

# TELEVISION PICTURES IN COLOUR

# Popular Wireless & TELEVISION TIMES

BUILDING THE  
1937 MIDGET  
PORTABLE

EVERY  
WEDNESDAY  
PRICE

# 3<sup>D</sup>

No. 787.  
Vol. XXXI.  
July 3rd, 1937.



## HIMMEL! SAPRISTI! PARBLEU! CRIKEY!

He thought the set would receive dozens of stations, and it does, all together! Does *your* set suffer from over-eagerness? Do you get interference on your programmes from a station or stations you don't want to hear? If so, you should read about the "Station Separator" in this issue; also W. L. S. deals with short-wave selectivity.

# Six Grand Gifts

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*A novelty with which you can demonstrate your aerobatic skill*

First 4 Cards of a Series of 32 entitled

"The King's Air Force" and a unique WALLET

*Specially made to hold all the cards*

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Every boy will be delighted with this magnificent Big Gift Number of "The Pilot" on sale today. Be sure to buy it for your son or young brother.

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ALL THESE GIFTS GIVEN AWAY FREE

# The PILOT

Every Friday 2<sup>D</sup>

On sale at all Newsagents and Bookstalls

# Laugh your troubles away—

with ANSWERS' SUMMER FUN BOOK

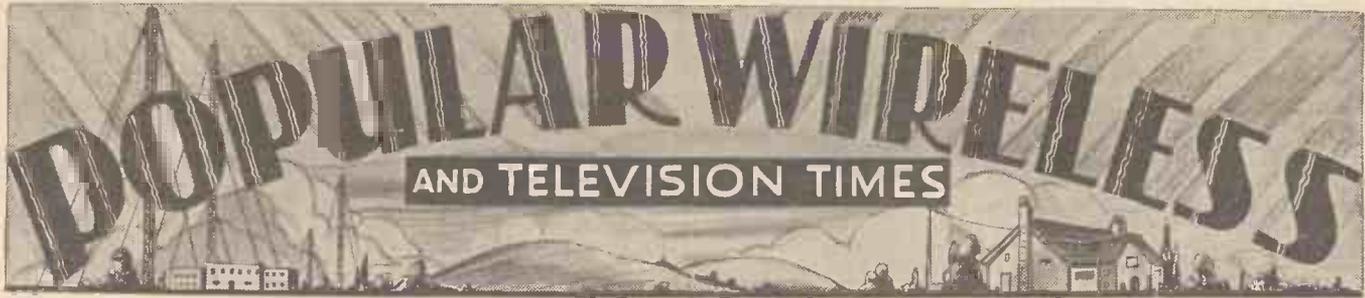


130 ILLUSTRATED JOKES and Complete Humorous STORIES

You'll laugh—and you'll laugh—and you'll laugh, every time you dip into this packed budget of good humour! 130 really funny, illustrated jokes and several complete stories wait behind this jolly cover, to tickle your sense of fun and put you in a happy mood on holiday, in the train, or wherever you may be.

# ANSWERS' SUMMER FUN BOOK

Of all Newsagents and Bookstalls 6<sup>d</sup>



Editor: G. V. Dowding

Asst. Editors: A. Johnson-Randall, A. S. Clark

SAILING RADIO  
A NEW CABLE  
CATCHING UP

## RADIO NOTES & NEWS

AERIAL FIREWORKS  
IN THE BATH  
RADIO ROMANCE

### Turkish Delight

YOUNG Turks are delighted by the announcement that their Government has placed with Marconi's a contract for the installation of a long-wave, high-power broadcasting transmitter, a high-power short-wave broadcasting transmitter, and a Broadcasting House for Ankara.

The long-waver will radiate 120 kilowatts on 1,639 metres, and it can be converted to a 60-kilowatt by a flick of the wrist. The short-waver will work on a carrier energy of 20 kilowatts, and will have an easy change-over between two wavelengths in the 14/100-metre band. It will be crystal-controlled and, like its big brother, will be up-to-date in every nut and bolt.

