notable personages. Mark you, it was really a completely inoffensive verse, but it did not meet with the approval of the broadcasting authorities. Anyway, the outcome of it all was that I got hauled over the coals for it, and quite thought my broadcasting days were over, whereas actually they were only just beginning.

"Oh, I have forgotten one rather important thing: During my concert party travels I had met a young soprano named Gwen Vaughan. She used to warble things like 'Bird of Love Divine,' and I used to play for her. To cut a long story short, we married.

### A Bit of a Worry

"I don't think she was specially interested in me at first. In fact, if you ask her she will probably tell you I worried her into saying 'Yes'—and I've been worrying her ever since! And, of course, I don't stop even when we're broadcasting!"

I thought it was time to ask Gwen

## A PRIZE AT FIVE FOR SINGING

Vaughan for her version of the life story of the Wireless Chatterers—and she was delighted to be able to say something without being interrupted by her troublesome husband.

"I've been singing," she told me, "ever since I can remember. My first prize, anyway, was at the age of five. As an elderly vocalist of eight I romped home with further awards.

"Success must have gone to my head, because the following year I went in for a competition. I thought, apparently, that if I held the copy of the song I was supposed to sing it would look very important—but actually it lost me the competition, because my singing was smothered by the copy!

"But before I go any further I really must make a confession: I am known as Gwen Vaughan, but I was born with the name Hughes—and my



THE  
RADIO  
THREE

### A TRIPLE PARTNERSHIP

*Meet the Radio Three—as bright a trio of songsters as any heard on the air to-day. On the left is Ann Canning, who is the leader of the act and the founder. The centre one is Kaye Cavendish, the pianist. She is a good all-round athlete, and has played under the baton of Sir Henry Wood in classical piano compositions. To the right is Joy Worth. Their close harmony singing is by this time well known to all readers.*

godparents gave me the additional handle of Mary Jane—two good, homely names taken from my mother and grandmother.

"My father wanted me to play the piano, but I am afraid that often when I was supposed to be playing the scales I was singing them. In a way, I am sorry now I did not persevere—although what our house would be like with two pianos being wrecked I don't know!

"As I had a very high soprano voice, being able to reach top B flat without any effort, it was decided that I ought to study opera. But I had other ideas—and contented myself with singing in a Welsh ladies' choir and at private functions.

### The Last Note

"My sister was already in musical comedy in London, and one day she told me they were holding a voice trial for a new production, asking me if I would like to go along. I went. When I arrived I found the place packed with other girls on the same errand. I marched up to the stage door and gaily wandered in. When I put my name down on the form the doorkeeper asked me to fill in, he gasped at my age—and asked me if there was not some mistake.

"After three hours' waiting my turn came. I had noticed that the other girls, when called, went straight over to the piano—so I did the same, handing over my copy to the pianist and asking him to start at the second verse.

"The song was supposed to end on an F—but wishing to put everyone else in the shade I thought it would improve the occasion to finish on top B flat!

"A man sitting at the table called me over and asked me to sing a scale. I finished with plenty of breath for the last note—and got the engagement. But it was simply through my cheek in walking in unasked, I imagine.

"Years of hard work followed in musical comedy. Then I went into the concert party business, following up this experience with revues and panto's and pocket opera. I might add that my salary as a star in this pocket opera, in which I had to sing as 'Marguerite' in excerpts from 'Faust,' was fifty bob!

"When the war came I was caught in several air raids, which affected the nerves of my throat. So for a time I had to abandon stage work and went into the ledger section of the Ministry of Munitions. I think Alec had better tell you the rest of the story."

### The Act Starts

So I returned to Alec McGill, who was anxious to put in his spoke again. He told me how the Wireless Chatterers act was born.

"I had been turning over the idea of a double act for some time," said Alec,

(Please turn to page 158.)

## STORIES OF THE STARS—

## They CARESS the MIKE!



HILDEGARDE

Jean Sablon, the French crooner who made such a hit in *Gala Variety*, and Hildegard, the Continental cabaret star, tell how they treat the microphone—like a sweetheart!

WHEN I met Jean Sablon he was literally on a flying visit here. He had landed in the fog at Heston that afternoon, arriving a little late for a rehearsal of the December Revue.

## Rhythm in His Voice

A handsome Parisien, Jean speaks English in a fascinatingly broken way. Somewhat like Chevalier's accent—only I am sure that by now the famous film star must be able to speak impeccably. Anyway, Jean asked whether I spoke French, and I replied "Eh! Bien, mais oui!" as I thought fitting for the occasion.

Came a delightfully understandable account of his doings in Paris. Have you ever been to the Gay City? If so, you will not need me to tell you that discriminating people go to the Casino de Paris to hear really first-class variety and revue. Jean has been a star at the Casino for some time, as well as playing in many well-known operettas.

It might be glibly said that Jean Sablon is the French Bing Crosby, but that is fair to neither. For whereas Bing personifies real crooning in an inimitable style, Jean does not exactly croon—he sings softly. At all events, Jean is about the only Frenchman I have ever heard who has rhythm in his voice—and uses it.

## Intimacy

"My technique? Oh, it is simple!" exclaimed Jean, with a smile that exposed two rows of extremely white and even teeth. "I refuse to treat the microphone as something inanimate. I treat it as a man would treat his lover!"

"You can say, if you like, that the microphone becomes for the moment

my sweetheart. I speak to it very softly, very close to it. Only in that way can one bring a sort of intimacy into the home, you understand.

"But no, I am not new to the microphone. Once a month in Paris I broadcast in what *Poste Parisien* calls 'Jean Sablon's Hour.' I like broadcasting in England; everyone is so charming to me. You heard me first time in your *Cosmopolitan Cabaret*, way back in April of 1935. Perhaps you will be hearing more of me in the future."

Understand I am now giving what we used to call a free translation of his French. I'm afraid it is to some extent free and easy—the translation, not the arduous job of doing it.

Jean has the Englishman's love of sport. "J'adore le sport," was indeed his first confession. He also indulges in a great deal of sunbathing—hence his tanned skin.

Hildegard, the Continental cabaret star with the unspecified surname—more about that in a moment—has a strangely similar microphone technique. I met her, too, as she landed from France on one of her frequent visits here for a B.B.C. show.

## Thirty-Five Dresses

She travels in style, does Hildegard. The day I met her she had as her normal mobile wardrobe no fewer than twenty-seven bags. Her little manager—or should I say manageress since it is the female of the species?—tells me in slightly hushed tones that Hildegard carries around as many as thirty-five dresses. No wonder, then, that she has the name of being the best-dressed cabaret star across the Channel.

Hildegard hails, surprisingly enough, from Milwaukee, but her long sojourn in Paris and her fluency in such languages as French, German, Russian and what might be termed English English, has removed the obvious traces of origin as she speaks.

Apparently that American star maker, Gus Edwards, was responsible for Hildegard's early grooming, and it was he who decided she had a pretty enough Christian name to stand by that alone. The result is that hardly anyone knows her surname. Even I could not in all delicacy demand this piquant information.

## On the Films

Her first picture was "Music Hath Charms," the Henry Hall film that has earned such praise recently. She tells me that she was very glad to be in this picture, not only because it enabled her to find herself on the film set, so to speak, but because, being so intensely keen on broadcasting, it seemed a nice gesture by a fellow star of the ether.

"I always feel absolutely at my ease with the microphone," asserted Hildegard. "My secret? Oh, I don't think I have one—unless it is that I caress the microphone!"

## BILLY SMITH



Billy Smith is Henry Hall's trumpeter. He joined the B.B.C. Dance Orchestra last December to replace Frankie Wilson. His first broadcast was at the age of fifteen from Dundee.

"Yes, I make it my friend. It is the only way to put over one's personality. Of course, I have had a lot of experience in broadcasting abroad—especially from Paris. But over in England everything runs so smoothly; the whole organisation is so terrifyingly efficient. I like your officials very much.

### The Accent Trouble

"How long in Paris? Let me see. Why, it must be just over two years now. In that time I have perfected my accent in the only way possible—by living with the people who speak the language. But, oh, my first songs in French!

"Customs? Ah, ha, I see my manager has been telling you of all my bags. But I have no trouble. You see, all the Customs men know me very well now by sight. They always ask me when I am going on the air, so that they can make arrangements to listen. Which I think is very sweet of them!"

### THE ARTIST IN HIM

—continued from page 154.

"copy," booked him right away for that night's edition of "In Town To-night." He appeared before the microphone anonymously and told his story.

The rest is history. He was deluged with letters. They staggered him. The fee he got for that broadcast solved a very present problem, but it was only the beginning. Eric Masch-



WHEN Esther Coleman, well-known "straight" singer, was trying over some light songs for a friend at the piano, the friend looked up and exclaimed: "But, Esther, you sing these songs delightfully—why don't you try your hand in variety for a change?"

So Esther decided thereon to live a

### JOAN CRAWFORD



Joan Crawford, the famous film star, has taken to regular broadcasting on the C.B.S. in America.

witz, with his faculty for recognising microphone material, was impressed and told Gilbert to keep in touch.

As "Mr. Gordon" in "Red Sarafan," Gilbert has become too well known to need any further explanation. A six months' run recently came to an end. And now he is booked to make love to Zita Gordon in "The Table Under the Tree"—Zita being the girl who did so remarkably well with Eric Maschwitz when he broadcast during that memorable week from Budapest.

Somewhere there is a moral in this story. If I were an artist myself perhaps I should be able to see it more clearly. What does occur to me is that Gilbert Rumbold did the right thing by insisting on being an artist first and a commercial success only afterwards.

At all events, the phrase "struggling artist" will always have for me a special meaning now that I have heard a real life instance of what that struggle means in sheer spiritual values.

### HER DOUBLE LIFE

double artistic life, so to speak. She recorded under the name Diana Clare—all kinds of songs normally outside her straight repertoire. She went over well. For a year the deception was maintained.

"Then," says Esther, "Henry Hall happened to hear me during a relay from the Paramount Theatre, Manchester, and he asked me to sing with his band. The discovery of my real identity was then inevitable, of course, but by that time I didn't care—I had proved my point, that I could sing light songs in a crooning fashion. And now, who cares whether Esther Coleman is Diana Clare or vice versa?"

### A FAMOUS RADIO PARTNERSHIP

—continued from page 156.

"and although Gwen pooh-poohed the idea at first because she said she couldn't do it, I persuaded her to rehearse a song with me. I then booked an engagement for us, where she was to sing ballads and I was to do a spot of entertaining at the piano.

### Spontaneous "Stuff"

"As the *pièce de resistance* we were to finish up with a double turn. We did. Unfortunately it was such a success that the audience demanded an encore. A bit of a poser, because we did not know another song!

"So we had to do the act all over again. I unconsciously put in some gags that had not been in the first performance. It was this that gave me the idea of working the act more or less on spontaneous lines. We determined to take an old-time popular song and do it our own way. The first adaptation was 'Love's Old Sweet Song'—and thereby hangs a tale.

"An old gentleman sought me out and said he had listened-in to us, and wanted to know why I had no more sense than to interrupt the singing of a lovely old song. Nothing I could say would convince him that that was the whole idea of the act. Since then I have had other complaints of the same kind. 'Why don't you give the lady a chance?' they say!

### Piano "Business"

"Although our present act relies a lot on spontaneous gags and topical references you must not imagine that it is not rehearsed. When we receive a contract for a broadcast I start at once thinking of new songs, new jokes (if possible!) and new 'business' at the piano. The last I regard as very important—because I regard the piano as part of my personality.

"My method of getting new ideas is rather odd, perhaps. I sit down at the piano and twiddle away until a rhythm or phrase comes along that pleases me. Then I churn over word phrases that may fit the music, and sooner or later the song is born.

"And now we've said a lot and ought to stop. But perhaps radio listeners might like to know how their favourites spend their time when not actually broadcasting. We Chatterers are just the same as any other happily married couple—and home is the place that sees most of us.

# SHORT-WAVE DEVELOPMENTS

BY W. L. S.

By the time this appears in print, one of the most powerful short-wave stations in the world will have come into operation at Rocky Point, near New York. Its call-sign is W E F, and it will be the largest of the group of R.C.A. stations located there, working with an aerial power of about 200 kilowatts.

W E F will be used both for high-speed telegraphic operation and for the relaying of American broadcasts over long distances for the purposes of re-broadcasting. Other stations at Rocky Point that are well known to short-wave listeners are W I K, W I Z, W Q P and W 2 X B J.

## Millimetre Waves

If we start to talk about 5- and 2½-metre waves as "ultra-short," what are we going to do when we start dealing with thousandths of a millimetre? Wavelengths of that order are now being used for short-distance communication in the U.S.A. Intelligible telephony has been transmitted over quite considerable distances, as well as being reflected round corners, up flights of stairs, and so on. Yes, you're right; it's a modulated light-beam.

Incidentally, a "one-tube" receiver on these frequencies will pick up signals from a distance of some millions of trillions of miles. (Yes, right again—it's an astronomical telescope!)

Amateurs in this country are doing quite an amount of quiet work on what we may call the legitimate micro-waves—between 10 and 100 centimetres in length—which really resemble light-waves in their behaviour. They are generated by oscillating valves and received on more or less conventional circuits.

## Modulated Light

By the time we go lower still and really start dealing with modulated light-beams, we discard radio apparatus as we now know it. The audio-frequency part of the gear consists of a big amplifier at one end, modulating the light-source, and a photo-electric cell and another amplifier at the

□.....□  
 SOME NOTES CONCERNING  
 THE LATEST SCHEMES AND  
 IDEAS BEING USED IN  
 VARIOUS PARTS OF THE  
 WORLD.  
 □.....□

remote end. The "radio" part of the apparatus consists of concave mirrors, lenses, reflectors and neon-tubes or headlamp bulbs!

I wonder how many readers remember the old "loose-coupler," with tappings and slider? Those that do will laugh very heartily when they see one of the latest short-wave accessories which will doubtless find its way on the British market very shortly. Not that I am deriding it—but its resemblance to our old loose-couplers is so ludicrous that one can't suppress a smile.

Actually it is an excellent idea—a kind of auxiliary aerial-coupling unit consisting of a fairly long, narrow low-

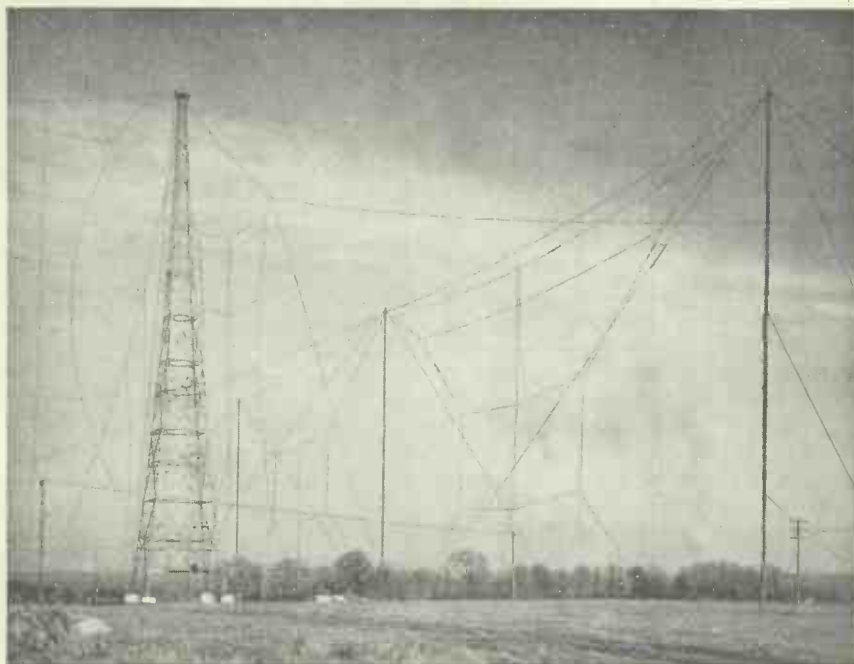
loss coil with a sliding contact instead of tappings. It is a compact little affair that may be used as a wave-trap or for coupling purposes; and it should also be invaluable for sundry "trick" connections when two sets are being run from one aerial.

## Studying Echoes

A group of amateurs in this country has been formed to study one of the most interesting of short-wave phenomena—that of echoes. Every reader who makes a habit of listening to amateur Morse, especially on the 20-metre band, will have noticed that stations in certain parts of the world always sound "watery" and indistinct on account of a very short-period "echo" on their signals. This is particularly the case with amateurs on the West Coast of the U.S.A., who can always be identified by the effect of "whistling in a tunnel" that their signals possess.

(Please turn to page 189.)

## CAT'S-CRADLE AS PLAYED AT DAVENTRY



This photograph shows the directional aerials at Daventry used for experimental work on 16 and 19 metres for the Empire short-wave service. One of the 350-ft. towers can also be seen.

# Inexpensive A.V.C. FOR ANY SET

*The Development Of A Remarkable Invention*



There is a tendency to refer to Automatic Volume Control as a refinement. But for the complete enjoyment of broadcasting it is a necessity in just the same kind of way as the gear-box is a necessity to good motoring.

Where the analogy fails, however, is that whereas if a motor-car were unable to climb a hill because of its lack of a gear-box, it would stop, and you couldn't make it go any farther, a radio set without A.V.C. runs into a series of stops and starts when faced by severe fading.

Which, in many ways, is even more disconcerting!

### A.V.C. Will be Universal

Some day, sooner or later, every radio set will be equipped with A.V.C. as a matter of course. At present we do not know how that desirable end will be achieved. But A.V.C. is a more or less simple addition to an outfit above a certain level of expensiveness and complexity.

And this for the reason that the hitherto known methods of applying it demand for their foundation, as it were, a circuit possessing a highly efficient H.F. amplification which can be varied in its effectiveness.

That is why superhets are so suitable for its application.

In the simplest of sets, however, there exists a very efficient method of H.F. amplification, and that is reaction. But this has not been used for A.V.C. as yet.

### A Logical Method

It is quite easy to understand why this should have been the case. Reaction is almost traditionally a something associated with manual control. It is not regarded as a fixed quality except, of course, in a small residual degree. It is a something which you adjust by hand to suit the needs of the moment. One thinks of

Full details of experimental circuits that provide automatic volume control in an entirely new way. The degree of reaction in a circuit is controlled in accordance with "signal" strength by means of fed-back voltages.

The circuits are described

By

G. V. DOWDING, Associate I.E.E.

it as a somewhat unstable factor in a circuit. Or an indeterminate force, a force which may vary widely in intensity with changing conditions. As in fact it does. Everyone will have experienced the alterations that occur

operate in a more logical direction than conventional methods.

These latter demand in the first instance a set which possesses a high degree of stable H.F. amplification. And then A.V.C. is applied to reduce the effectiveness of this H.F. amplification to varying depths to cope with alterations in signal strength so as to preserve an even volume.

### A Typical Example

And now consider for a moment the purpose and use of reaction on, say, a simple three-valve set. The reaction will be adjustable by means of a knob on the front of the panel. It is used to boost up the strength of weak stations. When fading occurs it is pressed more and more to the limit of its effectiveness in order to maintain the volume level.

The reaction control is almost invariably regarded as the tap controlling a source of reserve power. One instinctively keeps it "well back" when the signal is strong, and one carries out that delicate adjustment of "right on the edge" to wring the

last ounce out of a set as a last resource when all the other controls of the set have been "turned up" to maximum results and yet still more power is needed.

### Should be Perfect

If, then, instead of a manual control, an automatic action could be introduced which would push the set nearer and nearer to the point of oscillation as signals weakened, that would appear to be the perfect method of applying Automatic Volume Control, for the range of sensitivity covered by reaction is very great. The difference in sensitivity on a two-valve set, for instance, between Full Reaction and

### SEPARATE REACTOR

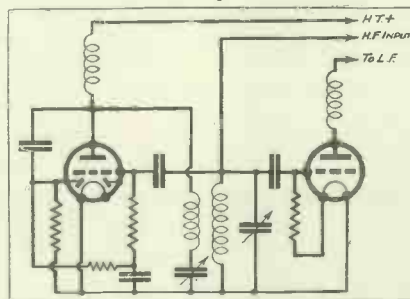
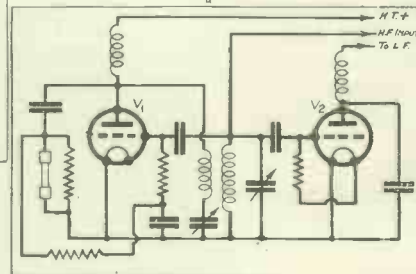


Fig. 1. In this scheme an ordinary detector valve is used with a separate reactor. In—



—one case a West-ector is employed for the bias control while in the other a double-diode-triode serves for bias control and reaction.

in a reaction setting with changes in the conditions of H.T. and L.T. batteries or with even the tuning of the set.

It would seem reasonable to concentrate upon a more stable form of amplification in order to apply the A.V.C. principle; the normal forms of H.F. amplification by cascades of H.F. valves.

But things which may superficially seem reasonable need not necessarily be strictly scientific. And it would seem to us that the reaction effect ought to be an ideal one to employ for A.V.C. purposes, and that it would

No Reaction may make all the difference of receiving a distant station at loud-speaker strength and not hearing it at all.

And, when you come to think about it, if there could be a method of Automatic Reaction Control which called for only a few additional parts, there would be an excellent alternative to A.V.C. for simple sets. A form of A.V.C. for the little two-valver, for the popular S.G., Det., L.F.

Well, it must be admitted right away that we are not yet able to say that the problem of harnessing reaction in this manner has been completely solved. On the other hand, the idea is very new, and there has not been much time yet to pursue the required research.

### Promising Results

The experiments which have been carried out have, however, proved most promising. They have shown that the idea is quite feasible. It is a question of obtaining sufficient control—to make the signals automatically vary the reaction over a wide range. This can be done with the aid of an extra valve, but that is adding more to the set than we feel will ultimately be necessary.

The target at which to aim is a full A.V.C., or should we say A.R.C. (Automatic Reaction Control), by means of, say, a Westector and a couple of resistances and small condensers. Thirteen or fourteen shillingworth of extra parts.

That would make the proposition a practical and very popular one, for it would bring effective "Anti-Fading" right into the cheap set field. We think it will be done, and to provide a basis for independent research we are publishing the accompanying circuits.

### Takes Time

The principle is too important for us to investigate in secret. Alone, taking into account all the other work which faces our Research Dept. (set designs, television, and so on), it might take us a year or more to hit the happy simplification which we think is essential for perfection.

## DIODE DETECTION

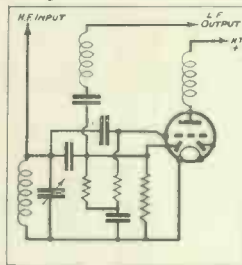
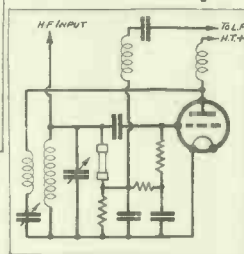


Fig. 2. Here we have a diode as rectifier which also controls bias on the—



—triode reactor. A Westector can be used in place of the diode portion of the combined valve. In the diode-triode circuit the reaction is omitted.

So far we have concentrated on the idea of obtaining the Automatic Reaction Control by means of varying the grid bias of the reacting valve.

## INDIVIDUAL FUNCTIONS

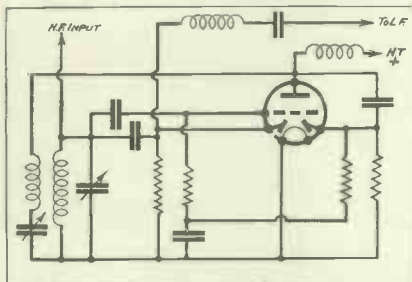
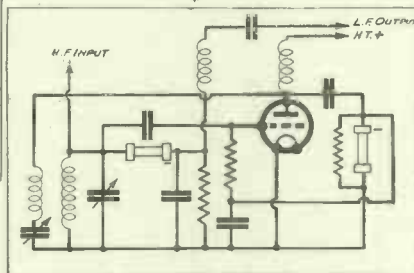


Fig. 3. The general arrangement here is similar to that of Fig. 2—



—but separate diode or Westectors are used for detection and bias control.

There may be—probably are—other ways of doing the trick.