Ankara's Broadcasting House, with five main studios, ribbon mikes, effects studios, echo room, and assorted what-nottery will be the radio high-spot of the Near East. It will be linked by high-class music cable to the transmitters at Etimesut, 15 miles away.

### A B.B.C. Appointment

MR. G. C. BEADLE, Director of Staff Training, has been appointed West of England Regional Director, in succession to Mr. E. R. Appleton. It won't take you long to like the West of England listener, Mr. Beadle.

### The America's Cup

WIRELESS seems to find its way into so many odd corners that we ought not to be surprised that it has now become part of the historic yacht race for the America's Cup.

Mr. T. O. M. Sopwith, sportsman that he is, has decided to have another go for Britain, and Endeavour I created a great impression in the States by sailing, unaided, the last 1,000 miles of her trans-Atlantic passage, after parting company with her tug.

She will fill in the time until July 31st with trials of various riggings, and is to be assisted in this by Endeavour II (the other prospective challenger), and by radio telephony between the vessels. Changes of sail, etc., can thus be discussed, enabling really comparative results to be obtained for the first time.

It should be a grand race this year; and if the new methods of communication enable us to win we shall have something more for which to thank radio.

### P.O.'s Motor-boats and Casks

HAD you been on the shores of Lock Awe and seen P.O. engineers with four motor-boats and 400 5-gallon casks, you might justifiably have concluded that they were going to have some party. Well, in a way it was.

They were laying a cable across the loch, which shelves so abruptly from the shore

an extension from Oban to the Outer Hebrides by wireless telephone.

### The New Vice-Chairman

THE appointment of Mr. C. H. G. Millis, D.S.O., to be Vice-Chairman and Governor of the B.B.C. (as already announced in "P.W.") brings the number of Governors up to seven, in conformity with the recommendations of the Broadcasting Committee. As colleagues, Mr. Millis will have Mr. R. C. Norman (Chairman), Lady Bridgeman, Mr. H. A. L. Fisher, Mrs. Mary Hamilton, Sir Ian Fraser, and Dr. J. J. Mallon.

Mr. Millis was twice wounded when serving with the Sherwood Foresters in the war of 1914-18.

### Advisory Council

THE B.B.C. has recently made the following new appointments to its General Advisory Council—an august body which advises on broadcasting policy.

Mr. L. S. Amery, M.P.  
Mr. John Jacob Astor, M.P.  
Mr. Harold G. Brown.  
Lord Elgin and Kincardine.  
Mr. John James Lawson, M.P.  
The Dowager Lady Reading.  
Mr. George Robey.  
Sir Josiah Stamp.  
Professor George Gordon.

Professor Gordon was appointed because he is Chairman of the B.B.C.'s Spoken English Committee. Mr. Harold Brown is a former vice-chairman and governor of the B.B.C.

### A Loss to Listeners

HIS many friends were grieved by the recent death of Mr. Francis Bolton, the first person to act as Talent Spotter for the B.B.C. The listening public, whom he served so well, has lost a good friend.

### Narrowing the Gap

ON the first of June the number of British radio licences in force was 8,202,000. The total for Germany on the same day was 8,372,818.

Germany, unlike Britain, has a short-period licence in force, and consequently there is a bigger fall-off in the summer than

(Continued overleaf.)

### MY WORD By THE EDITOR

## BRIGHTER B.B.C.?

The appointment of the Prime Minister of Mirth, George Robey, to an advisory position and John Watt's elevation to the post of Variety Chief are most commendable steps. They indicate that there is a move away from strict uplift and highbrowism at the Big House. Let us hope that at long last Britain's Dictators of the Ether are going to start giving us more of what we want than of what it is thought we need.

British Broadcasting is well established on the peaks of dignity and integrity. Its reputation for dogged educationalism against the will of its public is a world-wide source of wonder.

Probably in no other country would eight million ten bobs every year be paid to a piper who persisted in calling his own tunes.

Yet eight million listeners can't be completely wrong. They keep on paying out. Why? No doubt because they try hard to believe that their radio fare is a "curate's egg"—good in parts.

One day broadcasting may please most of the people most of the time, and that will be when gloom and uplift have been almost entirely eliminated from the programmes and a card bearing the phrase "Your job is to Entertain" stands on the desk of every programme executive at Broadcasting House.

that it was decided to attach empty casks to the cable at intervals, float them across, and then puncture the casks below the waterline to enable them to sink with the cable in the desired position.

The motor-boats, working from the centre, flitted joyously from cask to cask, directed by an ultra-short-wave radio-telephone link between the shores of the loch. Eh, mon, it was a bonnie sight.

The new cables, linking Oban with the main trunk system, will enable this to extend to the Highlands and islands, with

NEXT  
WEEK:

# AN ALL-MAINS "REACTO"

# GOLD WATCHES GIVEN AWAY WITH RADIO LICENCES

if the licence was an all-the-year-rounder. With the fine weather the German total dropped in the month of May by 97,744, whereas the British total showed the usual steady rise, the net increase in May being 24,995.

Another month or two like this and the gap will be narrowed still further, possibly giving Britain the lead again.

### A Short-Lived Triumph

**D**ID I ever tell you of the American business man who decided to extend his factory, and who had a son who was mad on radio? The young fellow persuaded his father that the great new chimney then being built for the works would be a fine mast for a super aerial. And the old man became so enamoured of the idea that he decided not only to build in a support for the aerial wire, but also to have a firework display at the chimney-top on opening night.

There was to be a large assortment of fireworks, to be fired by an electrical circuit from the ground. Unfortunately, however, something went wrong with this circuit on opening night. At the crucial moment, when the button was pressed and all the guests were saying "What a marvellous aerial," the fireworks at the chimney-top all went off together with shattering unanimity, and blew the aerial's support away! Down came that super aerial with a rush—and the chimney isn't due for steeplejacking for another five years!



### MELODY AND RHYTHM

A programme of "Melody and Rhythm," to be presented by Martyn C. Webster, on July 5th (Midland programme), will be given by two combinations which have broadcast before—Martini and his Music, and Eric Jeffcote's Rhythm Quartette. Martini maintains that hot jazz tunes should not be played on the Hawaiian guitar, but believes there is wide scope for arrangements of the classics, especially the Viennese waltzes. His bass player is only sixteen. Eric Jeffcote has frequently broadcast as an accordion soloist. Three of his quartet play with Jack Wilson's Rhythm Band.

### Atlantic Isn't Romantic Any More

**O**LD Man Atlantic is about to take the biggest knock he has had since the late Senor C. Columbus beat him in 1492. I write on the eve of the Imperial Airways test flights from Foynes, on the Shannon, to Newfoundland; and when the regular air-mail service gets going between Europe and America, the "awe-inspiring waste of waters" will become just that—a dreadful waste of water!

As the gallant "Hindenburg" has shown, these fast flights across the Atlantic depend greatly upon radio communications. I understand that in this respect the new service is all set. The weather-report organisation is complete; the machines are ready—and, perhaps, before

you read these lines the Atlantic ace will have been trumped for keeps.

History was a horrible subject at school. But it's exciting in the making, think you not?

### An Unusual Fatality

**T**HE Stockport coroner performed a public service recently in calling attention to the grave risks incurred by people who handled electrical apparatus while in their baths.

Readers of "P.W." will know that the effects of an electric shock largely depend upon the quality of the contact made with the body; a voltage that might do little damage to a dry skin may prove fatal if the hands are wet, or if the body is partly submerged.

The Stockport coroner was investigating the circumstances of the death of Mrs. Lightfoot, of Bramhall, who was found electrocuted in her bath with her wireless set resting on her body. As the coroner pointed out, it should be realised that any electrical apparatus—wireless set, electric iron, or other domestic appliance—may be made dangerous by using it in such conditions. Even to stand barefooted on a wet floor is to invite the possibility of a severe shock when high-voltage leads are being handled.

### "We Have With Us in the Studio—"

**G**ATE-CRASHERS have more than once given the B.B.C. something to think about, but some of the more out-of-the-way stations have problems such as we seldom imagine. Did you hear about the to-do in British Malaya on Coronation Day?