Before proceeding to describe the

## COMBINED L.F. AND H.F.

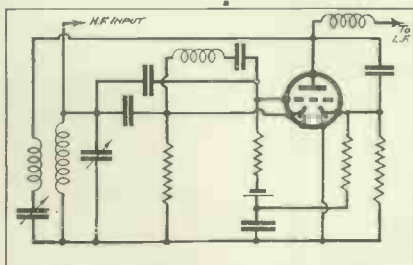
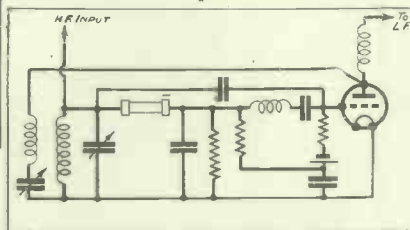


Fig. 4. This scheme is also on the same lines as Fig. 2—



—but the triode reactor performs the job of L.F. amplifier as well as reacting at H.F.

various experimental circuits, it might be as well briefly to consider what we

are aiming at. Let us pretend we have a set in which the idea is incorporated.

This is how I visualise it working: You first of all tune-in the set so that you get the required station just as loud as you can, and to do this you use all the controls including reaction. If the station is extremely strong a certain amount of detuning on the aerial circuit would be permissible. But what you have to do is to see that the reaction is carried just as far as it can be without oscillation replacing amplification.

### Switching the A.R.C.

Then you click over a simple switch which brings in the Automatic Reaction Control. If the station still has great strength then the A.R.C. (we might as well call it that instead of A.V.C.) will at once reduce the reaction effect as much as is necessary to reduce the volume to comfortable dimensions—perhaps completely nullify it. But now that it—the A.R.C.—is in circuit, should the station fall away in strength, the reaction will be automatically increased to make up for the drop in signal strength.

For the local stations the A.R.C. need never be switched in. As with sets having normal A.V.C. the manual volume control would be present so as to be able to set the volume level to which the

A.R.C. would pull fading stations.

All the foregoing is no completely imaginative picture. We have actually arranged an experimental set which does the trick. But, as we have indicated, only by employing rather more gear than is the ideal at which to aim.

The first diagrams show a scheme with which a very fair amount of control can be gained. Now it should be explained that there are five separate methods illustrated in the accompanying diagrams. In each case

we illustrate an arrangement using valves only as well as a circuit in which Westector metal rectifiers figure.

### Economy

Generally speaking there is little to choose between the results given by them, but there are obviously other considerations which make the one more desirable than another. In some

instances the Westector version might be more economical, taking into account that a Westector has no very great initial cost, may never require replacement, and needs no H.T. or L.T. current.

But at the present stage of development these are details that do not greatly concern us. First the simplified and perfected scheme must be hammered out, although in view of the very certain advantages of the idea it may be that the idea will have to be taken into practice on an interim basis even though the cost may be a few shillings more than that ultimate goal of thirteen or fourteen.

There is a big gap between the simple S.G. Det., L.F. and the superhet with A.V.C. The first named is so much cheaper that it will stand quite a tidy increase and still be a proposition well within the reach of many.

But let us run through the circuits. The first one clearly indicates the principle, and is a logical starting point for an investigation. There is a quite normal triode detector valve which may or may not be preceded by a stage of H.F. amplification. There is a separate reactor valve with a Westector Bias Control, to vary the grid potential of this reacting valve and make it run closer or farther from the point of maximum reaction according to the changing signal conditions.

### Reactor Valve in Parallel

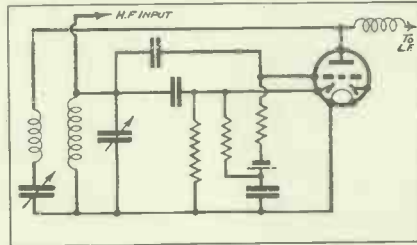
The grid of the reactor valve is connected in parallel with the detector tuned grid circuit, and the reaction is taken from the reactor anode. Also is taken from this the H.F. voltage which feeds the Westector. The rectified output of the Westector is fed via a decoupling resistance and the reactor valve grid leak. Thus, the grid of the reactor is biased by the voltage developed across the reservoir condenser. (The values of certain of these components are given underneath the diagrams for the guidance of experimenters.)

The signal is always fed to the plus (red) side of the Westector and the output is from the minus (black). It will be appreciated that the degree of control depends upon the values of the resistances within the limits of the circuit.

The valve version of this first circuit uses a double-diode-triode valve as a bias control and reactor.

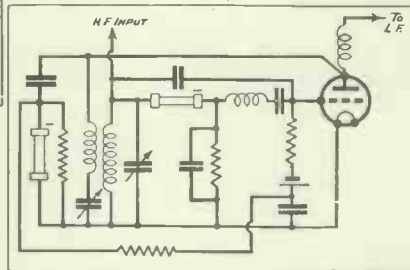
The second circuit is a cunning little arrangement wherein a Westector acts as a signal rectifier and a bias control of a triode valve reactor. A very

### A FINAL SUGGESTION



--for detection and bias control while the triode serves, as in Fig. 4, for both L.F. amplification and reaction.

Fig. 5. In this arrangement separate diodes or Westectors are used—



attractive arrangement, and one which approaches the ideal of simplicity, for there are only a Westector and a few small components additional to the valve found in the detector stage of any ordinary set.

### Using Another Westector

But, unfortunately, the circuit does not compare favourably in sensitivity with normal standards, and also the A.R.C. is not quite wide enough. However, we think that the hook-up may be a good pointer to the final triumph.

Rather better results are given when another Westector is brought in to control the bias on the grid of the reactor valve, as is shown in our third circuit. (As in the other cases we show also the all-valve equivalent.)

The general sensitivity is brought

up further in the fourth arrangement by making the reactor valve operate also as an L.F. amplifier. The single Westector acts as both a signal detector and a bias control. The H.F. voltage is fed to the grid of the valve through a small fixed condenser. There is a small initial grid bias supplied by a battery, which is made necessary by the fact that the valve functions as an L.F. amplifier. Even so, the valve tends to rectify apart from acting as a reactor and an L.F. amplifier!

Improved results, but at the expense of additional parts, are obtainable by bringing in a second Westector and relieving the first of the duties of bias

control. The scheme is to be seen in the last of the pairs of circuits. You will note that the feed for the bias controlling Westector is taken from the anode of the valve.

There is certainly considerable simplification when the alternative double-diode-triode is employed, as will be seen.

Now there is one very important point which those who try any of these circuits should note. When a very strong signal is being received, this tends by itself to cause an alteration of the reaction effect. Don't let this mislead you into thinking you have got your A.R.C. functioning properly. It is desirable to carry out initial tests with a signal of medium strength such as, say, one of the stronger Germans at the level of intensity that it is generally received on sets of modest dimensions.

## A NOVEL CIRCUIT TESTER

THE history of man's advancement is the history of failure—or, rather, that of turning apparent failures into stepping-stones to success. Take a microphonic valve, for instance. What good ever came out of it?

Yet this same valve can be made use of in a most fascinating manner, can become, in the hands of the set tester, a veritable instrument of good will. The more microphonic it is the better. One which will go off into cascades of roaring sound if you merely look at it is best of all.

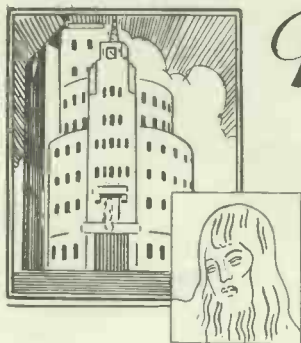
Of what use can such a monstrosity be? Listen, and I will tell you. You

have heard of a set going dumb, no doubt. To find out which stage is at fault requires an elaborate apparatus and knowledge, together with much time and some bad words. You have also heard it said, perhaps, that it is possible to track down the particular stage where the trouble exists by tapping each valve in turn with the finger-nail.

### Must be an Old Valve

Modern valves are so absolutely non-microphonic that this test is useless. You see the way the wind is blowing? Thank you. Yes, this is just exactly where our microphonic valve comes in. A general purpose one, for preference. Don't forget to adjust the grid-bias to suit. W. N.





# British Broadcasting NEWS & VIEWS

By "Prospero"

**B.B.C. Music Changes—Broadcasts from the "Queen Mary"—American Radio Chief's Visit—Those Excerpts from Stage Plays—Sponsored Programmes Not Approved—Religious Services**

## B.B.C. Personalities

SIR STEPHEN TALLENTS has got his way about popularising B.B.C. personalities by name. The B.B.C. has resisted this idea for thirteen years. What the change will mean will be that listeners will be regularly introduced to the people who make the programmes and run the service generally. Here are some who will be staged in this way: Eric Maschwitz, Director of Variety; Val Gielgud, Drama Director; B. Rose-Troup, Talks Director; Charles Siepmann, Controller of Regions; and Mary Somerville, Schools Broadcasting Director.

## Music Control

This year will see big changes in the control of B.B.C. music. As long ago as last September, Dr. Adrian Boult had made up his mind to relinquish the administrative post of Music Director, in order to devote all his time to conducting. Effect is about to be given to this decision.

The new Director of Music has not yet been chosen, but he is likely to be drawn from either the Music Advisory Committee or the Advisory Panel, which have most of the leaders of the British music world in their membership.

## The "Queen Mary" Affair

B.B.C. people are all excited about the plans for the broadcasts from the "Queen Mary" during her maiden run across the Atlantic, starting May 27th. There has been keen competition to

join the party of officials who will accompany the new ship. Roger Eckersley, the entertainment chief at head office, will be there in charge. John Snagge will look after the outside broadcast arrangements, and John Watt will be the principal commentator. Others wanted to go but there was no room.

## The Whisky Problem

The management of the B.B.C. is once again exercised about whisky. It has been the custom to provide dis-

tinguished speakers with cigarettes and the choice of sherry wine and whisky. Great care has been taken to see that this entertainment is confined to the really great people of the world, and not extended to the staff.

Even so, the matter has been brought to the notice of a well-known temperance society, which is making strong representations on the ground that the B.B.C. should not have any intoxicating liquor on its premises. It is planned to make a personal appeal to Sir John Reith, himself a total abstainer from alcoholic beverages.

## HEARING HIS LATEST RECORDS



*Fritz Kreisler, the famous violinist, recently made some new H.M.V. records, in conjunction with the London Philharmonic Orchestra. He is seen here listening to some of these records on an H.M.V. "Fluid-Light Autoradiogram."*

## Mr. Aylesworth's Visit

Mr. Merlin H. Aylesworth, who has just resigned the presidency of the National Broadcasting Company of America, but remains on the board of directors, is expected in England this month. Mr. Aylesworth will be repaying Sir John Reith's visit to New York to attend the opening of Radio City two years ago. The American radio chief and Sir John are close personal friends, although they do not see eye to eye about sponsored broadcasting.

## Austin Croom-Johnson for U.S.A.

Mr. Austin Croom-Johnson leaves for the United States in a few weeks. During his holiday visit to the States last year he was tempted to do one or two of his light musical shows for the N.B.C. sustaining periods. These were regarded as so successful

that powerful commercial sponsors took an interest.

The result is that Mr. Croom-Johnson has been signed on for a preliminary year at a figure which makes the people round at Broadcasting House, London, absolutely gasp. The B.B.C. will have to do some hard thinking about its rewards for able producers if it wants to keep them.

### Theatres Benefit from Broadcasting

It has now been proved beyond the shadow of a doubt that the theatres can benefit from broadcasting. The series of excerpts from stage plays that have been given by their own casts in studios, under the title "From the London Theatre," have been more than good programmes for broadcasting.

They have conferred great success on the plays themselves, invariably strengthening and prolonging their runs. Thus should come to an end the long feud between radio and the legitimate drama.

### The Plato Talks

The B.B.C. announces that "Plato To-day" is the title of a pamphlet issued in connection with the series of talks entitled "If Plato Lived Again," arranged to be given by Mr. R. H. S. Crossman, on Tuesday evenings, from 7.30 to 8.0, up till Easter. The talks will be complete in themselves, but this pamphlet has been prepared for individual and Group listeners who wish to know something more of the significance of Plato, both in relation to the Greece of his time and to civilisation to-day.

The pamphlet also includes pictures, a book list, and synopsis. It can be obtained from any B.B.C. office for threepence; by post, fourpence.

### No Sponsored Broadcasting

The unqualified recommendation of the Ullswater Committee against any form of sponsored broadcasting in Great Britain means the final collapse of the campaign on behalf of this cause.

The chief arguments were—first, that it was a pity in the national interest to permit the export of the large sums that are now absorbed by Continental stations broadcasting

### "PETER DAWSON'S PARTY"



A photograph taken at the H.M.V. recording studios during the making of the record entitled "Peter Dawson's Party." Peter Dawson is seen singing into the mike, Leonard Henry is sitting on the table, while the Wireless Male Quartet are also present.

sponsored programmes in English; secondly, it was urged that competition would be a good thing for the B.B.C. and for listeners as well.

But the Ullswater Committee was unconvinced. Therefore, the proposal is permanently dead so far as this country is concerned. This is another feather in the cap of Sir John Reith, whose opposition to sponsored broadcasting has been unflinching throughout.

I prophesy that the Ullswater recommendation on this matter will be the signal for another "drive" against the programmes in English from the Continent. Already both the Post Office and the Foreign Office have taken action, but not of a kind drastic enough to secure foreign governmental intervention.

### The St. Martin's Services

The broadcasting of religious services from St. Martin-in-the-Fields has become so much a part of the tradition of the B.B.C. that it will come as a shock to many listeners to hear that the Religious Advisory Committee of the B.B.C. is about to revise the arrangements so that St. Martin's will be heard much less in the future. The idea is to spread the facilities among a lot of churches up and down the country. There is no question of throwing out St. Martin's; but it will be relayed less frequently than it has been heretofore.

## THE ORIGIN OF THE RUMBA

JOSE MANZANARES, the South American whose music is heard over the American Columbia network, is said to be one of the few musicians who know the origin of the rumba.

The popular rhythm to which millions have danced had its origin in a waterfall near Santiago de Cuba. Manzanares visited the fall several years ago in his search for authentic native music. He found that a peculiar cleft in the rock at the top of the fall caused the water to drip in perfect rumba rhythm on to a huge flat rock below, 1-2-3-1-2-1-2-3-1-2. Years ago native instrumentalists found they could duplicate the rhythm of the water by beating upon a hardwood stick held with the hollow of the hand cupped as a sounding box. Replicas of these crude primitive sticks, called calavas, are now an essential part of every rumba band.

The regional native music spread to the night clubs of Havana, and later through radio to the entire world. The original crude beat is now augmented by guitars, gourds and other instruments.

## A POTTED BIOGRAPHY

PARKYAKARKUS, foil of Eddie Cantor when he broadcasts in America, hails from Boston, Mass., and his real name is Harry Einstein.

Was educated in Boston public schools. As a boy, wanted to be a fireman.

Was an advertising director before entering radio.

Made his radio debut in Boston and joined C. B. S. February 3rd, 1935.

Was so thrilled after his first broadcast that he walked home, a distance of seven miles, before he realised it.

Owens a pet parrot that speaks Greek.

At each opening broadcast, wears the same suit he wore at radio debut.

Admits the suit is rather worn, but would not part with it.

Dislikes grand opera and doesn't like to dance.

Once "ran" as mayor of Boston as Parkyakarkus during a radio feature.

Favourite dish is hamburgers. Also likes Chinese food.

Doesn't care for jewelry, but is an authority on old silver.

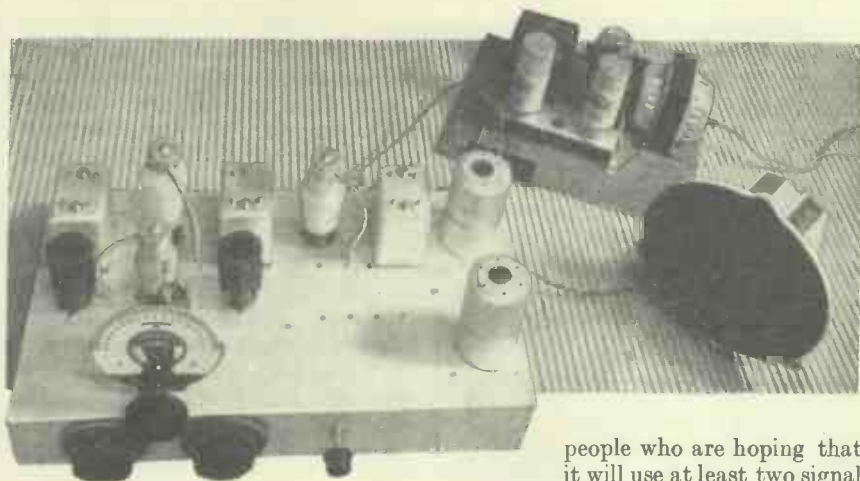
Is not superstitious, but always carries a "lucky" coin.

Only eccentricity in dress is wearing stiff-bosomed shirts.

The name Parkyakarkus is registered.

He weighs 199 pounds and is six feet tall. Has brown eyes and black hair.

# THE 1936 EMPIRE SUPER



By  
W. L. S.

*Here is just the set so many readers—especially overseas listeners—have been waiting for. It is a sensitive, easy-to-operate all-mains receiver, and is ideal for the loud-speaker reception of short-wave broadcasting.*

FOR some time past I have apparently been in disfavour with overseas readers. The chief reason has been my annoying little habit of designing and describing small short-wave receivers, derisively alluded to as “funny little one’s and two’s.” Although I have used a considerable amount of time and space in talking about larger outfits and their desirable points, I have not actually described a specific example in detail.

Readers who have sufficient patience to wade through all my rambling remarks will know, by now, that I have absolutely no use for the freak receiver, or even the complicated receiver—and that word “complicated” embraces quite a lot of things.

When I did start, some months ago, on a design specially intended for overseas readers, I therefore made a resolute attempt to cut out all unnecessary complication and to put up something as straightforward and simple as possible.

## A Sound Receiver

In this “1936 Empire Super” I really think I have succeeded in doing what I set out to do. I shall be criticised, not to say pulled to pieces, over the design (already I have had letters from

people who are hoping that it will use at least two signal frequency H.F. stages!). But it *does* work, and I am convinced that it is an altogether sound set for the overseas reader who is concerned, not with scratching about for DX signals, but with the steady reception of two or three particular stations at specified times of the day.

## Conflicting Opinions

Opinions about superhet design are extremely mixed. In two periodicals of about the same date I recently read these two statements: “As much of the amplification as is humanly possible should be carried out at signal-frequency. Intermediate-frequency amplification should be strictly limited.” And the other: “I.F. amplification may be carried to any desired degree without introducing complication, whereas too much signal-

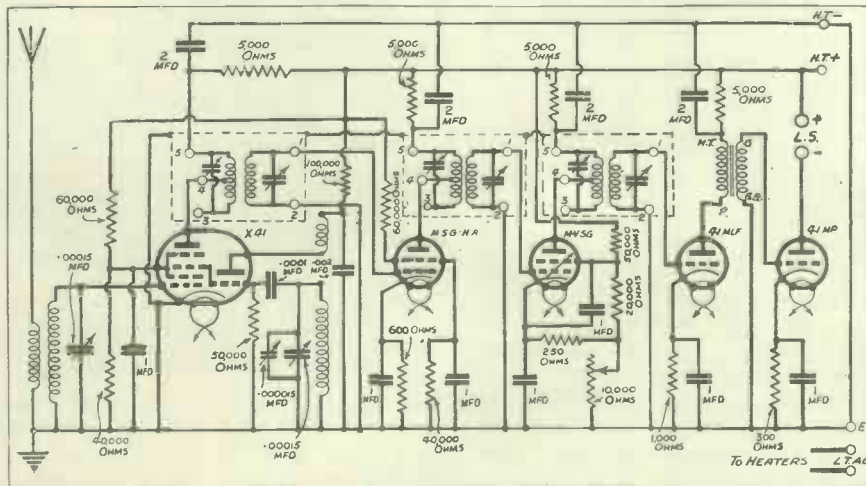
frequency gain is merely a nuisance when it comes to handling the receiver.”

Although I don’t necessarily agree with the latter point of view, I *do* think that we can dispense with signal-frequency amplification for certain purposes, and get all our useful gain in the I.F. section of the receiver. That is precisely what I have done in this set.

The schematic arrangement consists of a triode-hexode frequency-changer with a reasonably low-loss input circuit; two stages of I.F., with high-efficiency transformers, the second valve being of the variable- $\mu$  type; second detector and one L.F. (triode).

All decoupling, potential-dividing, etc., is done within the set, so that we simply have two H.T. terminals to which any good power-pack may be applied.

A MAGNIFICENT SHORT-WAVE CIRCUIT



The frequency-changer is a triode-hexode, and is followed by two S.G. intermediate valves, the second of which is of the multi- $\mu$  variety. The detector is an ordinary triode transformer coupled to the triode output valve.

## Band-Spread Oscillator

The two main controls on the triode-hexode—the detector tuning and oscillator tuning—have been mounted under the chassis and left separate. The oscillator tuning has been equipped with a band-spreader which is mounted “above board,” and forms the most important control.

The I.F. transformers are all adjustable, each being equipped with two trimmers and a variable-coupling device; further, to improve stability, the primary windings are provided with a tapping, which has been used in each case. For the benefit of those who may wish to do a little C.W. reception, I might mention that it is possible, by adjustment, to arrange for one of the I.F. stages to oscillate right at the limit of the volume control.

This isn't an ideal means of receiving C.W.—but this isn't meant to be a C.W. receiver, so we must leave it at that.

## ALL-METAL CHASSIS EMPLOYED

The wiring of both coils to their respective tuning condensers is quite short and direct, and the oscillator does oscillate smoothly, right through the range of coils, and right over the scale of the condenser in each case.

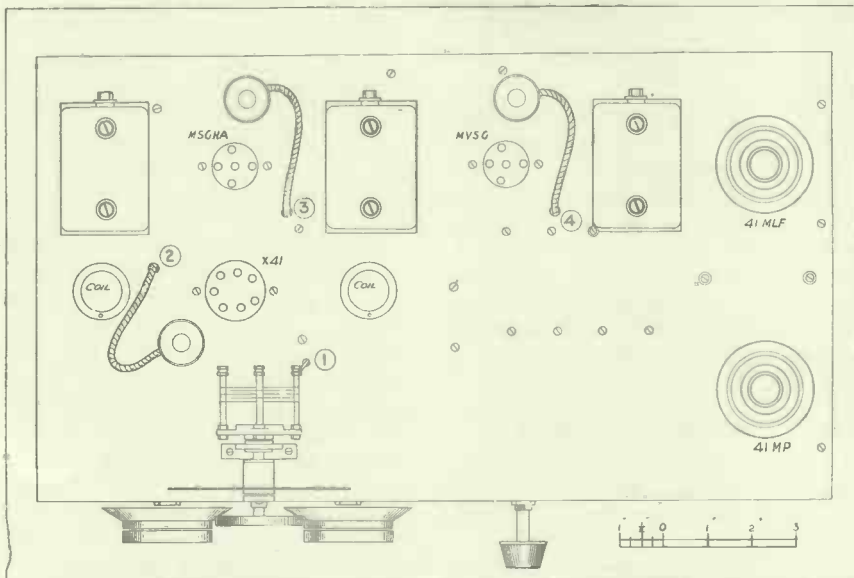
The oscillator portion of the triode-hexode is equipped with a .0001 grid condenser and a 50,000-ohm leak; the far end of the reaction coil is

and the primary winding of the first I.F. transformer, the secondary of which couples into the grid circuit of the first S.G. valve.

Both this and the triode-hexode have their screen voltages permanently fixed at two-fifths of the main supply, by means of a 40,000-ohm resistance going down to earth and a 60,000 to H.T. positive. The first S.G. stage is perfectly straight and couples through the second I.F. transformer to the next.

This next stage, using a multi-mu valve, is equipped with the resistance network recommended by the valve makers. The volume control is a variable resistance of 10,000 ohms, and it varies both the screen voltage and the grid bias. Fixed resistances of 250, 20,000 and 50,000 ohms are used in conjunction with it for this purpose.

### ONLY ONE WIRE SHOWS ON THE "TOP DECK"



Wire 1 is the only lead visible above the chassis. The screened connectors 2, 3, and 4 should be jammed tightly in the holes in the chassis.