The director of one station, newly erected on land reclaimed from the jungle, was taking a final look round before the all-important broadcast began when he encountered a cobra, short in the temper but 7 feet long! Having disposed of this unwelcome caller he hurried over to tell his assistant, and, stepping on something slithery, found that this time he had put his foot on a 12-foot python!

Despite these unexpected trifles the reception from Daventry was perfect, and everybody remarked that there hadn't been a hitch all day!

### Radio Romance

**M**ISS FENWICK, New Brunswick, listening on phone, Heard the amateur call-sign of Mr. C. Stone.

He lived at Corinna, a township of Maine; And Miss Fenwick heard him again and again.

They talked on their radios by day and by night; When you have the short waves there is no need to write.

From friendship to courtship; to billing and cooing.

Within the twelve months 'twas a radio wooing.

When Mr. Stone asked her, Miss Fenwick said "Yes."

And now they are married—and happy, I guess.

So let us all wish them a long, joyous life. Short-wave fan and radio wife.

(I made up the rhyme. But the facts are all TRUE.

C. Stone and his wife are as real as are you.)

### COLWYN FOLLIES OF 1937

The Colwyn Follies of 1937, under the direction of Ernest Binns, will broadcast a light summer show (Welsh programme) from the Pier Pavilion, Colwyn Bay, on July 6th. Listeners are already familiar with the Colwyn Follies, as they have broadcast from the Pier Pavilion for the past three seasons. Among the artists taking part in the programme will be Ton E. Brennan (comedian), Mildred Hammond (soprano), Reg Fenton (comedian), Phyllis Palmer (soubrette and dancer), and Jim Fitz (comedian and drummer).

### News of New Stations

**B.** B.C. engineers are hoping to start work on the new high-power station at Start Point, Devon, very shortly.

The Irish Free State is hoping that finances will run to a short-wave station, to keep wanderers from the Emerald Isle in touch with the old country.

Baghdad is now broadcasting on medium waves (about 391 metres) on Mondays, Thursdays and Saturdays, from 5.30 p.m. to 8 p.m.

The National Broadcasting Stations serving Melbourne, Sydney and Brisbane are to be replaced by high-power up-to-date transmitters.

### Advertising Polish

**P**OLAND has hit upon a bright idea for encouraging shilly-shalliers to buy wireless licences.

The first step was to bring out a cheap mass-produced set, inexpensive to run. The response was gratifying, but it did not become enthusiastic until some sporting official announced that the buyer of any licence completing a new series of 100,000 should receive a gold watch. Licence figures immediately began to leap, and the buyer of licence number 600,000 has recently been presented with his ticker.

In the rural districts of Poland the possession of a wireless set is quite sufficient to mark you as "one of the heads." If you can secure the watch, too, you are a man in 100,000.



ARIEL.

# THE STATION SEPARATOR

Does your receiver give you a clear-cut programme free from all interference by other stations? Are you able to pick out just the one station you want or do you invariably get two at once? If your set suffers from this irritating lack of selectivity, try the effect of adding the easily made little unit described below. The improvement in selectivity will surprise you.

**UNQUESTIONABLY** the crying need to-day is selectivity—more selectivity—and yet still more selectivity. What is selectivity? you may ask. Well, it is simply the ability of a particular set to separate one programme from another, so that you can receive the particular programmes which you wish to listen to without some other station “butting” in. A few years ago the problem was nothing like so acute. But to-day not only have we a large increase in the number of stations

although from the point of view of volume and quality it does all that one requires.

Now selectivity is solely dependent upon the number of tuned circuits which a receiver has incorporated in its design, always assuming that the said tuned circuits are efficient. But a large proportion of sets cannot aspire to the more ambitious band-pass arrangements, and so it is necessary to devise some method by which the overall selectivity can be improved without rebuilding and redesigning the entire receiver.