Let me make it quite clear, in fact, that this is *not* intended to be a super-selective superhet; such a set can't possibly be made really effective without pre-detector H.F. Its main claim is its high sensitivity; after that comes its simplicity of construction and operation; and, for overseas readers, its ruggedness and the absence of materials which will warp, bend, melt or generally cause trouble.

### The Triode-Hexode

If we work right through the circuit diagram and examine each point as it arises, we shall have a pretty good idea of the set by the time we reach the loudspeaker terminals.

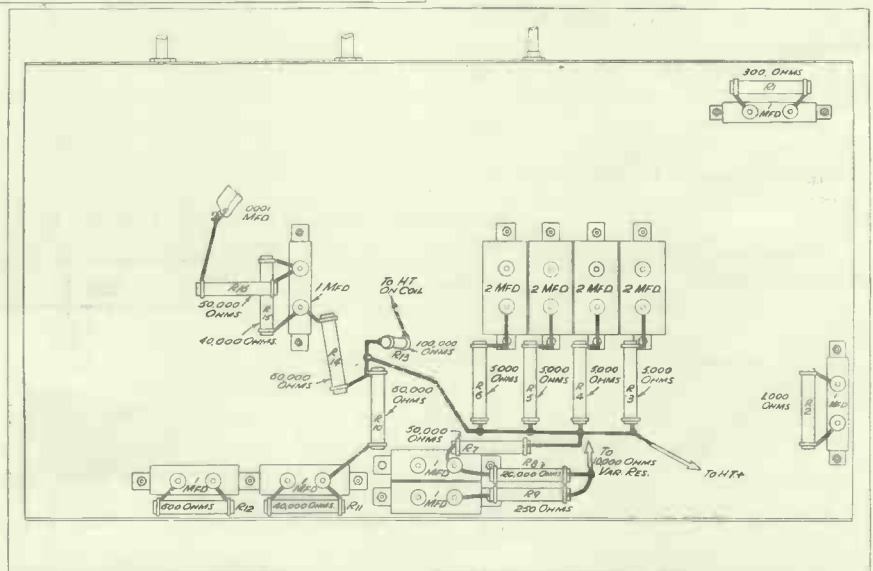
Two similar four-pin coils are used for the detector and oscillator circuits of the frequency-changer stage. The two windings in the oscillator circuit serve for grid coil and reaction; in the detector circuit for grid coil and aerial coupling.

### Anode-Bend Detector

This valve couples in conventional manner to the second detector, which is a bigish triode operating as an anode-bend detector. The voltage swing applied to its grid from a strong signal is quite considerable. Power-grid detection was originally tried, but I decided that straightforward anode-bend was preferable in the long run.

Nothing need be said about the L.F. stage, to which the second detector is transformer-coupled. Since the set

### RESISTOR CONNECTIONS



To simplify wiring, all the resistors are put in last, and this diagram shows the points to which they are connected.

earthed through a .002 fixed condenser, and the H.T. supply is cut down by a resistance of 100,000 ohms in series with the main H.T. positive lead.

The anode of this valve is fed with H.T. through a decoupling resistance

will almost certainly be used in conjunction with a moving-coil speaker with a built-in transformer, no output choke or transformer has been provided.

Now for the constructional side: You will note from the photographs

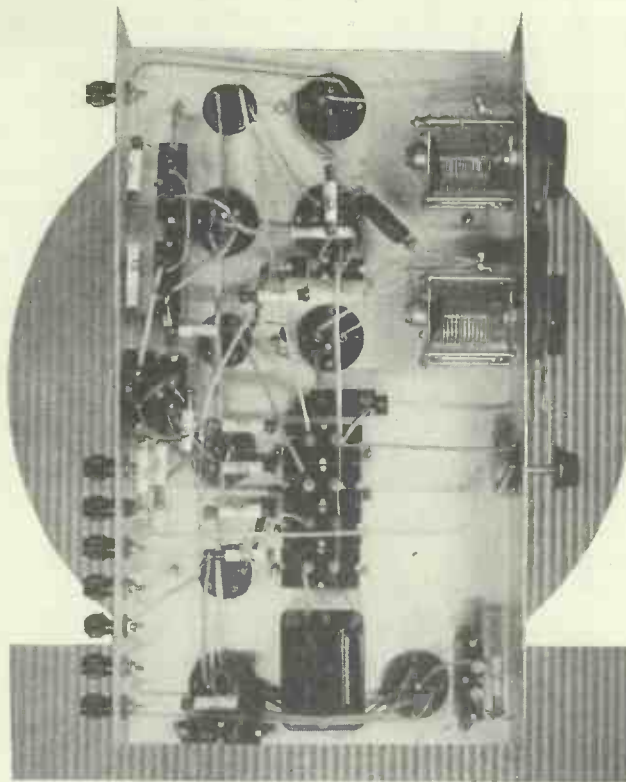
and diagrams that practically *everything* is done underneath the chassis. Only one lead, apart from the three "hoods" for the S.G. valves and the triode-hexode, comes through the chassis—and that is to the band-spreading condenser.

The I.F. transformers are so mounted that their terminals come underneath; valve holders of similar type have been used; and the two band-setting condensers are mounted on the lower part of the chassis. Wiring is therefore a very simple business indeed. After all components have been mounted, there are only four holes to drill for the wiring!

### Heaters First

As a practical tip, I advise readers to wire up the heaters first of all; then the tuned circuits and the leads from the I.F. transformers to their appropriate valves; and the resistances can be left till last, since they are all "above" the wiring (looking from underneath). As far as I can remember, the actual wiring-

## THE UNDERNEATH IN PHOTOGRAPH AND DIAGRAM



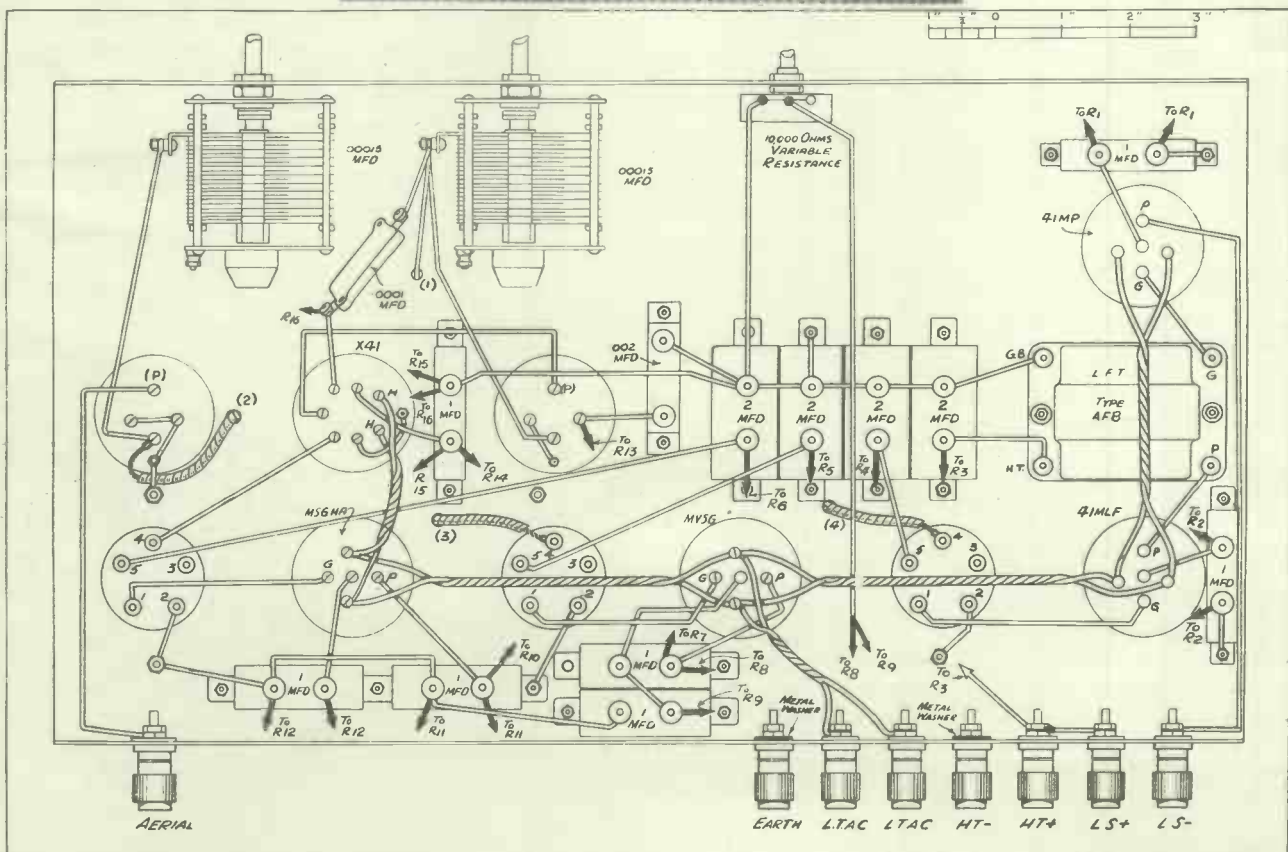
up of the set took me no more than a couple of hours at the outside.

About operation there is quite a lot to be said. I'm not going to anticipate trouble; the power-pack is almost ridiculously simple, the only components used being the transformer, choke, two smoothing condensers and valve holder for the rectifier. The transformer has a primary screen from which a lead is brought out, and this should be taken to H.T. negative—the "case" of the condensers and the bracket on which these condensers are mounted.

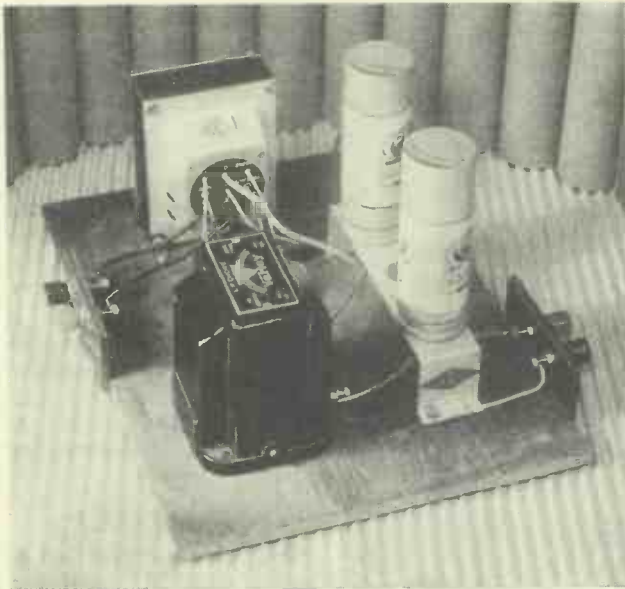
### "Sounds O.K."

Two leads (as short and as thick as possible) from this to the set are required—one carrying the A.C. L.T., and the other the H.T.

Now for the operation of the set, and I will assume that your model of the receiver will behave exactly as mine did. As soon as I had switched on for the first time, and waited for the valves to heat up, I heard



To keep this diagram clear no resistors are shown on it, but all the connections to resistors are shown. The diagram on the opposite page shows the actual resistors and their connections. Note that there is only one fixing bolt to one of the 1-mfd. fixed condensers. This is because the second bolt would foul the I.F. transformer above it.



Any reasonably good power-pack may be used with the 1936 Empire Super, or the one specially designed for it, and shown here, can be built.

a feeble rushing noise that made me say "Sounds O.K.," and proceeded to tune things up.

I sincerely hope your receiver will do exactly the same, in which case you will be able to find a signal of some shape or size within a second or two, simply by rotating the dial of the band-spreader.

Stick to this signal, whatever it may be, and rotate the detector tuning control (the left-hand dial). The signal should come up to a maximum at one point, and fade away again, without materially changing its frequency. It most definitely should not need chasing round one dial as you rotate the other one.

**The I.F. Adjustments**

The detector tuning should give the effect of a sharply tuning volume control, if you can imagine such a thing. Get your signal in tune and at once try *very small* alterations of the settings of the two trimmers on the first I.F. transformer. These are sent out from the works correctly adjusted, but they may need a final touch. If you find that one of them merely weakens the signal on either side of its original position, leave it exactly where it was and don't play with it any more.

All three I.F. transformers can be adjusted, very gingerly, in this way, and when that has been done, all should be well. If you find that one of the I.F.'s is oscillating when the volume control is rotated to the "maximum" position, don't worry unduly. That can be stopped by loosening the coupling on one of them by means of the little knob provided

at the rear; but quite possibly it won't happen. It depends almost entirely on the care you have taken with the wiring.

I can make one of mine go right off the deep end by working all three transformers at maximum coupling; but one normally does not want to do that.

Tuning, by the way, should be extremely sharp; and there should be an almost complete absence of background hiss between stations.

The set may sound as if it is working very poorly and almost "dead"—mine did, and worried me quite a lot. But when you acquire a reasonable delicacy of touch and tune the oscillator control

controls, if the band-spreader is set at zero these should give almost identical readings when the two circuits are in tune. Actually there is a constant difference of 465 kc. between the two circuits, but this accounts only for a few degrees, and there is the "lump capacity" of the band-spread condenser always in parallel with the oscillator tuning, which does much to level things up if the oscillator is always kept *lower* in frequency than the detector.

**Tune the Dials in Step**

Every station, of course, can be received in two separate positions of the oscillator, representing points 465 kc. above and 465 kc. below the actual frequency of the signal, to which the detector grid circuit is tuned. But if the two dials are carefully rotated "in step," at one of these positions the detector circuit will be *in tune*, and at the other it will be 930 kc. *off tune*.

In the case of very powerful stations, this degree of "out-of-tune-ness" will be insufficient to prevent the station being heard, weakly, in the second position. The selectivity of the detector circuit is sufficient, however, to weaken down this second channel very appreciably, and cases of second-channel interference between one station and another will occur only when two extremely strong stations are separated by a figure that is roughly twice the intermediate frequency.

Once the tuning operation has become almost mechanical—as it will with a little practice—the second channels will not be noticed at all except in the case of a few outstanding stations.

**THE VALVES TO USE**

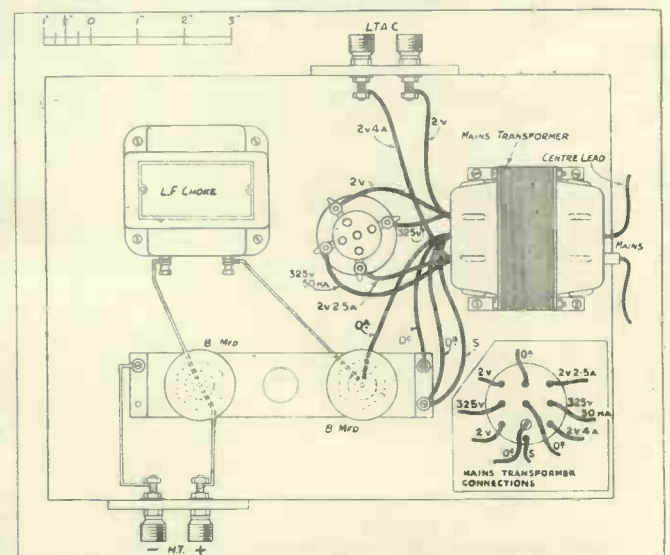
Frequency Changer	..	Marconi	X41
1st I.F.	..	Cossor	MSG/HA
2nd I.F.	..	"	MVSG
Detector	..	"	41MLF
Output	..	"	41MP
Rectifier	..	"	442BU

to a strongish signal, you will find the loudspeaker tending to come off its mounting if you don't hurriedly adjust the volume control.

No band-spreader has been provided for the detector tuning, since, although it is fairly sharp (or should be), it does not affect the frequency of the oscillator tuning. You may therefore get the two roughly in tune with each other by means of the two large condensers; and then tune in stations on the oscillator band-spreader, giving just a "finishing touch" to the detector control.

With reference to the dials of the two main

**HOW THE POWER-PACK IS WIRED**

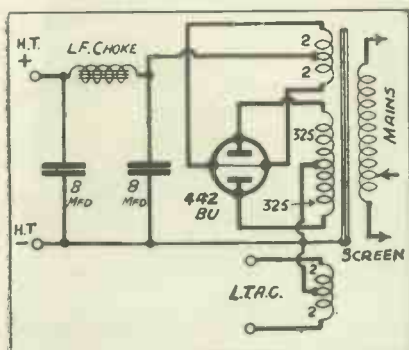


The leads to the mains transformer are illustrated in the little inset sketch in the right hand corner of the diagram.

Furthermore, if your pet station is unfortunately interfered with while the oscillator is in one position, the chances are that it will be clear in another. The possibility that it has a powerful station operating at 930 kc. on either side of it is pretty remote.

Since you probably will not require to listen except on the normal broadcast bands, the points at which these come in on the various coils should be

**A SIMPLE CIRCUIT**



The power-pack circuit is simple because all decoupling is incorporated in the receiver.

found as early as possible, after which tuning will consist of rotation of the band-spreader combined with a little touch on the detector control as a final adjustment.

The 13-, 16-, and 19-metre bands are covered on the smallest coil (Type LB); the 25- and 31-metre bands on the next (Type Y); and the 40-50-metre band on the largest (Type R). There is not much point in giving the exact readings, since they will vary slightly with individual receivers, and the makers' figures for the waveranges of the coils (13-26, 22-47 and 41-94 metres) give you a very good idea of the distribution of the various bands.

A few words about externals will probably be more to the point: First, as regards aerial and earth. The latter will probably prove unnecessary; but if you connect an earth to the set at

all, let it be a good one. If you are using the set high up in the house, the inevitably long earth-lead will probably put one out of court altogether.

My own earth is pretty good, but it didn't make a scrap of difference whether it was connected or not.

Regarding the aerial, you might think that since this is a sensitive superhet, you can hitch on any old length of wire. Quite the reverse, readers! It doesn't need a very long or very high aerial, but it is very desirable that it should be outside, clear of screening and well insulated.

**Good Screening**

Signal-to-noise ratio is invariably at its worst with a poor aerial. Direct pick-up on the set is very small indeed, as proved by the fact that hardly anything can be heard when the aerial is disconnected from its terminal and pulled well away from the set. As soon as the lead-in is allowed to dangle within a few inches of the aerial terminal, however, things begin to come in.

This means that you have every chance of a nice quiet receiver which does not give a poor signal-to-noise ratio.

With reference to the mains unit, there isn't much I can say, because I have not had the slightest trouble from hum or mains noises. I haven't even taken the precaution of putting in

**COMPONENTS USED BY W.L.S.**

- 1 Chassis to specification (Peto-Scott).
- 1 Seven-pin, 2 four-pin and 4 five-pin valve holders, chassis type with screw terminals (Clix).
- 3 "Air-Tune" I.F. transformers (Varley).
- 2 Sets of four-pin short-wave coils, types LB, Y and R (Eddystone).
- 2 .00015 condensers, type "C" (Polar).
- 1 .000015 microdenser (Eddystone, Cat. 900).
- 1 Vernier disc dial (Eddystone, Cat. 933B).
- 1 Adjustable insulated bracket (Eddystone).
- 4 2-mfd. condensers, 300-v. working (T.M.C.-Hydra, type 30).
- 7 1-mfd. condensers, 300-v. working (T.M.C.-Hydra, type 30).
- 1 .0001 fixed condenser (Dubilier, type 670).
- 1 .002 fixed condenser (Dubilier, type 620).
- 4 5,000-ohm resistances
- 1 100,000-ohm "
- 2 60,000-ohm "
- 2 50,000-ohm "
- 2 40,000-ohm "
- 1 20,000-ohm "
- 1 1,000-ohm "
- 1 600-ohm "
- 1 300-ohm "
- 1 250-ohm " (Erie 1-watt type).
- 1 10,000-ohm volume control (Erie).
- 1 L.F. transformer (Ferranti, type AF8).
- 3 anode connectors with hoods (Belling-Lee, Cat. No. 1,224).
- Terminals marked Aerial, Earth, L.T., A.C. (2), H.T.-, H.T.+, L.S. (2) (Belling-Lee, type B).
- 2 Valve-screens (Colvern).
- 2 coils of B.R.G. "Quikon" wire, nuts and bolts.

**Power-Pack**

- 1 wooden baseboard, 12 in. by 9 in.
- 1 mains transformer (Varley, type EP36).
- 1 4-pin valve holder (W.B.)
- 1 Smoothing choke (Varley, type DP10).
- 1 8-mfd. electrolytic condensers, 550-v. working, type D (Peak).
- Terminals marked L.T., A.C. (2), H.T.-, H.T.+ (Clix, type B).
- Bracket for three electrolytic condensers (Peto-Scott).
- 1 coil Quikon wire.

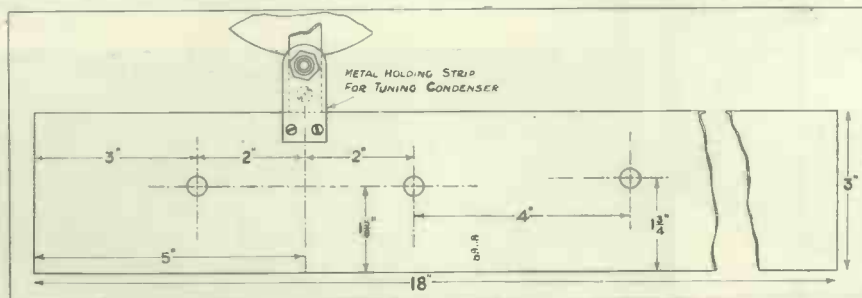
This means that if you do experience any trouble from hum, you can easily disconnect the H.T. section of the mains unit from the set, and substitute H.T. batteries. By this means you will find out at once whether it is the H.T. or L.T. part of the mains unit that is causing the trouble.

**A Battery Test**

The set should work passably well with only a 120-volt battery across the H.T. terminals. The original model did. But at any rate it will do enough for you to see whether your hum is still present or not.

If you should have trouble in this direction—and I don't in the least anticipate that you will—your best plan will probably be to add an external mains-filter unit consisting of two large chokes and two pairs of 4-mfd. condensers. This is placed between the mains and the input to the mains unit. The chokes

**RELATIVE DIMENSIONS FOR DRILLING HOLES**



The position of the holes for the control components are given here. Note the small bracket to secure the slow-motion condenser drive.

should be wound with No. 20 gauge enamelled wire, and should have about 60 turns each.

Next month also I hope to give further details that occur to me after a few more weeks' reception with the set. Meanwhile, go ahead, and good luck!

# HARRY ROY MAKES A FILM



*Harry Roy, the popular broadcaster, has made his first full-length film in which he and his band star. It is called "Royal Romance," and was produced by Joe Rock at the Rock Studios, Elstree.*

*An attractive setting with Harry Roy doing one of his "stunts."*



*Princess Pearl, daughter of the Rajah of Sarawak, now Mrs. Harry Roy, as she appears in "Royal Romance."*



*Unusual garb donned by Harry Roy in a comic scene from his film.*

*Below you see a tense moment. The famous band leader is on the left, behind the counter.*





# Television

## Go-day

**M**ANY people have asked me whether it will be easily possible to receive both the Baird transmissions, at definition of 240, and the E.M.I. at 405, the latter with interlaced scanning. This seems to have been worrying a good many people, as the definition figures certainly seem to be rather far apart.

You will recollect that the Postmaster-General, in his report about a year ago, made it quite clear that it was the intention that any systems of transmission used by the B.B.C. should be capable of being received on one and the same home television receiver without any elaborate or extensive adjustments.

### No Difficulties

Some little time ago the technical details of these two systems of transmission were published, for the information of the radio trade and others concerned, and since then actual official tests have been made to ascertain definitely that there is no serious technical difficulty likely to be encountered in receiving the two types of transmission on the same receiver.

I understand that these tests have shown that everything promises to work out quite all right, and so the fears of many people in this direction can be set at rest. At the same time, one cannot help remarking that it would have been much simpler if the definition had been the same for the two transmissions, as in that case there would have been obviously a minimum of control. It would, for example, still have been necessary to fit a control for the different brightness of the two transmissions. The use of two different degrees of definition, however, involves two extra controls on the set—possibly more—and means that the set has to be separately adjusted.

It is generally understood that we shall have one type of transmission

Details of progress in this country, in America, Germany and France, together with notes on the application of television to aviation, and allied items of interest.

By **Dr. J. H. T. Roberts, F. Inst. P.**

for one week (that is, six working days) and then the other type of transmission for the following week, and so on, so that the changing-over of the adjustments of the set will not have to be done from day to day.

People are saying that the transmitting apparatus which is being got ready to be installed at Alexandra Palace will not be in use for very many months before it will be obsolescent or, in fact, obsolete. As I expect you know, great strides are being made in electric (or "electronic") scanning, particularly applicable to the televising of actual scenes, as distinct from films of scenes, and it is thought by some that before so very long these methods will be sufficiently practical to oust present methods.

### The Policy

Personally I do not share this view; I think that it will be some considerable time before the apparatus which is being set up will need to be superseded. The B.B.C. and the Post Office authorities have shown throughout their desire to adopt a very conservative policy in regard to this television business, and the fact that they have been, as some people think, so tardy in their arrangements, is evidence that they wish to proceed on sound and certain lines and not to rush into

using or inaugurating any device or system until it has been thoroughly tried out in practice.

\* \* \*

Talking about the electronic system, by the way, you probably know that in the United States they have what they call the Farnsworth system and the Zworykin system.

In the Farnsworth system the image of the scene to be transmitted is focused upon a flat photo-electric cathode, from which an electronic emission is obtained which is, in effect, an electron *image* of the scene. This image is projected and focused upon a positive plate in which there is a fixed scanning hole.

### Shifting the Picture

The entire picture field is shifted by magnetic means so as to scan the scene as it passes the hole. This Farnsworth method has given very excellent results, so much so that it has been suggested as a method of ordinary photography, because it would make possible the use of very finely grained film for scenes which normally would not have sufficient illumination.

When the electron stream has passed through the hole of the "electron image dissector," as it is called, it passes into a chamber in which there are two cathodes, kept at a high potential difference. The electrons are bounced backwards and forwards between the two cathodes, and in this way a very great amplification is achieved.

In the Zworykin system the image

DR. ZWORYKIN



Dr. V. K. Zworykin, of America, one of the foremost figures in television, holding his latest electron multiplier.

is again optically focused upon a photo-electrode cathode which is arranged in the form of a "mosaic" of separate photo-electric cells based on a common signal plate. The emission from each of these tiny cells varies according to the intensity of the light upon it. The result is that the picture produces a positive charge on each cell, and this charge is a measure of the brightness at that particular spot. A cathode-ray beam traverses the mosaic and discharges the cells as it passes over them, so producing an electric signal corresponding with the brightness of the scene at each particular point.

### Huge Amplification

Zworykin has succeeded also in obtaining enormous amplification, by a process which he calls "electron multiplication," in a tube containing a succession of anodes and cathodes of successively rising potentials. The advantage of this type of amplification over the ordinary thermionic valve amplifier is that it accomplishes the amplification gain with a very low noise level.

It is possible to combine this new amplifier with the iconoscope by making the signal plate or photo-cell cathode of the iconoscope tube the initial cathode in the electron multiplier tube. Thus it is possible to house the television signal generator and the amplifier within one and the same glass bulb.

The first official television programme was broadcast in Paris recently when the Minister of Posts and Telegraphs arranged for the installation of television receiving sets in six different parts of the city.

### Small Pictures

One of these was in the French National Tourist Office in the Champs Elysées. Admission to these public television reception demonstrations was by ticket, and thousands of Parisians took the opportunity to see the first public tests.

The transmissions were between the studios and the Eiffel Tower and Posts and Telegraphs stations.

In these demonstrations

## PROGRAMMES IN FRANCE

only comparatively small receiving screens were used, about 7 in. by 9 in., but it was found that quite a fair number of people—about fifty—could see each screen at a time. Many well-known French artists from the Opera and the Opera Comique were televised, and sketches were given by various well-known French comedians.

The Minister of Posts and Telegraphs intends to continue these public demonstrations at regular intervals, with a view not only to showing the public what they can expect at the present time in the way of television reception, but also of creating public interest in preparation for the inauguration of regular television services.

An interesting and probably very important application of television is at present under experiment at the National Physical Laboratory, under

the auspices of the British Air Ministry. This new development relates to the use of television to facilitate "blind" flying by an aeroplane pilot, for example, in foggy weather. At present aeroplanes depend in such conditions upon various types of radio beacons which help them to land on the 'drome and also give them warning of any towers or other obstacles which they are likely to encounter.

### Seeing His Position

The new scheme involves the fitting up of a small television receiver in the aeroplane, and on the screen of this the pilot, when he is within a short distance of the aerodrome, sees a moving spot which represents his own machine moving over a map of a pre-arranged area surrounding and including the aerodrome. On the ground, wireless direction-finders locate the invisible aeroplane and then project its position on to a map, the whole being televised to the pilot as already described.

It is obvious that if this scheme could be made really simple and reliable, and the television cabinet made small enough and sufficiently light in weight, it should prove a tremendous boon to pilots in bad weather. Signals of various kinds are all very well, but what better can the pilot have than an actual moving visual indication of his position on the aerodrome?

There is nothing new under the sun, they say, and it really is surprising how often we find that an invention, which we think is of comparatively recent growth, dates back to goodness knows how many years ago. This was the case with wireless and with talking pictures, and now we find that it was also the case with television.

### An Old Patent

One of the earliest experimenters in this field was Nipkow, who is known to most of us by his invention of the perforated scanning disc. Nipkow took out a patent for this as long ago as 1885, which is many years before most of us were born. Recently he

(Please turn to page 194).

### AN ITALIAN AMATEUR



This photograph shows Mr. A. Passani, one of the best known radio amateurs in Italy, with some of his apparatus. Note the inevitable picture of Mussolini.

# AUDIO-REACTION

By JOHN SCOTT-TAGGART, M.I.E.E., F.Inst.P., Fel.I.R.E.

SOME inventions seem so preposterous to the professional scientist or engineer that jeers seem the only meet response to their suggestion. Yet it is well to remember the ursine fate of prophet-mockers.

To my mind come quite a dozen inventions which have undergone the following progressive treatment:

- (1) Suggested by some inventor.
- (2) Scorned or "proved" theoretically unworkable by scientists generally.
- (3) Established and proved effective by practice or commercial development.
- (4) Cautiously sniffed-at by scientific circles.
- (5) Scientifically and mathematically explained by those who at first scoffed.
- (6) Declared by these to be an old and well-established idea.

For nearly sixteen years I have been intimately associated with the patent departments of practically every large radio concern in Europe and America. As a lawyer and an engineer my interests have been predominantly concerned with inventions and I have had unique opportunities of studying the reception given to new or alleged new inventions by commercial concerns, their chief engineers, the independent academic scientists, and last, but not least, the so-called House of Lords sitting as a final court of appeal in patent cases.

And what a different attitude each has taken! I have heard the Law Lords declare with a tremendous sense of their responsibility that a gigantic step forward in lamp manufacture was taken when a filament thicker than usual was used in a gas-filled lamp. And a week before I had shown, for politeness' sake, an impassive face

Full details of a new development in radio are here given by the famous set designer and electrical engineer. It is not merely a suggested theory but an accomplished fact that has been overwhelmingly successful in thousands of homes.

to the sniggerings of parboiled but fully qualified young engineers who declared that such an invention was "obvious."

This preamble is by way of a warning to those who may be tempted to sniff suspiciously or even disdainfully

This idea consists in applying the beneficent principles of reaction—so well-known in high-frequency circuits for over twenty years—to the low-frequency circuits of a broadcast receiver. The merits consist chiefly in providing better quality of reproduction and louder signals. I know of no idea which is more likely to undergo the six-stage treatment described. Note particularly the final stage where scientific circles (I refer, of course, only to those of narrow diameter), finding their first opinions discredited, must save their faces by tracing the invention to some earlier source so that the inventor shall be robbed of his credit.

Audio - reaction has been announced not as a suggestion but as a *fait accompli* so that one of the six steps has already been eliminated. Realising that at first thought, and on paper, the principle would seem contrary to all we engineers have believed, I arranged scores of public demonstrations of the S.T.700 receiver which embodies this idea.

By aural and meter tests the blessing of audio-reaction was proved beyond a doubt, while a corroborative opinion also based on practical demonstration comes from Dr. James Robinson.

As far as I know, there is not a single other broadcast receiver in existence which embodies or has ever embodied deliberate adjustable audio-reaction, although the idea of reaction itself is about twenty-three years old. Why? The reason is quite obvious to me. Audio-reaction has always been regarded as a thing to avoid, not to encourage. Its possibility of occurrence has been fully realised, but only as a disadvantage. It remained for me to show that the baby had been thrown out with the bath water.

## J. S.-T. DEMONSTRATES HIS INVENTION TO DR. ROBINSON



Dr. James Robinson, D.Sc., Ph.D., F.Inst.P., M.I.E.E., formerly Chief of Radio Research of the Air Ministry, after trying out the S.T.700 with its audio-reaction, wrote:

*I have operated the S.T.700 and find that Mr. Scott-Taggart was justified in departing from usual technique, which was to avoid low-frequency reaction.*

*By departing from standard practice, and there are few engineers with sufficient foresight and courage to do so, he has made it possible, by his audio-reaction scheme, to increase signal strength, whilst greatly improving quality.*

*His success in this direction deserves to arouse the greatest interest.*

at a development which, on October 30th, 1935, was published in "Popular Wireless" by the present writer, and termed "audio-reaction."

## THE FIRST STEP

Why should audio-reaction be regarded as a disadvantage? Because it has hitherto always meant instability and distortion. That is because it has occurred "accidentally" and has not been under control. When better valves came to be used and when mains units ("eliminators") and mains sets were designed, it was found that "motor-boating" was liable to occur. This took the form of a definite pop-pop-pop sound in the loud-speaker, calling to mind the exhaust of a motor-boat. Sometimes only a mild fluttering noise is heard, but in all cases it completely ruins radio reception. This "motor-boating" was found to be due to low-frequency coupling in the common high-tension supply or even in common grid circuits. Decoupling systems were then developed to prevent the low-frequency reaction effect, resistances and large condensers being usually employed.

### A Case of Feed-Back

Note that "motor-boating" can occur without any wireless signals being received. It is simply a case of feeding back electromotive forces from the output of one valve to the input (i.e. grid circuit) of the same or a preceding valve in the chain of valves. When the feed-back is great enough low-frequency oscillation will occur and we probably hear it as "motor-boating." Similarly, a wireless set will oscillate at high frequency when ordinary reaction is increased too much, even though no wireless signal is being received.

The first step we did was to stop audio (i.e. "low" or audible) frequency oscillation, but we realised that even though the accidental L.F. reaction might be insufficient to cause "motor-boating," it would still

be there and would be a potential danger. For example, a stable receiver might start "motor-boating" if a valve were changed, e.g. a better or newer valve, or if the H.T. battery dropped below a certain voltage, in which case the resistance of the battery would materially rise and so provide increased coupling.

It was therefore necessary to provide, as a precautionary measure, much greater decoupling than was necessary to stop "motor-boating."

We all realised, however, from actual experience that the accidental L.F. reaction effect could be damaging to quality even when not sufficient to produce "motor-boating." The reaction effect might in some cases be of the reverse type, i.e. not tending to produce "motor-boating" but to do the opposite, viz. to reduce signals. It was—and is—impossible to forecast exactly what kinds of reaction results will occur in a receiver; both helping and opposing electromotive forces may be fed back or occur in different valves in the same receiver and the

phase of these e.m.f.s is always uncertain. Not even those with plenty of time to analyse such things have given a proper account of what happens.

The reason for this vagueness is that the same simple cure will stop all the spurious coupling effects, whatever their degree, sense or phase angle. That cure lies in decoupling so as to prevent all kinds of feed-back.

### Vital Considerations

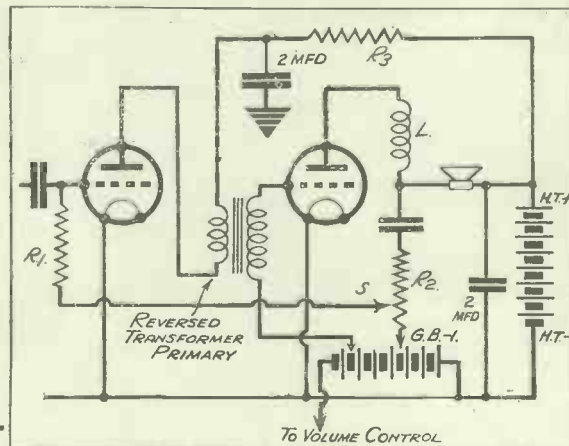
In my own experience I never recall ever having had any good effects from accidental L.F. reaction due to inadequate or non-existent decoupling. The effect has always been to produce distortion, instability or a weakening or "thinning" of signals. In the light of my subsequent work on deliberate audio-reaction, I attribute this to:

1. Absence of control.
2. Mixtures of feed-back effects.
3. Wrong phase-angle of feed-back voltages.
4. Reaction over undesirable frequency bands.

The third reason is a vital one. It is possible to get "motor-boating" by making a set unstable and yet if we reduce the instability it is possible not to get the true benefits of reaction. The same sometimes applies to high-frequency reaction, an increase of reaction producing no smooth "build-up" but a sudden breaking into oscillation. This is rare in the case of H.F. circuits but audio-reaction is a much more ticklish matter; most circuits which will produce "motor-boating" will give no beneficial audio-reaction effects at all.

The practical experience of radio engineers has always been that unintentional reaction in L.F. circuits is productive of bad results. Where theoretical thought has been given to the matter it has moreover been

### HOW IT IS ACHIEVED



Audio-reaction control is carried out by means of the potentiometer  $R_2$ , and slider  $S$ , the feed-back being through  $R_1$  to the grid of the first L.F. valve.

### LISTENERS' PRAISE

Audio-reaction strengthens signals considerably, and gives the bass a deeper note which is very pleasing to hear.—*L. R. OAKES*, 47, Norman Road, Bqw, E.3.

Low-frequency reaction increases the power and tone in a remarkable way; in fact, it has to be heard to be believed.—*C. J. BREHAUT*, c/o Leale, Ltd., 7, Borage Street, Guernsey, C.I.

I think it is one of the "wonders of the world"; it brings the studio right into your home with fine quality.—*E. BIGGS*, 96, Swinton Hall Road, Swinton, Manchester.

This method shows a marked improve-

ment in quality, lending body to speech and music such as is rarely heard.—*JOHN FLEMING*, Rosehill Dairy, Whifflet, Coatbridge, Scotland.

It has to be heard to be realised.—*THOS. MORE*, 1064, Argyle Street, Glasgow, C3.

From a whisper it will bring the signal strength and quality to something hitherto unknown.—*H. E. GOSS*, "Woburn House," 15, Cusley Hill, Goff's Oak, Herts.

Audio-reaction increases signal strength 25 times and the tone 100 per cent.—

### AUDIO-REACTION

*W. R. WALTHAM*, 1, Onslow Mews, South Kensington, S.W.7.

The volume increases considerably without impairing the realism of the output, but still further improving it with the accentuation of the low notes.—*J. ESPINOSA*, 70, Maycross Avenue, Morden, Surrey.

Audio-reaction, I think, makes a vast improvement to the tone.—*E. O'NEILL*, 10, Dock Street, Glasgow, C.3.

Audio-reaction greatly increases the strength of the weaker signals, giving them body and fullness which they otherwise lack.—*LESLIE A. PERRINS*, 101, Sycamore Road, Aston, Birmingham, 6.

considered that reaction would distort since it would act differently towards different frequencies.

In a word, audio-reaction has always been damned as an undesirable by-product, and every radio engineer worthy of the name has done his utmost to prevent its occurring, by using generous decoupling systems.

It is interesting to recall that when tea was first brought to this country it was eaten as a vegetable and the water thrown away. In much the same way, audio-reaction has hitherto been thrown away instead of being tamed and harnessed.

### A Difference

One might wonder why the same fate did not occur to high-frequency reaction. The reason is that its good effects were appreciated before high-frequency amplification was put into practice. Everyone knows that accidental high-frequency reaction is liable to occur when we use a valve as a high-frequency amplifier. In fact, by screening, decoupling and the use of valves with screened grids we do all we can to stop accidental reaction. But we still apply *deliberate* reaction because we always knew of the benefits of it.

My own analagous policy with audio-reaction has been to prevent all accidental audio-reaction (which is probably "mixed" and of wrong phase angle and covers the wrong frequencies) and then apply suitably controlled audio-reaction.

The broad idea of low-frequency reaction is very old—much older than the violent modern prejudice against it. So old is it, in fact, that its very age is significant. Such low-frequency reaction as has been proposed is pre-broadcasting. In those days radio was wireless

telegraphy, to all intents and purposes. The question of distortion did not arise. Spark, continuous wave, or "tonic train" signals produced substantially a single "note" in the telephones. Reaction, if applied to such a single low-frequency (commercially, an extremely rare occurrence), merely strengthened it if the reaction was effective.

### Frequency Range

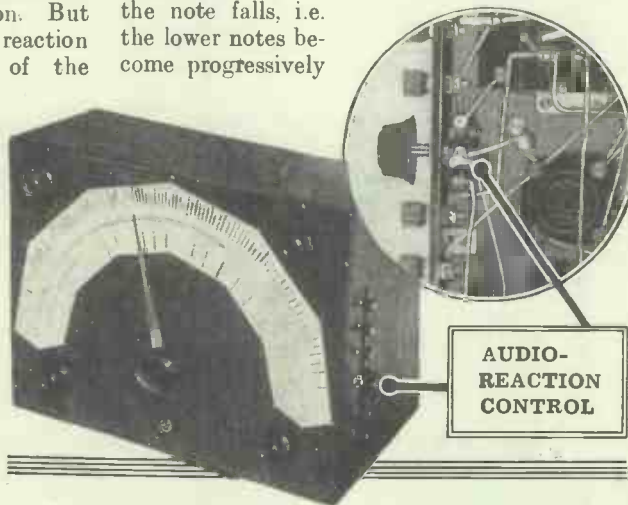
The situation with broadcast signals is entirely different; the frequency range is extremely wide—from say 30 cycles to 12,000 cycles per second.

## IMPROVING THE LOWER NOTES

It might be expected that reaction would single out a single frequency and exaggerate it. We all know that high-frequency reaction reduces the strength of the side frequencies corresponding to the high notes and—what is often ignored—increases those frequencies near the "carrier" frequency.

My own proposals for audio-reaction sail invitingly close to the guns of potential critics. But I admit quite openly that my published arrangement does involve "frequency discrimination." Criticism is disarmed by this admission. But whereas the critic does not know how the discrimination works or its extent, I do! It is arranged that the reaction works most effectively at the bottom end of the frequency scale, i.e. the lower half of the musical register.

The magnification is actually spread over a wide range and increases as the frequency of the note falls, i.e. the lower notes become progressively



The S.T. 700, the first set to use audio-reaction, is illustrated here. The knob used for controlling this marvellous effect is pointed out and seen both from the front and the back of the receiver.

louder. An overall increase of 25 times in loudness is easily obtained. But the improvement in the bass response of the set is an even more valuable feature.

It is known that loudspeakers and the human ear fall off in response as the bass is approached. The lower the note, the harder it is to hear. Or, put in another way, the low notes require more power to produce the same effect; this extra power is obtained by audio-reaction.

A really loud signal—a signal ordinarily unobtainable with a battery set—is essential to a feeling of good

reproduction, otherwise the bass seems inadequate. Loud signals, especially with a battery set, are, however, too often accompanied by distortion; so much so, that nearly every one "turns down the wireless" to get the music "sweet"! But actually the bass then goes to the dogs.

With my audio-reaction scheme, however, signals may be reduced to comfortable room strength—or even very much weaker—and the bass then brought up by audio-reaction. Likewise, signals originally weak are not only strengthened but given out with remarkable fidelity instead of being almost completely devoid of true bass.

### Uncanny Realism

The beneficent effect on quality of audio-reaction is so remarkable that a mere description can convey little. But speech and music acquire an uncanny realism. A few extracts of readers' opinions are published to indicate how vivid and how immediately recognisable is the improvement.

Needless to say, the type of programme affects the noticeability of the improvement. Any music containing low notes is startlingly better. Speech becomes very much more personal and alive for the same reason. The organ can be heard as a majestic instrument even on a simple battery set, while the drums and rhythm of a dance band become a real delight.

There is naturally more than one way of applying audio-reaction, but that shown in the figure has proved very successful in the S.T. 700. A small portion of the L.F. output of the last valve passes through a condenser and resistance. The values of these are important, as indeed is the step-up interval transformer which is a Niolet 1 to 3.5 standard type with connections to one winding reversed. The apparatus used is important because it is vital that the band of frequencies to which reaction is applied should be correct, and because a wrong phase angle of the e.m.f.'s will ruin the reproduction. Design is therefore more than a pencil sketch of the circuit.

It will be noticed that decoupling is very generous. This also I found essential. Absolute stability is the ideal before audio-reaction is applied. Mixed feed-backs are ruinous, and maximum signal strength improvement is only obtained when every kind of accidental feed-back is thwarted.

The circuit alone is a guide, but practical design will always play a great part in the application of audio-reaction principles. Every condenser, resistance and inductive winding will modify the effects, but a proper combination will upset all preconceived prejudices and will almost startle engineer and listener alike with the improvement obtainable.

# TELEVISION NOT to COMPETE with CINEMAS!

WHEN a certain Sunday newspaper—significantly alone, it is true—brightened up our jaded interest in television by hinting at a war to the death between the B.B.C. and the cinema interests, every radio scribe in the country asked himself: "And now, what?"

The answer—or perhaps it would be more true to say embarrassment of answers—came decisively enough from the lips of both Mr. Gerald Cock and Sir Noel Ashbridge, when these scions of the broadcasting hierarchy attended the January meeting of Press men.

## Short Films Only

Under the genial chairmanship of Sir Stephen Tallents, the Director of Public Relations, Sir Noel Ashbridge briefly went over the well-turned ground that centres around the adaptation of Alexandra Palace for the first high-definition transmitting centre.

He told us very little new—but that was hardly his fault in view of the fact that installation work proverbially closes the lips of engineers. But he did remind us that the erection of the steel mast on the brick tower would begin almost at once, that it would be 300 ft. above ground level, and that the first television signals would be radiated from a height above sea level of just over 600 ft.

Mr. Cecil Graves put in a word at this stage, pointing out that although he was responsible in the last analysis for all the programmes radiated by the B.B.C., he was leaving the spade work of television to Mr. Gerald Cock and his assistants.

Mr. Cock then implored us to stop him if he was in the least boring, and, with pious hopes that he was not being terribly indiscreet, proceeded to tell us a good many things we wanted to know.

"I want time," he said, "time to develop some of the many new ideas we have in mind. I may as well dispose of the story about films right away. We never expected to run long feature films through the television transmitter, and therefore it is absurd to suggest that we are up against the cinema interests in this matter.

"Short films, yes, we are all in favour of. We hope to transmit films of, say, ten minutes' duration, for we believe that even on a small screen such films will need no special degree of concentration, and will therefore have a great interest value. We hope to gain the co-operation of the film industry for such films.

## Three Sessions

"I think I can say that the present plan of transmission timing is pretty well fixed. There will be, as I told a somewhat smaller gathering some weeks ago, three one-hour periods each day. The first will be from 3 to 4 p.m., the second from 6.15 to 7.15 p.m., and the third from 9.30 to 10.30 p.m.

"These periods, I hope, will enable the maximum number of people to see just what television is all about. I am hoping that we shall have the co-operation of many of the big stores in London in the provision of suitable looking rooms where people can sample the television programmes. I visualise arrangements whereby, say, 10 to 20 people might sit around the

An account of the latest statements by Sir Noel Ashbridge and Mr. Gerald Cock on B.B.C. Television.

By

OUR SPECIAL CORRESPONDENT.

screen, with room at the back for a constant stream of interested passers-by.

"It is obviously impossible for the B.B.C. to consider putting up a large number of these looking-halls—we have said something about the equipment of one such hall in the West End, but I am looking to the stores, and possibly even news-reel theatres, to provide similar facilities around London.

"It seems to me absolutely essential that, at the beginning, people must be given the urge to look-in. After all, a good deal of money will be involved in the purchase of the early apparatus, and before manufacturers can hope to sell it the public must be given a chance to see just how good modern high-definition television really is.

## During the Rush Hour

"I am anticipating that women will help in a large way with the propaganda work of television. They will be able, during their afternoon shopping expeditions to Town, to see for themselves what we are doing from 3 to 4 p.m., and I hope that will inspire them to persuade their husbands that they simply must have a television set!

"Then, during the 6.15 to 7.15 p.m. rush hours of business people, many more will be able to look-in at the demonstration halls. As for the evening programme beginning at 9.30, I expect its audience will

comprise, at first, well-to-do people who will "show-off" their newly acquired apparatus to admiring friends.

"The whole point being, of course, to arouse the public in every sphere of life to the great interest that can be gained by subscribing to the new science of television.

"Programmes? Someone asks me at this stage what kind of programmes I shall put over. It is really awfully difficult to be as specific as I should like to be. I can give you only a general idea of my plans, but I do want everyone to realise that *nothing* is to be fixed during the early days of the service. We shall try everything—and scrap anything that does not seem any good.

"I aim to provide at least one hour a day of variety, divided into two parts. But as I want to show the wide range of entertainment possible with television I shall also bear in mind all kinds of short, informative shows—illustrated talks and lectures on interesting subjects. Topicality will be strongly featured—always subject to the limitations of the apparatus.

## The Question of News

"News films are rather a problem, it is true. To give a complete service of news in all its aspects would run us into a film bill of something like £120,000 a year! That is, assuming such news films to cost between £1 and £2 per foot, as I understand they do.

"Some suggestion has been made to the effect that we are going to get the Post Office film unit to make our films. That is not true. We may use up some of the old films made by the Post Office, but everyone who talks so freely about the amount of film we are going to use must remember that normally the making of a film is a costly business, which can hope to pay only through a large number of showings."

I think that is rather a fundamental point the film fans are tending to overlook. Mr. Cock is quite right to point out, as he did, that films are practicable in a big way only because they are shown hundreds of times in different cinemas to different audiences. What a contrast with the position of broadcast films! Two or three times through the scanner and they are finished!

For this reason alone the B.B.C. will have to go slow in its use of film. Indeed, it is obvious that with only £180,000 per annum for the whole of the cost of the service, the use of films will be very far from encroaching upon the cinema's preserves.

## Next Month?

Talking of the cinema, Sir Noel Ashbridge made an interesting statement about the entertainment value of the latest high-definition television pictures as will be broadcast from Alexandra Palace.

"When working at its best," he said, "the new television will be as good as a normal home ciné system. But, of course, we must not forget that ultra-short waves may prove variable—and for that reason alone it would be dangerous to say exactly how well the pictures will be received in any given spot during the experimental period.

"If all goes well, engineering tests on the Baird and E.M.I. apparatus ought to begin at the

(Please turn to page 193).

## FOR DEEP-SEA MEASUREMENTS



By changing sounds heard under water into electrical currents, this apparatus known as the hydrophone assists in the accurate determination of distance below the sea.



# RADIO RACKETEER

*The wireless operator was delirious, and no one else could be found on board who understood the apparatus. Yet the SOS was sent out and help brought to a sinking ship*

It all started when the Snake Pincelli bunch bumped off Shamus O'Hanan. Shamus was a good dick, and worked for Millsome's private detective agency, New York.

So did I—Michael Harrigan.

Why Pincelli suddenly got sore at O'Hanan is just guessing. All I know is that he rubbed Shamus out good and quick and sort'er hinted that New York could get along swell without any help from me. Pincelli runs a big racket an' several tanks. I'm no hero. Shamus left a wife an' three kids, an' all five of us left New York together.

There wasn't what you might call a hatful of dollars in the jackpot, and five tickets back to old Ireland called for a deep dig into the jeans. That was how we came to be crossing the Pond on the S.S. Lily of Lagonde, an' she was some lily, believe me! The less said about that rotten old barrel the better. She boasted— an' boasted is the right word—five state rooms, an' a terrible state those rooms were in, too! But Mary O'Hanan looked at them like they were the Royal suite at Windsor Castle or some place. She was sure shook up was Mary, and aching to place the Atlantic Ocean between herself and Pincelli.

I reckon my ache was different. I'm fortyish an' hard-boiled, an' never had no use for sob stuff or the dames, but every time I took a peek at Mary, my fool heart sprung into my Adam's apple so slick as if a guy had prodded a rod in the small of my back.

Maybe it was the Irish working in me, but when I glimpsed her unruly red head and looked square into her eyes, as grey as a soft dawn over the Donegal hills, I just naturally wanted to fall into a clinch, if you get my meaning. The idea of her being the mother of three healthy kids seemed like comic paper stuff.

We fed at a table with the second officer and a little squirt, who wagged his tail to the name of Squiggs. It fitted him perfectly. He was going to Europe to try an' sell hardware. I didn't ask him why. I had enough troubles of my own.

When we were two days out on the run I got a radio from Millsome's which started invisible ants running races up and down my spine. Reduced to English—well, read it for yourself now I've decoded it, and tell me the answer!

*"Buddy Clanden sailed on Lily of Lagonde stop Watch your step stop Millsome."*

Just enough to give me the jitters, an' about as helpful as a sick headache.

Buddy Clanden was Snake Pincelli's closest boy friend, and for years he had stuck as near to Snake as glue to a blanket. He was number one on Pincelli's payroll, and none of the boys ever hankered to try an' beat him to the top of the class. His temper was only a mite quicker'n his trigger finger, an' he had about as much yellow in his constitution as a hungry leopard.

Some of the big gang bosses spend a lot of time an' greenbacks in building up a rep. for being tough. From what I'd heard of Buddy Clanden, he wasted no time or jank in that direction. He was just naturally born that way. A friendly little playmate to have aboard the Lily of Lagonde!

My itch was that I'd never seen Buddy an' wouldn't know him if I rubbed noses with him in the dark.

If only old man Millsome had spread another couple of dollars on the counter and sent me a description of Buddy, I'd have felt a whole lot less seasick.

Inside of two minutes after reading that flimsy I was at the radio cabin and grabbing for a blank.

The key-pounder was a lantern-jawed, lemon-skinned waddy, an' he took my message with a yellow claw that shook like it was a bunch of dried reeds in a breeze. It didn't take both eyes to see that he was no advertisement for a physical culture course.

"What's eatin' you, son?" I asked him, more for something to say than because I was curious. "Whisky or coke?"

"Two guesses and both wrong!" he came back, grinning like a starved Chink. "Malaria. Just malaria. I suppose I'm still in my right mind? This wire reads like gibberish to me."

"It isn't any language," I told him. "It's code. An the best thing you can do, Buddy, is to get that over the air an' then hit the hay. Got any quinine?"

"Gallons," he says, reaching for a switch on a black panel. "Inside an' out! S'long."

I padded the deck until I near wore a groove in it, but no reply came from Millsome's. In the end I dived back to get a line on how long I might have to wait. I never got it.

□.....□

## An Unusual Story

by

H. A. Dossett

□.....□

## HOLED IN THE STEM

The second mate was bending over the bunk under the porthole, an' he was some het up.

"If you've come to use the wireless you're unlucky," he jerked at me over his shoulder. "Poor Bilbee is delirious. He should never have tried to make the trip. He ought to be in hospital and we've no doctor on board. It's a rotten shame"—his voice kind'er drifted away into a whisper.

The radio man in the bunk moved as if he was lying on pins, an' then offered in a loud voice to knock the block off of somebody, if the gink in question would come down out of the tree.

My chance of getting anything back over the space link seemed more'n slim, an' Buddy Clanden was loose somewhere's within a few yards of me, with a gat in his poke; maybe the same rod that had fixed Shamus O'Hanan.

Was Buddy a passenger? There weren't so many that I couldn't look 'em over in the saloon at dinner-time, an' if Clanden was there, an' I couldn't sort him out of the bunch, I deserved all that was comin' to me. Had he shipped as a fireman?—or a deckhand? Pincelli could pull more strings than any other big shot in New York.

I had a hunch that knocking around in my dome was something I ought'er remember. Something important that tied up with Clanden. It was after midnight when I got it, an' I cursed myself for the original Simon from

fool hick who had actually called him buddy was me! By shooting off my mouth that ways I had good as told him that I was wise to the game, when all the while I was just plain one hundred per cent. sap!

An' was he really bats, or just stringing me along for a sucker? He could slide out on the first dirty night, fill me with lead, an' in two jumps be back in his bunk, raving about ginks in trees, an' raising hell until the second mate came along to kiss him good-night, an' underline his alibi.

I figured that another good eyeful of Mister Bilbee wouldn't hurt me any, an' although it was as near to one o'clock in the morning as whiskers are to a chin, I bit the end off a cigar, climbed into a bathrobe, an' left my cabin.

It was a calm night, with the sea like a basin of soup, an' great stars reaching down to the mastheads. I looked up at the blazin' points of light, an' started to think of the five-foot-nothing of sugar that was Mary O'Hanan; then my fingers touched the cold iron in my pocket, an' I thought of Clanden instead.

I had taken two paces when the ship struck. Not that I knew it then. I sort of felt the whole caboose give a kind'er hiccup, which made me sit down on the deck, quicker'n a broody hen. When I got on to my stalks again, men were milling forward, an' the officer on the bridge was howling like a hop-head in a fit.

A boyo came pounding past, an' I grabbed him by the slack of his jersey. "How come, fella?" I asked him. "Anything wrong?"

"You've said it," he growled, an' tried to free himself.

"Let's have it all," I said, tightening my grip. "I gotta woman an' three kids on this rat trap, an' I want'er know exactly where I'm stepping."

"So do we all," he answered, with a grunt, and, pushing a hand like a ham against my chest, vanished after the others.

I got the low-down on the trouble from the second mate about half after one.

The Lily of Lagonde had struck a submerged derelict, or a large chunk of hefty floating wreckage, and her stem had opened out like she was *really* a flower.

The old can was in no condition to rough-house it with a floating match-box, an' she started to settle by the head in an amazin' short time. I thought of Mary an' the kids, an' wondered if help would arrive in time. I guessed that when Clanden was wised up to the fact that the old tub was going away under his feet, he would snap out of his delirium with a jump, an' start key-pounding in earnest.

But I was dead wrong. I tried to put a little heart into Mary an' the youngsters, an' then went along to the radio room to see how Mr. Bilbee, come Clanden, was making out. He wasn't. He was still lying in his bunk, twistin' slowly from side to side, and singin' in a voice like a spoon hitting a cracked plate.

Beside him stood the old man and the chief mate, an' if ever I've seen worry stamped on a couple of pans, it was on theirs. The skipper took a walk as I entered, and the chief officer, after one hopeless slant at the song-bird in the bunk, shrugged his shoulders and fixed a pair of bright blue orbs on mine.

"Who are you?" he snorted, like a man at the end of his string. "Ah, I remember; Mr. Harrigan, isn't it? You, sir, do not, I suppose, know the Morse code? You can't work these gadgets?" He flapped his fins helplessly at the pile of switches an' knobs draped around the wall.

I shook my bean, an' he shrugged again.

"If only I could get someone to set that junk heap



... AND BUDDY CLANDEN WAS LOOSE SOMEWHERE ...

Pieville for not putting myself wise when I first read Millsome's warning.

It was a stunt which Pincelli had pulled, way back in connection with a bullion consignment. He had placed Clanden as a Morse-mawler in the shipping offices—sure, that put a thumb on it. There could only be one place—the radio room. Then the yellow-faced guy bawling his fool head off in that bunk below must be Clanden, an' the



## THE BOATS WERE WORM-EATEN

alive on 600 metres, I'd have a shot at getting an SOS away myself, although I'm lousy at Morse; even five words a minute with a lamp. As it is——" He jumped to his feet. "Perhaps one of the chaps in the engine-room, or one of the passengers, can help." He tapped a sheet of paper lying on the operator's desk. "That's our position. I want a man to get it on the air, and I want him *now*."

"What about the boats?" I cut in. "I've got a dame an' three kids——"

"You're telling me!" he said, snorting again like a bull in a stockyard. "Boats!" He wheeled to the cabin-door. "They ain't boats, mister. They ain't worth lifting off the chocks. The first smack of a rising sea on those worm-eaten sieves, and they'd go like a pack of cards. This shipping company spends money on dividends, not gear. Where do you fancy you are? White Star or Cunard?"

An' that was that.

I took a squint at Bilbee, or Clanden, or whoever he was. There was no doubt about him being all in. It didn't take no pill-roller to tell me that; an' the ship was slowly but surely lifting her tail higher an' higher towards the stars which I had been admiring so peaceful a short while back.

I left the radio cabin an' went back to try an' help Mary keep a stiff upper lip. I was scared she would go to pieces on account of the kids.

Little Squiggs was standing outside his cabin door as I went past, wringing his hands together, an' bleating like a sick sheep. I felt like kicking him in the pants, but chased him away for a stiff highball instead. One woman on my hands at a time like this was enough. Mary didn't seem to be in any danger of breaking up, and the hours passed somehow. I had a catnap an' a cup of tea laced with rye, an' once I heard a sound like tearing linen, an' thought maybe the chief mate had found a bird to liven up the emergency radio.

Day came up on a flat calm, an' a sinking ship. The sea hadn't got enough punch in it to knock out a fly. We scrambled a breakfast of sorts, an' later tucked some lunch under our belts.

The worst part, I guess, was doing so much waiting: just waiting with nothing to do. It's plain iodine on the nerves.

The well decks forward were awash, the sea slipping over the rusty plates, an' lazily crawling off again, like it was in no hurry to finish the job. The old man watched it from the bridge, but he wouldn't risk the boats until he had to.

Eight bells struck, an' I had just kidded Mary to swallow some tea an' toast, when a holla from the deck sent me leaping like a flea to the rail. Away to the westward a trail of smoke lay down along the horizon like a blue-black plume, an' yet another, fainter an' greyish, swept the rim of the sea to the east.

Believe me, those two good Samaritans were in one real hurry to do their good deed for the day, an' yet by the time they reached us you could almost have rolled a baby off the deck of the Lily of Lagonde into their boats.

It was about time the old hooker blew herself sky high, I reckoned, an' I ain't above admitting that I felt plenty good as I watched Mary an' her little flock stepping off that sinking apology for an ocean-going steamer.

Mary was sure easy to look at, her little red mouth parting in the suspicion of a smile, an' showing her white, even teeth. I—anyway, I wanted to buy a big drink for the bozo who had worked the radio, an' so soon as we were

aboard a real liner, I asked the mate of the old Lily where I could contact him.

"You can't," he grunted. "No one can. He just don't exist."

"What are you giving me?" I said quickly. "D'you mean to say you don't *know*!"

"I do," he snapped, "I don't! No one does! You remember that sheet of paper giving our position? Well, just as soon as the look-out spotted that smoke, I made tracks for the wireless cabin. Bilbee was still muttering in his bunk, but that paper had been shifted over alongside the transmitting key. That's all there is to it, mister. Now you tell me!"

I reckon I could have done, but I didn't.

"Where's Bilbee now?" I said, trying to seem as if it didn't matter two hoots, anyway.

"On this packet," he answered; "down in the sick bay. The doctor's working on him; he's in bad shape."

So Clanden had done it after all, without laying his cards face up. I couldn't help admiring the slick way he had put it across. Out of his bunk quick, but instead of gunning for me, he had grabbed that sheet of paper, an' sent the SOS on which all our lives depended, an' then flipped back into the blankets an' his malingering malaria.

Look at it which way you like, he had saved Mary an' the young O'Hanans, an' I could have forgiven him for plugging me, just for doing that one thing.



I GRABBED HIM BY THE SLACK OF HIS JERSEY. "HOW COME, FELLA?" I ASKED HIM. "ANYTHING WRONG?"

"I guess I'll take a peek at Bilbee," I said to the mate. "Suit yourself," he groused. "That is, if they'll let you. He's right down on the carpet. He should never have made the trip. He was bad enough on the way out from England——"

I took that one right on the point, an' almost heard the birdies sing.

(Please turn to page 196).

# WHAT IS HAPPENING IN RADIO

**C**APTAIN FURNIVALL in a lecture to the Royal Aeronautical Society on "Wireless and Its Applications to Commercial Aviation," predicted that short waves would be used more and more by aircraft because of the smallness of the apparatus and aërials required. And also because of the freedom from atmospherics, so often severe in the Tropics, when working on short waves.

He also referred to the increasing use of telegraphy instead of telephony. For this he gave three reasons. The apparatus required is light and inexpensive; the greater degree of accuracy obtained; and the fact that special codes helped to overcome language difficulties.

## Eiffel Tower Demonstrations

So great was the interest shown by the French public in the first television transmissions from the Eiffel Tower, that special police had to be drafted one night to the Avenue des Champs Elysées to deal with the crowd. One of the public "looking-in" rooms is situated in this thoroughfare.

## A Just-in-Time SOS

The dance music from the Vienna broadcasting station was recently interrupted for an SOS to be broadcast at the request of a dispensing chemist. He stated that certain medicine handed to an unknown girl contained a deadly overdose of a poison and should not be taken.

The doctor who had prescribed the medicine happened to be listening-in, and recognised it as for one of his patients. Immediately he 'phoned to the patient, and was told by her that the medicine had just been handed to her and she was about to take it when the 'phone rang.

## "Built-in" Aerials

The block of flats known as Carrington House, Hertford Street, Mayfair, is claimed to be the first completed building in London to be equipped with television facilities. Each flat is to be fitted with "central aerial system" to provide a unique service for the individual reception by tenants'

## Some Recent Items of General Interest

own sets of wireless and television programmes.

## Floating Broadcasting Station

The Postmaster-General's Department of the Commonwealth of Australia has granted a broadcasting licence to the motor ship Kanimbla. This is the first licence of its kind to be issued.

The Kanimbla was but recently launched, and is the first passenger ship in the British Empire to be licensed to transmit programmes for broadcasting throughout Australia from the sea to the shore.

## Television by Telephone

The G.P.O. is experimenting on the establishment of a 100-mile television line between London and Birmingham.

stalled a microphone and loudspeaker system, so that the headmaster can address all the classes simultaneously. It has been developed because the school lacks the advantage of a school hall where all the pupils can assemble at once.

At the conference of Educational Associations, Mr. J. H. Whitehouse suggested that there should be a broadcasting station entirely devoted to school broadcasts. A general all-day service was indicated.

The annual conference of the Educational Institute of Scotland closed with a demonstration of the methods used in arranging a B.B.C. schools broadcast. A breakdown in the apparatus made it necessary for one of the B.B.C. studios to be used to complete the demonstration.

## Headphones for Hospital

All the beds in the King George Hospital at Ilford have been equipped with radio at a cost of £350. One hundred and twenty pairs of headphones and six loudspeakers have been installed.

## Re-enacting Their Crimes

Convicts in Joliet Penitentiary, near Chicago, are presenting a series of radio playlets. The plays concern the crimes for which they are in gaol. Needless to say, these broadcasters will be unpaid.

## Listeners' Electricity Consumption

The International Broadcasting Union estimate that 2,420,000,000 units of electricity were used in a year by all the listeners of the world.

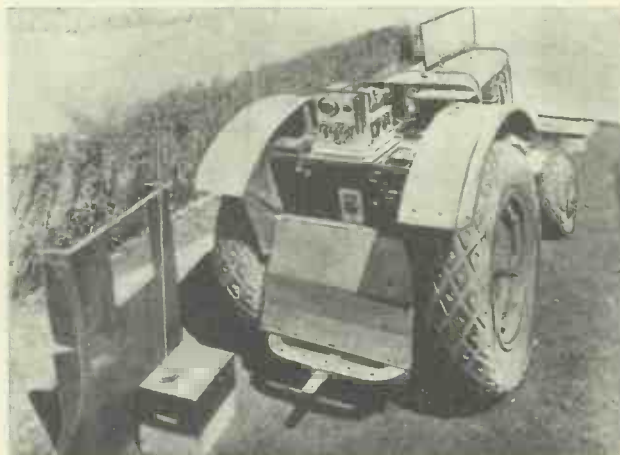
## Flying Loudspeakers

So successful have the aeroplanes equipped with loudspeakers proved in dealing with natives in Iraq, that the R.A.F. have decided to use the method on the North-West of India, and possibly in Somaliland.

## B.B.C. Appointments

Recent B.B.C. appointments include that of Mr. A. P. Ryan to be Assistant  
(Please turn to page 195.)

## A WIRELESS-CONTROLLED TRACTOR



The International Harvester Company of Chicago produce this radio-controlled tractor. Its chief advantage is that one man at the same time can manage several tractors pulling ploughs. The cover, with the vertical aerial, is seen to the left.

The idea behind the scheme is the possible provision in the future of a television service for ordinary telephone subscribers.

## Radio and Education

Three items of interest concerning the use of radio in schools are as follows:

Hyndland School, Glasgow, has in-



*An economical design for the quality enthusiast who is without the advantage of an electric-mains supply.*

*Designed and described by  
ARTHUR SMITH.*

So much for the evolution of the design. The solution is now very obvious, but I can assure you that it was not so to me when starting from scratch. After all that, the most important thing to tell you is the power consumption of this amplifier. The static H.T. current is approximately 7 milliamps, whilst the average working current is some 14 milliamps.

Messrs. Ever-Ready are supplying a specially tapped model of

## HOW TO BUILD

# A Four-Watt Battery Amplifier

**T**HE most important point about this battery amplifier is its very large output. I believe that it has a considerably bigger undistorted output than any battery amplifier yet designed and published. There would be no difficulties in designing an amplifier that could be run from batteries if there were no limitations. But there are limitations, the most important of which is the necessity for keeping the current consumption within reasonable limits. If it were not for this, mains valves could be used, with battery power supply. This would necessitate such exceedingly large batteries that it would be impracticable.

### A Knotty Problem

At first the problems involved in designing such a high-power amplifier to take its power supply from batteries seemed insuperable. However, there had been so many requests from readers of WIRELESS, that something had to be done about it! Consequently I got down to some very hard thinking. Straight triode or even pentode output was obviously impossible, as the biggest output obtainable from a battery triode is about 500 milliwatts, and from a pentode about 1,100 milliwatts. Furthermore, the H.T. current is about 20 milliamps in each case. These outputs are many miles, or rather watts, from the output I had to achieve.

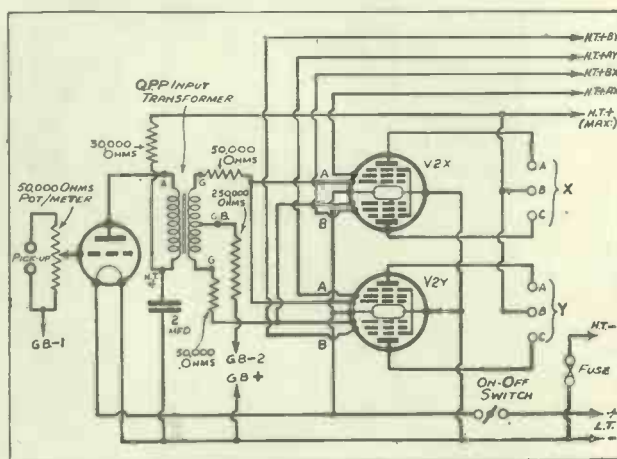
My thoughts, then, quite naturally turned to using a class B output stage. The best this could give was found

to be something over 2 watts. Still not enough of those elusive watts! Two class B valves in parallel, and the H.T. consumption, was rather excessive, although a nice fat output of about 5 watts could be obtained. From class B I turned to Q.P.P. as my last hope, and fortunately this gave the very thing required. The Mazda Q.P.240 I found to give an output of about 2 watts, with an average H.T. current of only some 6 to 7 milliamps, and with an H.T. voltage of 150. Using two of these valves in parallel enabled me to solve the problem.

their 150-volt Popular Power battery for the H.T. supply at 21s.

The L.T. consumption is .9 amp., and it is suggested that you obtain an accumulator which has a capacity of not less than 20 ampere hours actual. Of course, if the amplifier is to be used for long periods, an accumulator of larger capacity should be chosen, so that too frequent charging is not necessary. Although the grid-bias battery does not come under the heading of power supply, as it does not supply power, I would mention here that it is a perfectly standard battery of 16½ volts, of which 12 volts only are used.

### DOUBLE PENTODES IN PUSH-PULL



*This circuit diagram shows the secret of the large output. Two Q.P.P. double-pentode valves are used in push-pull, the combination giving sufficient power for dancing in a small hall.*

### Volume Available

Before going on to the construction and other practical details, a few words about the capabilities of the amplifier are necessary. It is absolutely impossible to state definitely the exact size of room or hall for which it will give sufficient volume, owing to the varying acoustic properties of different structures. The number of people in the room or hall and also the furnishings will have considerable effect.

Generally speaking, however, the volume

should be sufficient for, say, fifty or sixty people dancing in a small hall. For normal domestic use the volume is ample for even the very largest of rooms. Although designed primarily for gramophone record reproduction, the amplifier may be used to amplify radio programmes, and also as a microphone amplifier. In all cases excellent results are obtainable.

I feel that enough has been said to enable you to decide whether or not you require such an outfit, so I will

## IDEAL FOR RECORD REPRODUCTION

recommend no alternative is the transformer. You may have trouble if you use some other make, not necessarily because it is an inferior article to that specified, but because it is not suitable for the circuit as it stands.

The general shape of the amplifier is easily followed from the diagrams and photographs.

Three pieces of  $\frac{3}{8}$ -in. plywood are required. One piece for the top is 7 in. by 5 in., the other two pieces for the sides are 7 in. by  $3\frac{1}{2}$  in. The ebonite end panels are 5 in. by  $3\frac{5}{8}$  in. The construction of the container —one can hardly call it a cabinet —is carried out in the following order: First drill

the holes for the valve holders in the piece of wood which is to be the top of the container. The holes for the two output valves ( $V_2X$  and  $V_2Y$ ) are  $1\frac{1}{4}$  in. in diameter and that for  $V_1$  is 1 in. in diameter. These are most easily cut with an adjustable centre-bit, but if you do not possess one, they can be cut quite well with a key-hole saw or fret-saw. Next drill the holes for the terminals and volume control in the ebonite end panels. Now fit terminals and volume control to panels.

### The Final Touches

The finished pieces are now screwed together, with countersunk screws. If you decide to polish the woodwork, these screws should be sunk below the surface and filled in with plastic wood. Those in the ebonite end plates should be sunk flush with the surface, and brass or nickel-plated screws look and keep better than iron.

Having finished the container, the components are screwed in position, and after this the wiring may be done. There is just one very important point I should like to remind you of

### COMPACTLY ARRANGED

here, and that is to make sure that you have mounted the 9-pin valve holders the right way round. The filament pins are numbered 4 and 5 and may be identified by the fact that one of the fixing screws is situated between them.

There is no particular order in which the wiring should be done, but I advise you to mark off each wire on the practical wiring diagram as you put it on. When you have them all marked off, you will know that the wiring is complete. Make sure that you mark the ends of the leads to the screening grids correctly (these are marked HT+AX, HT+AY, HT+BX,

*Although the design is compact, the accessibility of the components is ample to permit of easy wiring, a point which is assisted by the type of valve holders employed.*



### EVERYTHING YOU WILL NEED

- 2 Clix 9-pin chassis-mounting valve holders with screw terminals.
- 1 Clix 4-pin chassis-mounting valve holder, with screw terminals.
- 1 Varley Q.P.P. input transformer.
- 1 Erie 250,000-ohm 1-watt resistance.
- 2 Erie 50,000-ohm 1-watt resistances.
- 1 Erie 30,000-ohm 1-watt resistance.
- 1 Dubilier 2-mid. fixed condenser, type B.B.
- 1 Erie 50,000-ohm potentiometer with switch.
- 8 Clix indicating terminals, type B.
- 2 Peto-Scott ebonite panels, 5 in. x  $3\frac{1}{2}$  in. x  $\frac{1}{8}$  in.
- 1 Piece plywood, 7 in. x 5 in. x  $\frac{3}{8}$  in.
- 2 Pieces plywood, 7 in. x  $3\frac{1}{2}$  in. x  $\frac{3}{8}$  in.
- 8 Clix Wander plugs.
- 1 Belling & Lee Wander fuse.
- 2 Belling & Lee Accumulator spades.
- 1 Coil B.R.G. "Quikon" connecting wire.
- Screws, flex, etc.

$V_1$	VALVES	$V_2Y$
Cossor 210 H.F.	$V_2X$	Q.P.240
	Mazda	

#### BATTERIES

- L.T.—2 volts Exide.
- H.T.—150 volts Ever Ready "Special Popular Power."
- G.B.—16 $\frac{1}{2}$  volts Drydex.

Loud Speaker  
W.B. "Stentorian" Senior.

now proceed to more practical things. A short description of the complete circuit will no doubt be of some interest to most readers, so here it is: The input is fed via a 50,000-ohm potentiometer volume control to the grid circuit of a triode amplifier valve of the H.L. class, the anode of which is fed to the primary of a Q.P.P. input transformer. The outer secondary terminals of the transformer are connected in this manner. One via a 50,000-ohm resistance to the control grid A of both  $V_2X$  and  $V_2Y$ , the other to the control grid B of both  $V_2Y$  and  $V_2X$ . The four screening grids of the two output valves each has separate H.T. leads; this will be explained later in the installation hints. The anodes of the two output valves are taken to separate output terminals, so that one loudspeaker may be used on each valve, or the outputs may be paralleled and one loudspeaker only used.

### Constructional Details

That concludes a brief description of the circuit used. So now we come to the actual construction: It is first necessary to obtain the few components which are required. The only component for which I can recom-

and HT+BY in the diagram). This is important, in order to match the output valves properly.

When the wiring is completed, the valves may be inserted, the batteries, loudspeaker and pick-up connected, and then the amplifier is ready for action. However, I have quite a lot to say about these connections, and I want you to read carefully. There is nothing difficult or terribly critical, but everything must be done correctly.

### Voltages to Use

I will first deal with the battery connections: The L.T. accumulator is connected in the normal manner. Nothing out of the ordinary here. The G.B. connections are: G.B.+ to + of G.B. battery, G.B.-1 to 1½ volts negative, and G.B.-2 to 12 volts negative. The value recommended by the valve manufacturers is actually 11½ volts, but 12 is perfectly satisfactory. Most important of all are the H.T. connections. H.T.- is connected to - of H.T. battery. H.T.+ (max) to 150+ on H.T. battery. That is quite straightforward. Now we come to the remaining H.T.+ connections, namely, H.T.+AX, H.T.+BX, H.T.+AY, H.T.+BY.

The letters X and Y refer to the two output valves. The letters A and B refer to the letters on opposite sides of the bases of the valves. Above the letters on the bases there are letters on the glass envelopes of the valves. These letters decide the voltage to apply to that particular screening grid of each valve, and the necessary voltages are obtained from the pam-

phlet supplied by the valve manufacturers. For example, if valve X has P on the glass envelope over A on the base, then the voltage to apply to H.T.+AX is 112.5, and so on. I hope I have succeeded in making this quite clear. It is really all very simple,

fit screening if necessary. The screening should be connected to the pick-up terminal which goes to the grid-bias side of the volume control, that is, the top one.

Any pick-up of reputable make will be satisfactory, provided it has an

### DIRECT CONNECTIONS FOR THE BATTERIES



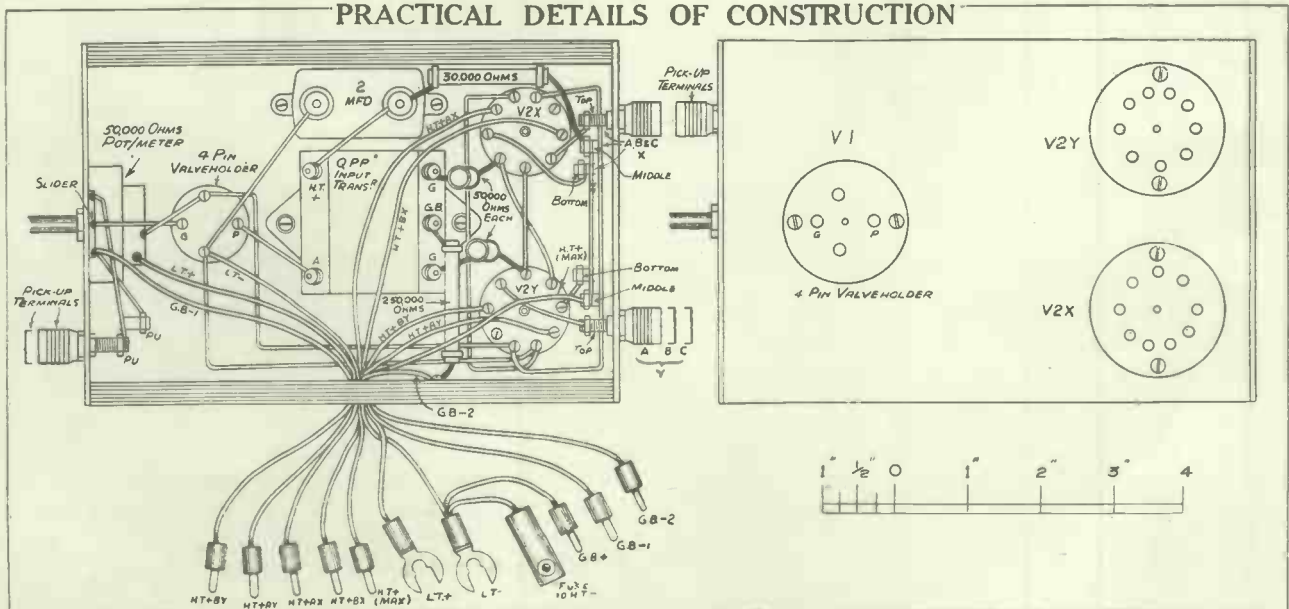
*There are no terminals apart from those for input and output, the leads for the batteries being brought out at the side of the case. These can be seen behind the valves in this photograph.*

but also very important that you should get it right.

Regarding the pick-up, I found it necessary to use screened leads. Most modern types have these fitted. In any case, it is quite an easy matter to

output of not less than about one-tenth of a volt, a figure which is exceeded by practically every pick-up on the market at the present time. The value of the volume control fitted is suitable for most pick-ups. Should you use a pick-up with a volume control incorporated, that in the amplifier may be omitted, and the

### PRACTICAL DETAILS OF CONSTRUCTION



*Here are the wiring and layout details. No dimensioned drilling diagram is needed, as approximate positions for the valve holders, terminals and volume control will be satisfactory in practice.*

## IN WORKING TRIM



*This is how the amplifier looks when connected up and working. It is impossible to put the valves in the wrong positions due to the two types of holders employed.*

grid of  $V_1$  and G.B.—1 connected straight to the pick-up terminals.

The output terminals are arranged in two rows of three terminals each.

One set of three may be used for one loudspeaker, and the other set for another loudspeaker. On the other hand, should one loudspeaker be used and the full output be required, connect A terminal of X output to A terminal of Y output, and B of X to B of Y. Then connect the loudspeaker in the normal way to either set of output terminals. The letters A, B and C in the diagram refer to the letters on the "Stentorian" loudspeaker specified. When using two loudspeakers, they should be adjusted to have

a load resistance of about 16,000 ohms, and when one is used to about 8,000.

To obtain the best results I would advise the use of large baffles for the loudspeakers. Three feet square is not too big. This not only aids quality but also increases the overall volume to a really surprising extent.

This amplifier was designed primarily for the reproduction of gramophone records for dancing in small halls, where electric power supply is not available.

It was mainly for this reason that the output was split, so that a loudspeaker could be used at each end of the hall and thus giving a better sound distribution.

## For Home Use

This, of course, is not the only use to which the amplifier can be put. It can be used in the home for really first-class reproduction of records. Of course, the H.T. consumption is somewhat more than the average battery wireless receiver, but the fact that it is used for comparatively short periods makes it really very cheap to run.

Although the full volume would not be required in the normal room, the volume may be kept down, and there would be no sign of overloading on peak passages.

## WIRELESS IN THE WILDS

—continued from page 151.

Despite the heat of the sub-tropical sun and the fatigue which overcomes workers in the Near East who have been up since sunrise, they seemed quite content to spend the couple of hours at their disposal listening-in, and as the programme gave at intervals one or two of the folk songs they all knew, they would occasionally join in and sing most beautifully to the melody given forth by the wireless, with all that fervour which is characteristic of the Southern race.

But for sheer incongruity, nothing has touched my experiences in Morocco, where I journeyed on a donkey through the lesser-known tracks, dressed as a Moorish woman, in order to hear, unobserved, the songs of the people.

Harem life still continues in Morocco, and very delightful were the hours I spent within the cool courtyards of the harem quarters of several of the more important native houses. All the old superstitions remain, too, in Morocco, as I discovered when I was invited to join the four wives of one harem, all garbed in white flowing garments and, of course, completely veiled, on their expedition to a famous saint's tomb, where they reverently placed tokens and charms, asking for exemption from ill-fortune at the same time.

It was somewhat of a shock to be escorted by the charming dark-eyed women to a modern and sumptuous motor-car, fitted with orange glass windows so that the women should not be seen by people in the street.

Very soon after we started for the shrine, which was situated on the desert some eight miles distant, I realised

the truth of what I had been told the day before—namely, that there is no speed limit in Morocco! We tore along, scattering the natives to right and left, at a pace which I noticed registered 90 miles an hour!

After our return to the harem quarters my hostesses discarded their voluminous outdoor dress, to display the lovely vivid silk dresses so dear to the heart of the Moroccan women, complete with silk handkerchiefs worn on the head and tied in a knot in front.

Then came the incident which made me wonder if I were actually living in the world of to-day, or dreaming of the fantasies of Arabian Nights!

Clapping her hands as a summons, the lady-in-chief called out a command in Arabic and, without more ado, Fatma, the old and faithful Negro slave, wearing a large brass ring through one ear to denote her servitude, carried in one of the latest models of a portable wireless.

## Modern Music from Europe

Henna-tipped fingers handed me a bowl of delicious mint tea, and kohl-tinted eyelashes fringed the eyes of the smiling harem audience as, seated on the cool divans, we heard the modern music from European capitals.

Smoking tiny cigarettes, we listened-in until the sun dropped down with the suddenness one becomes accustomed to in the tropics, and as I took my reluctant farewell the thought flashed through my mind that several old slogans and sayings will shortly have to be revised, and the one in particular which will soon be obsolete runs:

"East is East and West is West and never the twain shall meet,"

for on that day they did indeed make more than a nodding acquaintance.



# A Word On SOLDERING

By R. O. COLLINS

*There's nothing mystic about successful soldering. There need not even be anything difficult; and here an expert gives just that small amount of help the inexperienced require.*

**T**HE password to successful soldering is cleanliness.

I know you have read that eighty-five times already, but have you taken any notice—real notice?

Did you ever read that delightful story of the native cook whose cookery book commenced with the injunction to "clean the hands carefully, using a nailbrush"? The cook, you will recall, did not altogether see eye to

### TO SAVE YOU TIME

*The photo at the top of this page shows a useful idea. The three tin lids, screwed to a piece of wood, contain two sorts of fluxes and solder for tinning. The clip holds the stick of solder, and there is also a piece of broken file for cleaning the iron.*

eye with the cookery book, but did, occasionally, go so far as to wipe his hands on his pants.

Perhaps, consciously or unconsciously, you have, in the past, applied his somewhat rough-and-ready method to soldering. I have met people who clean nothing, tin nothing, and use the iron just as it comes from the shop. Their efforts do not meet with success, and they say that somehow or other they just can't get on with soldering.

No one using their methods could.

Yet soldering—or, at any rate, wireless soldering—is simplicity itself.

### Size is Important

Let's begin with the iron, which may be purchased at any reliable tool-shop. The principal consideration in making the purchase is that of size, especially if it is not an electric iron. The larger the iron the longer it retains its heat, but a really large iron is far too clumsy to reach into all the nooks and crannies of a wireless set.

There is no virtue in having it so large that you can't use it, and you will therefore plump for the happy medium. Besides the iron you will

require a stick of solder, some soldering paste, and a fine or medium file.

When you arrive home you will have to get hold of a soldering cloth, and your success in this direction will depend upon the state of subjection to which you have reduced your wife. The real hundred per cent "he-man" will have her tear up a sheet; but this is, perhaps, going too far. All that is required is a clean white duster—but it must be clean. Remember that you are—or should be—master in your own home, and do not let yourself be fobbed off with a rag which has been used for metal polish.

My own method is to take a duster and say nothing.

### The First Process

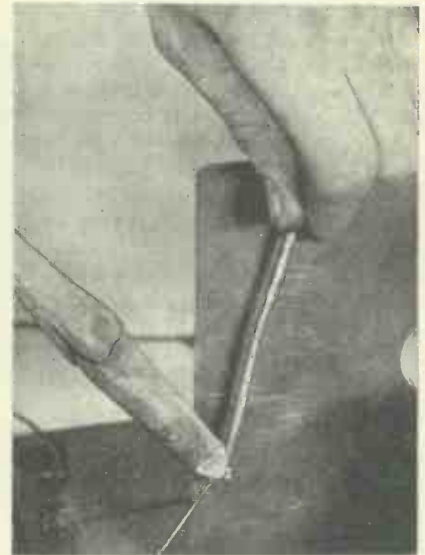
The bit of the ordinary soldering iron has four faces, and before anything at all can be done these faces require to be "tinned," or "plated" with solder.

For the purpose of tinning the iron must not be heated to the extent which will be necessary for the actual solder-

ing. When it is just hot enough to melt the solder remove it from the gas-ring and file its faces until they are bright.

If they discolour rapidly after filing the iron is too hot, and may be allowed to cool for a moment or two. Beware,

### TINNING A WIRE



*When tinning the end of a wire it is a good plan to steady it against a piece of wood slipped in place for the occasion.*

### HEATING THE IRON



*On the left is a useful rest to employ when the iron is heated with a bunsen burner. It is self-explanatory and takes only a few minutes to rig up.*

however, of overcooling, or you will produce surfaces of beautiful and lasting brightness, only to find that the iron is too cold to melt solder.

As soon as the filing is done—and it must be done quickly—dip the iron in the paste and touch it with the solder. Sufficient solder will adhere to the iron to cover the four faces, and it should be wiped over them with the cloth. When the four faces shine like silver the iron is “tinned” and ready for use.

### Preparing the Work

Solder will only adhere to it, however, and it can only be used for so long as the tinning remains in perfect condition. If the “tinning” is injured either by allowing the iron to reach red-heat or by dirt, the iron should at once be re-tinned. After very little practice the tinning operation takes but a few moments, and these will save many minutes of fruitless effort on the actual work.

Having tinned the iron, melt some solder into a clean tin lid. The solder on the iron can then be replenished as the work proceeds by dipping the hot bit into the tin lid, a much less wasteful method than taking the solder direct from the stick.

The iron, having been prepared, may be set aside while operations are commenced on the work which is to be soldered. The process to be followed with the actual soldering may best be described step by step:

1. Clean the two surfaces which are to be united, using emery cloth, a knife or a fine file.
2. Immediately each surface is cleaned coat it *lightly* with soldering paste.
3. While the above work is in progress the iron should be on the gas-ring. A green flame appears as it heats, and it may be left on the ring for a moment or two after the appearance of this flame.

### Don't Forget to Wipe

4. The iron being hot, remove it from the gas-ring, wipe it with the cloth, dip it in the tin lid, and apply it for a moment to the cleaned surfaces in turn.

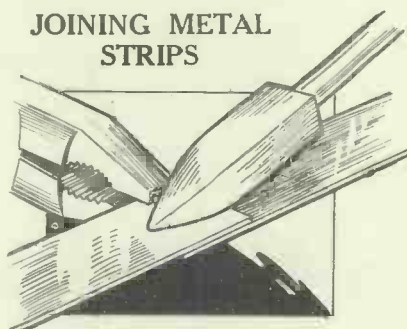
5. At this stage a coating of solder is firmly affixed to each surface, and all that remains is to merge the two coatings. Smear each lightly with soldering paste, hold them together (with pliers if need be), and apply the iron. The solder on both surfaces will then melt and merge, the result being a clean and strong joint.

## THE RIGHT PROCESS TO FOLLOW

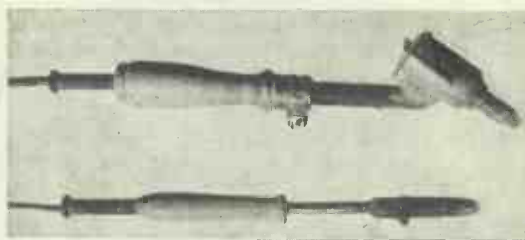
To tin good quality connecting wire is, of course, gilding the lily. It is a good plan, however, to melt some solder on to each soldering tag. The connecting wire can then be dipped in the soldering paste, held to the tag, and jointed by the application of the iron.

When soldering wire to grid-leak holders the leak should always be

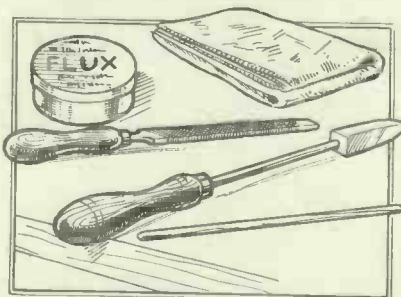
### JOINING METAL STRIPS



*When joining two metal strips, first tin them and then hold them firmly together with pliers while applying heat by means of the iron.*



*If you have electric mains, don't hesitate to get an electric soldering-iron. It is well worth while. Two popular types are illustrated above.*



*The essentials for good soldering: iron, file, solder, flux and clean cloth.*

removed before operations commence, as heat injures it. Great care should also be taken with such components as transformers and chokes, as it is possible to melt their internal connections.

It is best, however, to approach matters boldly. Injury is less likely to result from the momentary application of a really hot iron to a really clean tag than from six bungling attempts

with a semi-hot iron. The iron must always be sufficiently hot to make the solder liquid. It is impossible to make a clean or strong joint with an iron which is only hot enough to smear the solder into an untidy pasty lump.

Try to pretend, too, that soldering paste is worth a guinea a box. If too much is applied it runs all round the joint and terminal and gathers dirt, to the detriment of the joint. All surplus paste should be removed before the joint cools, the terminal nut being removed if necessary.

### Monotonous but Desirable

If you are tackling a whole set, it is as well to do all the tinning of soldering tags at the very outset. This may be considered a monotonous method, but it saves much time on the actual wiring. It is infinitely easier to work on the components before they are fixed in inaccessible positions on baseboard and panel. A tag in the pliers is worth two in the set!

When you have finished the work and the last joint is cool, tighten all nuts.

## RELAYING EUROPE

A SPECIALLY built isolated receiving station for transatlantic reception has recently been completed for the Canadian Radio Broadcasting Commission, and will be used in connection with a daily service of overseas programmes on its national coast-to-coast network.

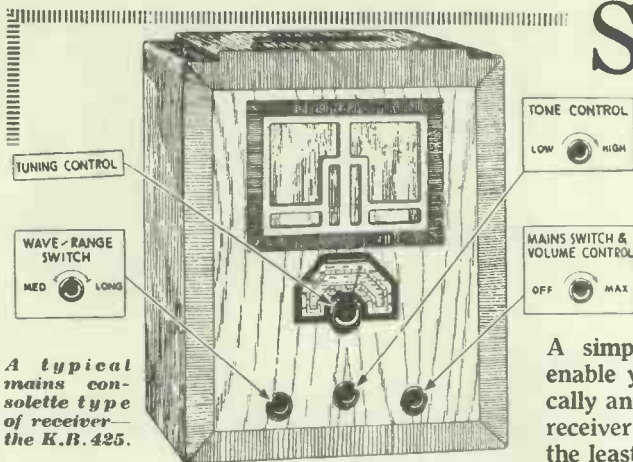
The new station is situated ten miles west of Ottawa on a twenty-acre site, far enough from the travelled highway to do away with noises from the ignition system of motor-cars, which often mar short-wave reception. The station has two receivers of the latest design made by the Canadian Marconi Company. These two receivers have their output connected to a blending panel, and the synchronised reception is fed by telephone line to C.R.C.O., the Ottawa Commission station, as well as to the telephone network which connects the national chain of stations.

The inauguration of this short-wave station is part of the plan for the nationalisation of Canadian broadcasting laid down by the Aird Commission which recommended nationalisation in 1929. Up to now transatlantic programmes have been fed to Canadian stations through the commercial short-wave radio telephone systems and the receivers of the United States broadcasting systems. J.M.



# Set Installation

## FOR THE NON-TECHNICAL



A typical mains console type of receiver—the K.B. 425.

A simple guide that will enable you to install practically any type of commercial receiver without requiring the least knowledge of radio.

By K. D. ROGERS

If you were asked by a friend to come and fix up his commercial set, would you be able to do it? How would you set about the task of getting that set fixed up to a reasonably good aerial and earth and running properly?

### Look at the Aerial

I think you can assume that some sort of aerial is ready for you, but even so the first thing you would have to do would be to have a brief look at the aerial and the earth to see if they were reasonably efficient.

Without knowing anything about radio you can tell that by a short examination. The aerial wire should be as high as possible and as far away from the house as can be. Something like 50 feet of wire is enough, and where the wire enters the house it should either be insulated by means of an ebonite tube, or consist of insulated wire. Bare wire going straight into the house is likely to prove inefficient in wet weather, though it will not stop the set from working. It will merely reduce the strength at which distant stations are received.

### Direct Leads Best

Inside the house the wire should go as straight as possible to the set, not wander all round the room. If it has to go round the room it should be kept well away from the earth wire. One plan is to run the aerial round the picture rail and the earth wire along the skirting, using insulated wire in each case.

The earth wire must go either to an earth pin in the ground outside the house or to a waterpipe somewhere in the house, and the main thing to remember is that the wire should be as short as possible, so if the waterpipe is nearer to the set than the outside ground, choose the waterpipe. But

remember it must be a pipe that is going to the water main, and not just a hot-water pipe, or a cold-water pipe going off to a cistern somewhere.

Any thick copper wire will do for the earth wire. Ordinary house flex is all right if a waterpipe earth is used, but if an outside earth connection is employed it is best to use some stout weather-resisting wire like the aerial

wire. This must always be of stout material.

In many cases the aerial has to be stayed away from the walls of the house as well as supported on a pole or tree at the far end. Where it is so supported, whether by tree, pole, or the wall of the house, it should have an insulator so that the aerial wire itself does not touch the support.

### Power Connections

With the aerial and earth wires reasonably to your satisfaction have a good look at the set. If it is a mains receiver the power supply will be obtained by plugging a lead supplied with the set into the electric light or power supply. If it is a battery set the power will be obtained from batteries, of which two are required. One is an accumulator, and the other a dry H.T./G.B. battery. Sometimes a separate battery will be used for G.B.

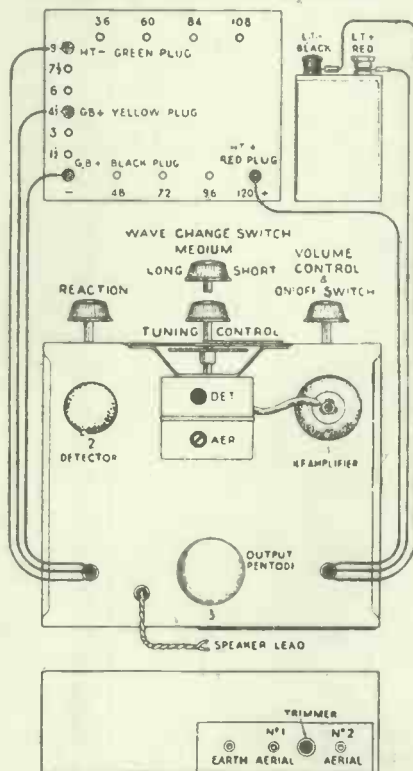
There will be leads or terminals at the back of the set for the connections to the batteries, and these will be marked L.T.+ and L.T.— (or perhaps with red and black markings against the letters L.T.) for the accumulator connections, and H.T.+ and H.T.—, or red and black again for the dry battery connections. There may be several H.T. leads marked H.T.1, H.T.2, and so on, and reference to the instructions with the set will show the voltages in the battery into which the various H.T. wires have to be plugged. Similarly, there will be G.B. battery leads to connect whether a separate G.B. battery is used or not.

### Supply Ratings

In the case of a mains set, all that has to be done is to plug the mains plug into the electric light or power socket AFTER you have examined the set and seen that the voltage adjustment is right for the voltage of the mains.

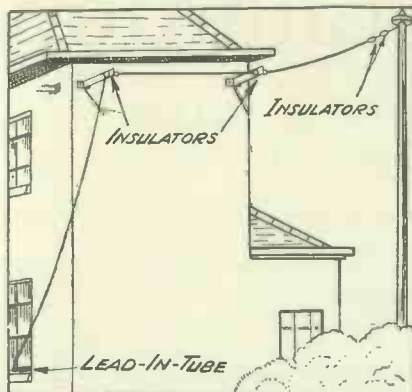
To do this you first of all find the voltage of the mains by the simple expedient of examining the voltage marked on one of the lamps used by your friend for lighting the house. Then have a look at the back of the set, if necessary removing the back

### FITTING THE BATTERIES



Many battery sets are provided with long leads fitted with plugs for insertion in the H.T. battery and with spade terminals for the L.T. accumulator. Here is a schematic diagram of the Vidor all-wave battery set, showing the battery connections as well as the controls.

**FIXING THE AERIAL**



When an aerial has to come along the side of the house, stand-off insulators should be used, as shown, to keep the wire away from the wall.

which is usually a thin piece of wood or fibre attached by a few screws.

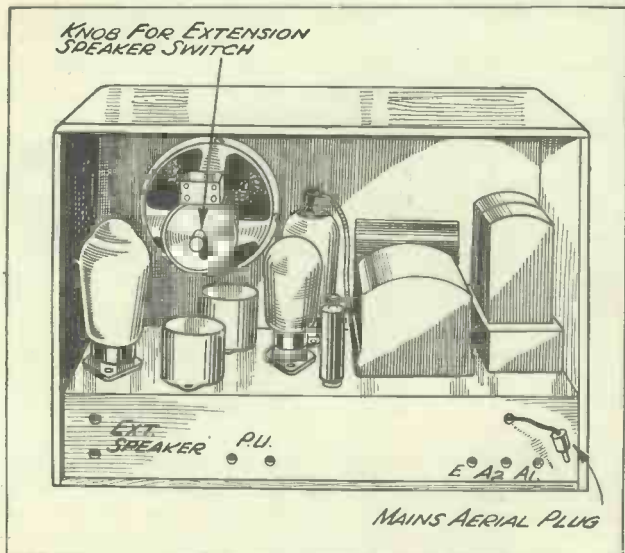
Inside you will find that there is a plate on which is a row of sockets, or screw tags. These will be marked in most cases 200, 220, 240, or perhaps every ten between 200 and 250. Into one of these sockets, or on to the screw terminals, you will have to fix a lead that is supplied already fixed at one end to the set. Probably this lead is already fixed in the socket or to the terminal with the highest marking.

**Setting the Screw**

This must be attached to the socket or tag marked with the voltage of your mains, or with the marking nearest to that voltage.

Possibly the sockets will be provided with one screw which has to be inserted in the socket with the marking

**AT THE BACK OF THE SET**



This set chassis has the usual extension speaker sockets and a speaker switch on the back of the loudspeaker in the set. Note also the plug which is inserted in A1 or A2, when a mains aerial is required.

corresponding with the voltage of the mains. The actual method employed will vary with the set.

At this juncture I should remark that you should ascertain whether the set is for D.C., A.C. or "Universal" use. If the former it means that it must be used with D.C. only (direct current) mains. If it is marked A.C. it must be used with A.C. only (or alternating current) mains, and if it is marked "Universal" it can be used with either.

Therefore, before you connect up, make sure that in case the set is marked D.C. or A.C. that your friend has the right sort of mains. You can find that out by looking at the meter, which will be marked D.C. or A.C., or instead of these it may have "continuous current," or the sign  $\sim$  (or alternating current), denoting either D.C. or A.C. respectively. Sometimes the meter just has the voltage marked and "50 periods" or "50 cycles." If so, it is an A.C. meter and the mains are A.C.

With all this settled, adjust the set according to the mains voltage, and before plugging in the aerial and earth leads, which usually go into a couple of sockets marked A and E, plug the mains plug in and switch on the set. See that the dial-light lights up and that the valves glow.

You may find that you will have to turn the volume control on the set to the right in order to switch it on, or there may be an on-off switch on the set. The volume control will be found near the tuning control on most sets, and will be marked

"volume" or "increase." If there is a separate on-off switch you may find that on the side, or even in a few cases at the back of the set.

**Aerial Variations**

With the set lighting up properly, switch off and connect the aerial and earth. Some sets have two aerial terminals or sockets, marked A1 and A2. One is for use with the set when tuned to the local or a powerful station, and the other for use when the set is used for distant reception. It does not matter which you use now, for you will be concerned at first with getting the local.

There may be another aerial terminal or socket for use as mains aerial. In this case the ordinary aerial is not connected and a special lead supplied with the set is plugged into the mains aerial terminal. Sometimes a flex and plug are attached and must be plugged into the aerial socket for "mains aerial" working. The outdoor aerial is not then used.

In many sets there are other little oddments at the back that may puzzle you. Ferranti have a knack of placing an extension speaker switch on the back of the speaker in some of their models, while most set-makers have sockets for the use of extension speakers.

These are usually clearly marked, and do not concern the operation and installation of the set.

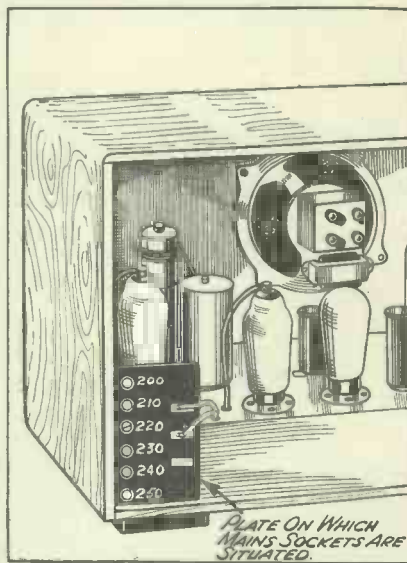
**Concerning the Valves**

I have assumed so far that the valves have all been in position. In many cases the sets come with the valves in position but wrapped up (in which case the wrappings have to be removed), or else they arrive with the valves out of place and contained in separate cartons.

In such a case, unless the directions for the valve positions are provided or are marked on the set itself, it is often almost impossible to tell which valve goes in which socket. If you are not

(Continued on next page.)

**THE MAINS VOLTAGE**



Many sets have a plate situated somewhere inside with screw adjustments for setting the receiver for the correct mains voltage. In this illustration the screw has been inserted in the 220-volt socket.

### SET INSTALLATION

—continued from previous page.

clear which valve goes into which socket you should get in touch with the makers and find out where they should go. Do not try various combinations in the hope of getting the right one. You may do incalculable damage.

Do not forget to switch on before trying the set and to see that the wave-change switch is correctly set. You will be very disappointed with the results if you try to tune-in the local station with the switch at "gramophone." So will you be if the volume control is not fairly well turned to the right.

### Visual-tuning Devices

If the set is fitted with a light indicator of the best position of tuning, or with a little moving wire, you should tune to the point that gives either the brightest light, the dimmest light, the highest or lowest position of the light "rod," or the highest or lowest position of the moving wire. It depends on the set which system is used, but if you note the position, or the degree of light, when the set is not tuned to any station, and then tune-in a station you will see which way the device moves, and can then continue the tuning until movement in that direction is at maximum. That is the correct tuning point.

### SHORT WAVE DEVELOPMENTS

—continued from page 159.

Many high-powered commercial stations have a "tail" one-seventh of a second behind them, on account of their signal going right round the world and arriving a second time at the receiver.

The lower-powered amateurs, however, don't often do this, and the queer effect that one notices on them is due to their signals arriving by two different paths. The slight difference in the two times is sufficient to produce this ringing effect.

A few days ago I was lucky enough to log a very queer phenomenon—a station with an "echo" that was louder than the main signal itself. This meant, of course, that the signal which was going right round the world was stronger than the one that arrived by the more direct route.

This isn't an easy subject to investigate with real scientific precision, but

listeners can help considerably by virtue of the large mass of data that can be compiled from their logs.

Signals from the Antipodes *never* echo. In this country the most frequent offenders are those on the West Coast of the U.S.A. and Canada, and certain stations in South America.

If you are not lucky enough to hear the next stratosphere broadcast, keep an ear open on Moscow's wavelength, and you may run across something almost as interesting. Parachutists are now being equipped with midget short-wave transmitters, and it is planned to broadcast the "running commentary" of a parachute jumper

during his long downward journey. If anyone can now think of any type of mobile unit on which radio has *not* been tried, I should be glad to hear of it! Cars, trains, planes, ships, submarines, gliders, perambulators and *parachutes!* The only thing left seems to be the scooter with a world-wide range. Budding inventors, forward.

A SPECIAL FEATURE NEXT MONTH WILL BE:

ALL ABOUT INTERFERENCE SUPPRESSORS

The types to use and how to fit them

# EXCLUSIVELY SPECIFIED

for the

## 1936 EMPIRE SUPER

and the

## FOUR-WATT BATTERY AMPLIFIER



Point by point, from cone periphery to "Microlode" switch, W.B. engineers have explored their highly successful first "Stentorian" to find possible avenues of improvement.

They have designed a larger "Microlode" device with new section winding and interleaving, to take high-note response another 900 c.p.s. higher. They have perfected a new and larger "Mansfield" Magnet, 15% stronger than its predecessor. A new handmade cone reduces "focussing," and eliminates frequency doubling on music passages; and innumerable further detail refinements take their part in bringing a standard of realism and volume never before possible in a commercial instrument.

In the words of "Wireless," the new 1936 Stentorian quality is indeed "an achievement to be proud of."

Only by hearing one can you appreciate the striking improvement this new speaker brings. Try one on your set today. You will be astonished!

#### 1936 STENTORIAN

Senior Chassis	42/-
Junior "	32/6
Baby "	23/6
Midget "	17/6
Stentorian Duplex	84/-

#### CABINET MODELS

36S	63/-
36J	49/6
36B	29/6



Send this advertisement, with your name and address for interesting illustrated booklet:—

"36 HINTS FOR IMPROVING AN OLD RADIO"

# 1936 STENTORIAN

PERMANENT MAGNET MOVING COIL SPEAKER

Whiteley Electrical Radio Co., Ltd. (Electrical Dept.), Radio Works, Mansfield, Notts.

# BERTHE GROSSBARD *of the* ROME STATION

*in its efforts to "educate" European listeners in the many-sided aspects of the Fascist regime, the Italian station at Rome makes use of a team of no fewer than seventeen multilingual announcers, among whom Berthe Grossbard is numbered. Many listeners in this country will have heard Miss Grossbard's weekly talk in German on the amenities of Italy.*

**A**CTRESS, programme compiler, radio journalist—and now, after many years of experience in European broadcasting, Berthe Grossbard is one of the vast team of "announcers" at the Rome station.

When she was over here for one of her special programmes she told me something of her life in Italy—or, perhaps I should say, of life generally in the Eternal City.

"My flat in Rome," she exclaimed—for everything the lady says is an exclamation—"is situated in one of the most beautiful spots in the city. It is in the famous Pinciano, a kind of garden on a hill, if you understand me.

## A Superb View

"You must come one day and see the view. It is superb—especially of the sunsets. I can see, from my window, the spires of St. Peter's. And when the sun goes down behind San Pietro—it is a divine sight. I can't describe it to you. It is indescribable. But I am sure it is one of the most wonderful sights in all the world.

"My life in Rome? It is the same as anyone else's, of course. I, personally, am a passionate devotee of early rising. But in Rome no one can be passionate about that. There is, how shall I say, a certain heaviness in the air. One doesn't feel very good in the early morning in Rome—not as one does in Berlin or London.

"But we waken ourselves with black coffee. The Italians drink a great deal of black coffee, you know. I have your English tea, myself, with perhaps a little roll. No, no, we do not eat your enormous English breakfasts! But I'll tell you something. When I am in England I always eat a great plate of bacon and eggs for breakfast! It is all so different here.

"When do we eat? Well, lunch is a great meal in Rome. We start, of course, with spaghetti—but you must remember there are dozens of different kinds of this marvellous dish. It is



BERTHE GROSSBARD

very good stuff—but if you eat too much you are apt to lose your line!

"Always one starts with spaghetti. Then, perhaps, some meat, fish, salad, cheese, fruit. This is the standard menu. If you go to a hotel it will never vary.

"After lunch? One sleeps, assuredly. Everyone does. Between 1 p.m., when most folk have finished lunch, and 4 p.m., nothing moves. Everyone rests. It is the only thing possible.

## Business in the Evening

"Business people arrange to meet at 6 p.m., when they go on working until perhaps 9 o'clock. Then dinner, usually from 9.30 to 10 p.m. After that the opera, yes? Most of the operas begin around 9 p.m., and go on until midnight—or even until an hour after that. And so to the coffee houses and bars that abound in Rome,

to talk until one is tired. Yes, we go to bed rather late!

"But please do not think we only eat and sleep. There is, to the visitor, no external sign of bustle in Rome. Everyone seems to be taking his time. But then it is the Eternal City, with eternal time to spare. There is—how shall I say?—an inner excitement one senses almost as soon as one enters Rome.

## Open on Sundays

"It is very restful after the bustle of other cities. Suppose you call on a Minister. He does not ask you your business. Oh no. 'How are you?' he asks, 'and how did you sleep,' and so on. Only as a sort of afterthought does one mention business!

"They are not lazy people, though, for most of the offices open on Sundays—at least, in the mornings. Hard work is often done at such times. For there are then no visitors to pass away the time!

"It is because of this Roman habit that I love your English Sundays so much. I am never likely to overcome my amazement at the way your great city of London suddenly shuts itself right up on a Sunday. The peace of it, the quietness, it is wonderful.

"No wonder, I say, you are such an energetic people! You have your Sunday as a complete rest. You awake on Monday a re-born person! Never must you allow your peaceful Sunday to change. I only wish Continental countries would follow your example."

Thus speaks Viennese-born Berthe Grossbard. She loathes to talk about politics. I don't wonder. She must hear quite enough from the signorinas around her.

A. H.

## SOME NEW SHORT-WAVE SOCIETIES

We have received letters from readers in several parts of the country, asking to be put in touch with other readers in the same localities, with a view to forming local societies.

Below are published some of the addresses of the readers concerned. In some cases the societies have already been formed, but still have room for many more members.

We invite correspondence from other readers who are desirous of obtaining co-operation from their own particular areas.

Salisbury and District:

Mr. C. A. Harley, 85, Fisherton Street, Salisbury, Wilts.

Monmouthshire and South Wales:

Mr. R. V. Allbright, G 2 J L, 2 Palmyra Place, Newport, Mon.

North Shields (Society already in existence):

Mr. G. A. Lce, 41, West Avenue, Balkwell, North Shields.

North Manchester (Society formed last October):

Mr. R. Lawton, 10, Dalton Avenue, Thatch Leach Lane, Whitefield, Lancs.

Swindon and District:

Mr. W. C. Barnes, 7, Surrey Road, Swindon.

Bezley, Kent.

Mr. N. H. Habben, 37, Penhill Road, Bexley.

**MODERN INSTRUMENTS**

—continued from page 144.

Then there are the remaining two models which cover ultra-short waves as well. The range is 5 to 100 metres, and the unit plugs direct into the receiver. The mains version costs £3 15s. 0d. and the battery model £3 2s. 6d.

Wright & Weaire, Ltd., of 740, High Road, Tottenham, London, N.17, have one kit model converter available. The parts required cost £2, and a further £1 19s. 6d. for coils and valve.

The valve is of the triode pentode type, and acts as oscillator and mixer. The intermediate frequency utilised is 600 kilocycles, so the broadcast set has to be tuned-in to the region of 500 metres. Wavechange is achieved by changing the plug-in coils in use.

**BEFORE BROADCASTING CAME—**

—is the title of an outstanding article next month giving the stories of famous radio personalities before broadcasting came into their lives

**A NOVEL AERIAL AND EARTH SUGGESTIONS WORTH TRYING**

THE following novel aerial and earth ideas were thought out to overcome all unsightly wires running down walls, round skirting boards, and picture-rails, etc. They have been tried, and proved satisfactory in the writer's case.

Instead of using wire for an aerial, the writer, when wallpapering the room in which the set stands, procured a tin of metallic paint and covered the wall standing at the back of the set with this. After the paint was dry the wallpaper was used in the ordinary way to cover it over.

The connection to the set was made with a small piece of flat tin lying against the metallic paint, and positioned behind the cabinet.

The above idea is useless where the wall is damp.

If you are interested in short-wave work, which more often than not condemns the use of long, straggling earth leads, coat a sheet of brown paper with metallic paint and lay this face downwards on a brick floor,

in almost every case an efficient earth for short-wave work is created.

A short connecting wire is, of course, essential. As an alternative to metallic paint silver paper or thin sheet tin may be used. **W.W.**

**AN AERIAL HINT**

THE weakest part of an aerial is generally where it joins on to the lead-in tube before entering the house. If there is a strong wind blowing, the wire sways about, and it is by no means uncommon for the continual twisting and turning to unscrew the terminal on the end of the tube.

This is often a source of bad crackling noises in a receiver. If, however, the aerial lead-in is stayed off, all the strain is taken off the last foot or two of wire, and the aerial can swing and sway as much as it likes without having any effect on the lead-in tube.

The strain of the down lead should be taken by a length of rope, insulated from the aerial, and so arranged that there is about a foot or more of slack wire going to the lead-in tube.

It is a very simple dodge, but one worth considering, especially with the winter months ahead.



**PIFCO TEST INSTRUMENTS ENSURE 100% EFFICIENCY FROM RADIO**

Buy to-day one 42/- Pifco Rotameter-de-luxe (Moving-coil) or one 29/6 Rotameter (Moving-iron) and you will receive a complete set of 3 Pifco Valve Adaptors costing 15/-, in velvet-lined case for 7/6. A Rotameter and set of Valve Adaptors will form a complete test set for your radio.



**PIFCO VALVE ADAPTORS**

Each adaptor has a 5-pin base with top sockets for "plug-in" testing of 5, 7 or 9-pin valves under working conditions without alteration to set wiring. Four nickel-plated terminals complete with strapping links are fitted, to connect meter in either grid or anode circuit of valve.



**ROTAMETER-DE-LUXE**

(9 Ranges including valve test) Every conceivable test, also valves, can be made with this amazing instrument (400 volts - 500 ohms per volt). Black bakelite finish, complete with leads. In handsome velvet-lined case. Price 42/-.

Ask your dealer to-day to show you Rotameters and Adaptors, or write for Pifco Testmeter Folder, post free, from PIFCO LTD., SHUDEHILL MANCHESTER, or 150 Charing Cross Road, London, W.C.2

**PIFCO ROTAMETERS and RADIOMETERS PIFCO ON THE SPOT WILL TRACE YOUR TROUBLES LIKE A SHOT**

**The Paper for the Boy of To-day!**

MODERN BOY keeps you ahead of the news! There is no other paper to take its place. You will find described and pictured in its pages not only the latest mechanical marvels of to-day, but also those of tomorrow. In addition, it contains tip-top stories by the world's finest boy's authors. Buy a copy to-day — you will agree that MODERN BOY is the paper you cannot do without.

**MODERN BOY**

Every Saturday 2d

**IT PAYS TO BUY THE BEST**



**INTERCHANGEABLE COILS**

New low loss formers of DL-9 high-frequency insulation. Rigidly made and each coil matched. First-class results assured. 4-pin coils have two windings, 6-pin three windings. No. 939 6-pin Set of 4 12-170 metres Price 16/- No. 932 4-pin " " " " Price 14/-

**Universal S.W. Valve-Holder.**



A low loss holder for above or below base-board use. The valve enters the contacts from either side. There is no measurable increase of self-capacity to that already in the valve base. DL-9 H.F. dielectric, one piece noiseless contacts.

No. 1015 4-pin 1/3d. No 1016 5-pin 1/5d. No. 1024 7-pin 1/8d.

**STRATTON & CO., LTD., Bromsgrove Street, BIRMINGHAM.**

London Service Dept: Webb's Radio Stores, 14, Soho Street, Oxford Street, W.1.

**EDDYSTONE SHORT WAVE COMPONENTS**



# Our CONTACT PAGE

Conducted by the Assistant Editor

REGULAR readers of WIRELESS will spot this page right away as something new. That's a good start. And right away let me tell you that the word "Our" in the title to this page is all-embracing. It includes every reader, just as much as it does the staff which produces Britain's Leading Radio Magazine for you each month.

This is where we shall all "get together." For our part, we should like to meet personally every single reader, and to ask him what he likes to see in the magazine. And to ask him also what he *doesn't* like to see.

## Every Point Studied

But that, unfortunately, is impossible. So what do we do? Why, we carefully study every point of every letter we receive, no matter whether it is primarily a query, is sent in praise, or contains a grouse.

Strange though it may seem, we even like letters with grouses in them! They are always so definite. And they at least tell us what readers do *not* want.

In the centre of this page we give in simple form the aims and policy of WIRELESS AND TELEVISION REVIEW. And we honestly believe they have *your* approval. You see, we aim always to give readers just what they really want. There's no reason why WIRELESS should not be a magazine "run by readers for readers."

Just tell us what you want, and we'll get it. After all, that's why we are here!

## Consoles and Radiograms

One of the first of a batch of recent letters contained the query, "Why are console type receivers not more popular?" And before I had read many other letters I had the answer; it was enclosed in the letters themselves.

They contained a large number of references to record reproduction—questions regarding pick-up, volume controls, and so on. Without doubt,

and in spite of what some would have us believe, records are still very popular. And so it is only natural that if a person desires a bigger set than the table console type, while he is about it he buys a radiogram. The console model seems rather to "fall between two stools."

## A Queer Fault

Writing of radiograms reminds me of dance records, and dance records of parties, and parties of a queer incident of interference I ran up against the other week. Here it is—I'll tell it quite briefly:

We wanted the set in the front room where there was no aerial. So we decided to use the curtain runner instead. This proved quite sensitive, but all stations were accompanied by a terrible hissing and crackling. Every connection proved sound, and moving the curtains made no difference.

## THE POLICY OF "WIRELESS"

1. To give readers articles which will assist them to get the best results, and make the most of radio, whether a home-built or commercial set is used.
2. To provide general articles of a nature interesting to anyone who listens.
3. To put the reader first in each, and every consideration, and so, keep WIRELESS Britain's Leading Radio Magazine.

The curtains were fixed to small runners which moved along a strip of similar metal, I don't know quite what it was, but it was a steely colour. This strip of metal was supported by two brass hooks, and one of the runners had slipped off the nail, or strip, and was resting on the hook.

Here was the solution. For removing the runner from the hook immediately stopped all noise. What was happening was that the two different metals touching one another were acting as a minute cell and were feeding voltages down the aerial. I wonder if any readers have ever experienced a more queer cause of interference?

And by the way, if you are troubled

by interference you can't cure, don't forget we run a query service especially to deal with readers' technical problems.

I doubt if any reader could serve up a practical radio problem that would beat *our* Query Editor! Believe me, he's a wise guy.

As a matter of fact, he has given me the answers to a couple of queries that are typical of readers' letters. They are particularly interesting and may prove of help to others, so I am printing them below in Question and Answer form.

## A Reader's Experience

Dear Sir,—I have recently constructed a four-valve receiver, consisting of an S.G., detector and 2 L.F. stages. My friend also made a similar receiver, in fact we built these two receivers together, but this second set only employed 1 L.F. stage, in fact the output stage was a pentode. Although my friend's receiver is perfectly satisfactory, my own set will only give a very distorted output. By substitution we managed to test each and every component—my batteries, leads, etc., I used to test his receiver. The valves employed in the 2 L.F. stage were returned to the manufacturer and found to be quite satisfactory. Since each and every component is known to be O.K. and also the batteries, I am at a loss to see where the trouble exists.—Yours faithfully,

The above is a letter which was recently received by the Query Department, and is typical of the many problems which this department receives. It is assumed that the components in this reader's set are above suspicion, since substitution by identical components known to be O.K. failed to improve matters. There was, however, one very important point—although the reader had tested his batteries on his friend's set, he had failed to test his own set by using his friend's batteries. The Query Department suggested that he borrowed his friend's batteries, or as an alternative took the set to his friend's house complete and used the other's batteries, etc.

In the course of a few days we received a letter from this reader, in which he said that the whole cause of the trouble was the grid-bias battery. His friend's set only called for a maximum grid-bias voltage of 9 volts, whereas in the case of the output valve in his own set 15 volts was required. On test the grid-bias battery showed that between the 10½-volt socket and the 12-volt socket there was a complete break. Great care should therefore be taken when carrying out tests by substitution to make quite certain that the components and the batteries are being used under identical conditions to those which exist in the receiver under test.

## Table Stopped Reception

Dear Sir,—My receiver which I have just built is giving excellent results, but only when this is used in one of two rooms. I have in both of these rooms an indoor aerial and satisfactory earths; actually the two earths are to the same water-pipe and the clips are only a matter of a yard apart, the aerials are also similar. The receiver will work in both rooms providing that I stand the set on the floor. I have spent hours with this receiver, which, incidentally, is a superhet consisting of five valves and two L.F. stages, but I still cannot obtain satisfactory results in the second room unless I operate it as stated above. Can you make a suggestion?—Yours faithfully,

At first sight it appeared that the reader had failed to give some vital information, and conditions were not identical in so far as the two rooms were concerned. Further information was requested, and sketches of the rooms asked for, including the actual positions in the rooms where the receiver operated. In both cases the receiver had been stood on a table. The room in which the set refused to work unless placed on the floor

(Continued on next page).

**OUR CONTACT PAGE**

—continued from previous page.

was the kitchen. There was still, however, no indication as to why when the receiver was tested on one table it worked, but in the case of the second table, i.e. the one in the kitchen, the set motor-boated, and there was every sign of L.F. instability. This further information was sent in the reader's second letter.

It rather appeared as though the table possessed some weird properties whereby it could cause the receiver to be unstable. The Query Department had a similar query some few years ago, but the information in this case was given in a totally different form, and we did not link these two until the reader informed us that if he changed the two tables over the trouble ceased in the kitchen, but he experienced the same trouble in the second room. The kitchen table was obviously the culprit. We asked for details of this table and received the information that this was a normal white deal table with a white oilcloth cover; and there was the trouble—with the white oilcloth removed results were O.K., irrespective of where the table was placed.

It should be appreciated that coverings of this nature are in most cases paint sprayed on to some form of "material," such as calico or linen, and in a large number of cases this paint has a metal base. The oilcloth was acting, in effect, as a coupling agent between various components in the receiver. If, therefore, a receiver fails to operate in a satisfactory manner when first tested, make absolutely certain that on the table, or possibly underneath, there is not in effect a mass of unearthed metal.

**TELEVISION NOT TO COMPETE WITH CINEMAS**

—continued from page 176.

early part of March. Aerial tests will follow soon after, and we propose to let potential lookers into our confidence as regards times of experimental transmissions. I think it may be said that the first two months of the aerial radiations will be experimental, so that the service will really get going some time in May or June."

One or two scribes seemed to think that the B.B.C. ought to wait until there were some sets about, until it began to transmit high-definition television. But, as Sir Noel pointed out, without a suitable yardstick in the form of service transmissions it was impossible for the makers of suitable apparatus to know what they were doing. The service, in a word, must precede the sets.

The next station? Someone wanted to know whether, in view of the fact that the Post Office's co-axial cable was being laid to Birmingham from London, the next television transmitting centre would be Birmingham. Sir Noel denied that this necessarily followed, pointing out that, in any case, only London would have a transmitter for at least a year.

**Possible Changes Discussed**

Supposing, it was asked, a very much better system was evolved while the present systems were being tried out, would the B.B.C. change over—and thereby possibly render existing receiving apparatus obsolete?

Sir Noel was perfectly frank about that. He thought that they could not blind themselves to the possibility of another system coming along, but that before anything definite was done to alter the transmissions very careful consideration would be given to existing apparatus.

He thought that in view of this possible development it was just as well only one station had been envisaged for the present. There was no need to suppose, he said, that all the other stations would follow the Alexandra Palace model if other developments indicated any definite improvements.

And so there we must leave television for the moment—suspended high up on a tower at Alexandra Palace, with Mr. Cock straining at the leash of his new job.

**AN ALL-WAVE RECEIVER**

See next month's Wireless for full details of a special inexpensive superheterodyne set, covering short as well as medium and long wavebands.

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*Because:—*

All Clix components, in addition to giving Perfect Contact, are easy to wire; for instance, in Clix Chassis Mounting Valveholders the centre socket of the 5-pin and two sockets of the 7-pin type are made longer than the others; this reduces the possibility of short-circuits and adds to the ease of wiring.

**CLIX CHASSIS MOUNTING VALVEHOLDERS**

*Specified for the*

**"1936 EMPIRE SUPER"**

**CLIX PANEL TERMINALS**

*Specified for the Power Pack*

Clix Terminals are extremely robust and soundly made. Hexagonal shoulder, when held by spanner while nut is made tight, greatly facilitates mounting. Insulated and non-removable head. Provision for secure, solderless connection. Clear and easily read markings - - - **4d.**



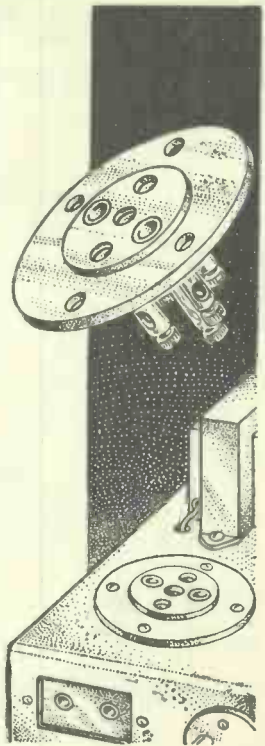
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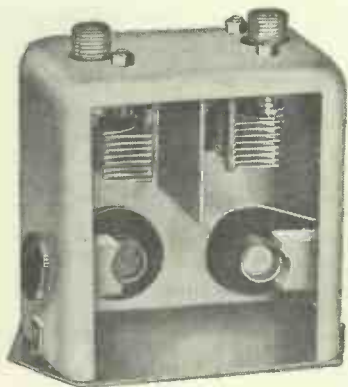
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for the **"1936 EMPIRE SUPER"**



**Varley**

The Varley Air-Tune transformer is the exclusive choice of the "Wireless" technicians for their superb All-Wave receiver "The 1936 Empire Super." It is the only AIR-TUNED I.F. Transformer with IRON-CORED Litz-wound coils, giving both high dynamic resistance for amplification and high magnification (Q) for selectivity. Litz-wound Air-Cored coils of the inductance necessary with air-dielectric trimmers of reasonable size will give a high dynamic resistance, but comparatively low Q. The Litz-wound iron-cored coils in the Varley Air-Tune give both high stage gain and high selectivity. An electrostatic screen is fitted between the trimming condensers to prevent unwanted capacity coupling. The inductive coupling is variable. Trimmers give a range of approximately 430-600 kc. with positive adjustment. The Air-Tune is suitable for chassis or baseboard mounting.

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We have prepared a most interesting little book, giving details of Mains and Battery All-Wave receivers with circuits, incorporating the Air-Tune. May we send you one? A coupon is below.

To Oliver Pell Control, Ltd., Bloomfield Road, Woolwich, London, S.E.18.

Please send me your book of Air-Tune circuits as described in the February number of "Wireless."

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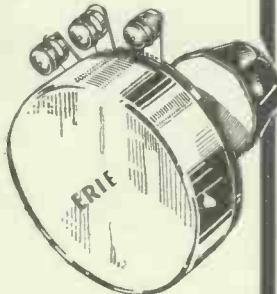
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Specified by the Designer of the

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**Superhet Short-Wave Receiver**

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No. 1224. 3 at 1/6 each



**"B" Type Terminals**

No. 1001. 8 at 6d. each

USE THIS COUPON

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Cambridge Arterial Rd., Enfield, Mdx.  
Please send, free, "Radio Connections"  
Catalogue.

Name.....

Address.....

W.T.R.2-36

## TELEVISION TO-DAY

—continued from page 172.

attained his seventy-fourth birthday, and they gave him a high-definition cathode-ray television set, plus radio receiver, as a memento of the occasion. What he said about it is not recorded, but it must have been very gratifying to him to see what marvellous strides have been made in the science of which he is regarded, in Germany at any rate, as the father.

### Early Patents

I dare say many of you will be surprised to know that patents were taken out for synchronising cinematograph films with gramophone records as long ago as forty or fifty years—long before cinematograph films were perfected and, needless to say, long before valve amplification for the reproduced sound was available.

television transmissions with their film programme items.

Probably this will be one of the first ways in which we shall see television "on the screen," which has been promised us for so long. It seems peculiarly appropriate that it should first find its way into the public places via the news theatre. These news theatres have shown us some pretty marvellous achievements in the way of getting news items to the screen within a few hours of their occurrence, but with television to their hand they will in many cases be able to reduce the "delay" to a few seconds, whilst in specially favourable cases we shall see the events on the screen as they are actually happening. The slogan "up-to-the-minute" will then become true, indeed.

Owing to the limited range of the ultra-short-wave transmission which is to be used for television purposes, we

## IN THE MARCH NUMBER

Two Special Features:

### THIS YEAR'S S.T. 100

A modernised version by Mr. Scott-Taggart of his world-famous reflex receiver.

### All about Interference Suppressors

How to choose the right unit and to connect it in place.

And Many Outstanding Articles Including:

- Before Broadcasting Came
- Building an All-Mains All-Wave Superhet
- How Loudspeakers Are Made
- etc., etc.

When you read through some of these old patents it is almost pathetic to see how the early experimenters struggled against difficulties which to them seemed almost insuperable, but which nowadays have been completely eliminated by subsequent inventions and discoveries.

I expect most of you have at some time or other spent an interesting hour in a news theatre. These theatres are, of course, very common in London, and they seem now to be springing up in all the more important provincial towns. The advent of television is obviously of particular interest to the news theatre which caters, as far as possible, for up-to-the-minute presentation of events of news interest. It is suggested now that arrangements should be made as soon as possible to enable the news theatre to interlard

are accustomed to believe that television will be confined to the London area for a very long time to come. But it was stated by a speaker at the recent meeting of the British Association at Norwich that plans were in hand for providing a television service for about three-quarters of the population of Great Britain, and that it was expected that the scheme would not take more than perhaps three years.

### Extending the Service

As a matter of fact, if you remember, it was foreshadowed by the P.M.G. quite a long time ago that the service would be extended as rapidly as possible to the provinces, although, naturally, the wise step was to concentrate on the London service in the first instance, and in that way gain all the experience that possibly could be gained before proceeding farther.

(Continued on next page).



## TELEVISION TO-DAY

—continued from previous page.

This very conservative kind of policy is the one that the B.B.C. has shown throughout its whole career, and I think everybody, even its severest critics, will admit that the service technically is the finest in the world.

Whatever you may think of the B.B.C. programmes, the technical organisation stands as a model throughout the world, and when any broadcasting proposition is mooted in other countries the first thing they always do is to come over and have a good look at the B.B.C. and all its works.

The same kind of policy in television should result in the minimum time in giving us a really reliable service and the best that can be obtained in the then state of the science.

### Empire Service Requested

Another point to be borne in mind is that in the intervening two or three years the price of home television receivers will no doubt have decreased quite considerably, so that, in a way, the people in the provinces will be better off than we in London, since they will have to pay perhaps only half or two-thirds of the price for their sets and will have better sets—and possibly better service—at that.

There have been many requests made to the B.B.C. for the provision of an Empire television service similar to the Empire service. The B.B.C. is sympathetic to the project, but there are some very important technical difficulties in the way. For one thing a television service of any real quality involves the use of a wide frequency band and, of course, of wavelengths considerably shorter than those used for the Empire service.

From time to time we hear of the prospect of giving television pictures in colour. A good deal of work has been done on colour television, especially by the Baird people, and it can be said that certainly in the laboratory, if not indeed in practical outside conditions, television in colour is a pretty well understood technique. The Fernseh A.G. in Germany has lately been going into this television colour question, and has developed a special kind of cathode-ray tube for the purpose.

## WHAT IS HAPPENING IN RADIO

—continued from page 180.

Controller, Public Relations; and Mr. Eric Davis to be Education Officer in the West of England Region.

Mr. Davis, who is 27, succeeds Mr. E. H. F. Mills, who has taken over other duties with the B.B.C.

### Good Work!

A fourteen-year-old Polish schoolboy recently saved the lives of twenty Soviet seamen. He was listening on short waves about 10 o'clock one night when he picked up messages from the vessel Lena 4,000 miles away, giving her position and calling "SOS."

He hurried to the telephone and rang up the authorities in Katowice, who, in turn, got in touch with the Soviet Embassy in Warsaw. The result was that within twenty minutes of the first SOS being heard the crew were rescued.

### A Loss to Radio Art

The death of Robert Loraine, the actor and airman, after an operation for quinsy is a great loss to radio drama.

### Germany Bans Advertising

The transmission of advertising matter from German broadcasting stations was banned from January 1 onwards. Prior to this decision by the authorities the German stations had broadcast a total of 115 hours of advertising per month.

### A "Mystery Tower" Station

The Nab Tower, one of the fortified "mystery towers" of the War, and situated off Spithead in the English Channel, has been turned into a radio station. It has been equipped with a radio beacon and transmits the letters G A M.

It aids the navigation of ships during foggy weather, and can be employed for bearing-setting-up to about 45 miles.

## PILOT AUTHOR KITS

can only be obtained direct from Peto-Scott. We can supply any Kit for sets featured in this Journal during the past 3 years. Any item supplied separately. Orders over 10/- sent C.O.D. Carriage and post free.

## 1936 EMPIRE SUPER

—SEND FOR DETAILED LIST OF PARTS—

RECEIVER Cash or C.O.D. **£9:11:6**  
KIT Carriage Paid

Or 12 monthly payments of 17/6

Author's Kit of First Specified Parts for Receiver portion only, including Peto-Scott ready-drilled Aluminium Chassis, less Valves, Cabinet and Speaker.

**POWER PACK** Parts for Power Pack, including: Peto-Scott Baseboard, less Rectifier. Cash or C.O.D. Carriage Paid. **£2:13/6**, or 12 monthly payments of 5/-.  
Set of 5 Specified Valves ..... £ 8 3 0  
Rectifier Valve for Power Pack ..... 4 15 0  
1 W.B. Stentorian Junior Speaker ..... 1 12 6

## Peto-Scott 1936 TESTED KITS

AS REVIEWED ON PAGE 144

### SHORT-WAVE ADAPTOR-CONVERTER

SEND FOR FREE BLUEPRINT

Covers 13-80 Metres.



Converts your existing battery or A.C. Receiver for operation on short-waves, with no alterations, bringing you America direct programmes from all over the world. Two hours to build a lifetime of world-wide radio entertainment!

**KIT "A"**  
CASH OR C.O.D.  
Carriage Paid.  
**£1:19:6**

Or 2/6 down and 10 monthly payments of 4/3. Comprises all parts for building with full-size blueprint, assembly and operating instructions, less cabinet.

WITH CABINET. Cash or C.O.D. Carriage Paid, £2:10:0, or 12 monthly payments of 4/6.

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**B.T.S. ADABAND** Enjoy the Short-Waves on your present set with no alterations. Battery model. Cash or C.O.D. Carriage Paid, £5/5/0. Balance in 11 monthly payments of 9/6.

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Please send me free of charge (1) 1936 Empire Super List of Parts; (2) Peto-Scott S.W. Adaptor-Converter Blueprint and full details; (3) B.T.S. Adaband and S.W. Adaptor Leaflet. (Cross out list not required.)

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ADDRESS.....

EST. 1919.

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65/- RADIO-GRAM CABINET FOR 35/-  
No Middle Profit's Finest Radio Furniture as supplied to B.B.C.  
**PICKETT'S**  
Piano Tone  
Cabinet (R.C.) Works, Boxleyheath, nr. London.

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to your A.C. or Battery set, without alteration.

Wavelength range, 12 to 70 metres. Full vision scale, 100 to 1 tuning. Aerial coupler for adjusting aerial to set. Change-over switch allows instant change from short waves to normal broadcast. Simple connecting and operating instructions with each unit. No need to disconnect lead after once fitted.



Price complete with coils 50s.

Free: Leaflet "W.T." of this and other models. **50/-** Cash or C.O.D.

**UNIT RADIO**  
347, City Road, London, E.C.1.  
Phone: CLE 5340.

**THE RADIO RACKETEER**

—continued from page 179.

"Would you mind repeating that, mister?" I asked slowly, coming up for air.

I could see he was curious, but I couldn't help it.

He just repeated it, an' added: "An' now what?"

"Oh, nothing! nothing in all the world," I assured him, and went away like a dog without a bone. They wouldn't let me see Bilbee. It was only after I'd asked that I took a grip on myself, an' realised that it didn't matter, anyway.

It wasn't Bilbee I wanted any more. I wanted Buddy Clanden, an' like the little kid in Hunt the Slipper I hadn't the foggiest notion where to look.

Wandering round the deck, I stumbled over a deck chair with little Squiggs bedded down in it. He had a big travelling rug tucked up under his chin, and grinned up at me like a monkey as I skinned my shin-bone on his woodwork.

I don't know why, but I suddenly felt sore as a scalded cat, an' reaching down I got a good handful of his collar an' yanked him to his feet. We were all alone for the moment, an' I was minded to give the little runt the hoof in the pants he had missed when the old Lily of Lagonde was sinking.

But I never did. The grin left his face, an' his eyes an' mouth was just three slits in a white mask, while something hard an' painful stuck me in the stomach just below my third vest button.

"For a split dime, you big, hairy-handed baboon, I'd blow your innards out through your backbone!" he whispered hoarsely, an' it was right then that I knew I had found Buddy Clanden at last. Scared as I was, an' mad as he was, I guessed that he wouldn't do it; leastways, not in broad daylight, with folk liable to butt in at any moment—an' I guessed right. Slowly the pressure on my body relaxed, an' he slumped back into his chair.

"Go get yourself a pew, flatfoot," he snarled, "an' bring it over here. There's a mouthful I want to spill to you right now."

I pulled up a chair. There wasn't much else I could do. Clanden lit up a long cigar, and for a while he smoked in silence. Then he squinted sideways at me out of his cold mean eyes, an' every word that guy slung at me hit my nerve centre like a drop of cold water.

"Listen you," he said quickly. "When we make dry

land again, we'll be in England, and the Limeys don't stand for gun play on their two by four heap of mud. I got about four days to croak you in if I want, and four days is aplenty for Bud Clanden. That ain't news to you. What you don't know is that I've split with Pincelli—that I'm never going to push a snout into New York again. The show-down was over that sidekick of yours, O'Hanan. He knew too much, or Pincelli figured he did, which comes to the same thing. Snake put him on the spot, and I was just too late to grab him off it. It was Rocco who actually turned the typewriter on O'Hanan, an' it was me who bumped Rocco before I lit out for the Lily of Lagonde. Likewise it was me who sent that S O S while you was snoring like a pig and leaving Mary and the kids to tell each other fairy tales on a sinking ship."

I suddenly felt myself getting hot under the collar. Mary! It was the way he spoke her name, soft an' lingerin' like, that did it.

"Clanden"—I jumped in right there—"let's leave Mary O'Hanan out 'er this! I don't want no trouble with you after what I've heard, but by the great horn spoon; if you don't lay off Mary O'Hanan, I'll call your bluff. You said four days was aplenty. Well, hop to it! I got a rod, too, an' I ain't no slouch. Which is it to be?"

Clanden laughed—a funny little close-lipped laugh.

"I suppose you want to run in double harness with Mary yourself, you big punk, eh!" he poked at me.

"I do," I spat back quick. "An' if she'd have me, I'd get hitched up to-morrow. Anyways, you're the last guy on earth Mary would marry, you cold-blooded, gun-fanning, four-flushing little rat!"

"Sure!" Clanden replied, cool as an ice-pack. "That's why I tried to save O'Hanan. That's why she told me she was sailing on the Lily of Lagonde, and why I travelled with her. That's why I made her swear not to tell you I was Bud Clanden when we met on board. Sure, I'm the last guy on earth Mary would marry!"

"I don't get you," I said, my mind running around in circles. "Come clean, an' maybe we can play ball."

He kind 'er heaved a sigh, an' pitched his cigar into the sea.

"Harrigan," he said, like he was in pain, "you're so dumb you ought to be destroyed, but seeing that Mary loves you, I haven't the heart. You better get out of here before I change my mind. Go find her, nit wit, and when you do, tell her from me that she's picked the biggest bag of baloney in all the Great United States of America to be my new brother-in-law. Get going, you fat fish!"

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**For Country Listeners**

**I**N many country homes, where the electricity supply is made on the premises, the voltage is generally low, 25 or 50 or so. Ordinary mains receivers are therefore out of the question, and it would seem that the residents are forced to be tied to the use of high-tension batteries.

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21

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