To do this is obviously an expensive business. For the benefit of those who are troubled with this problem of station separation we have designed this little unit. It is, briefly, an efficient additional tuned circuit which can be tacked on to practically any set. It does not affect the existing receiver in any way, except in so far as improving its selectivity. Moreover, it is not critical as to its layout: those who

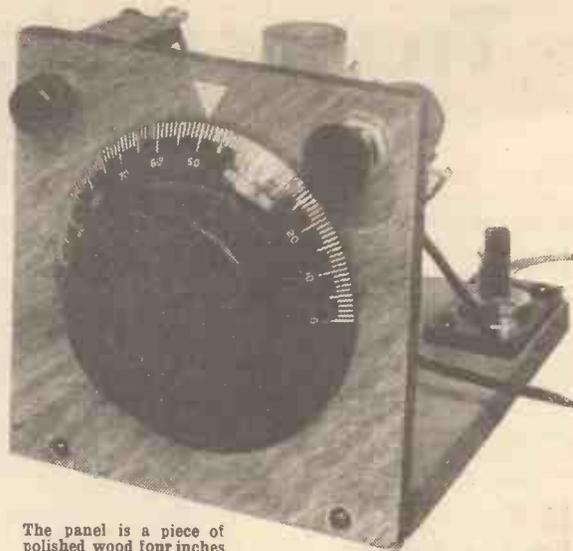
prefer to build it on to some other type

of base or into a small cabinet or box which they may have on hand may do so, so long as they adhere to the components specified and to the wiring.

But in practice it would be difficult to find anything neater or less expensive than the particular arrangement that we ourselves have adopted. The unit works equally well on both medium and long wavebands, and the change-over is effected by using an ordinary three-point push-pull switch.

There is a preset condenser of .00005 mfd. to vary the coupling between the unit and the aerial tuning circuit of the set, to which it is attached. This preset is set by rotating a small ebonite adjuster on top of it.

The setting will depend upon the type of receiver with which the unit is used, but it is a very simple matter to find the best position, since this can be quickly done during reception.



The panel is a piece of polished wood four inches square, with the tuning knob in the centre and the wave-change switch and aerial terminal placed half an inch in from the sides. But these dimensions are not in any way critical.

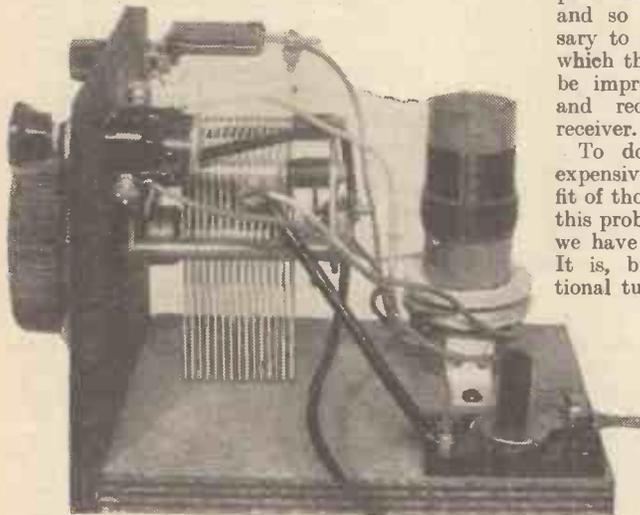
To commence with, the adjuster can be screwed fully clockwise, this giving maximum coupling.

### Preparing the Panel

To commence the construction, take the panel—a piece of polished wood 4 inches by 4 inches by  $\frac{1}{4}$  inch thick, and drill a hole in the centre for mounting the J.B. condenser. Drill two more holes  $\frac{1}{2}$  in. in from the top edge and sides for the aerial terminal and wave-change switch. Drill two holes for the wood screws which secure the panel to the plywood baseboard.

Mount the terminal wave-change switch and condenser, and then the wave-change coil and preset condenser on the baseboard.

Now wire up, remembering that one side of the .0005 fixed condenser is secured directly to the shank of the aerial terminal, the other side being joined to the blue lead



The Station Separator does not involve any alteration to your existing set, and it works equally well on both medium and long wavelengths.

occupying the medium and long wavebands—in particular, the medium—but there has also been an all-round increase in power.

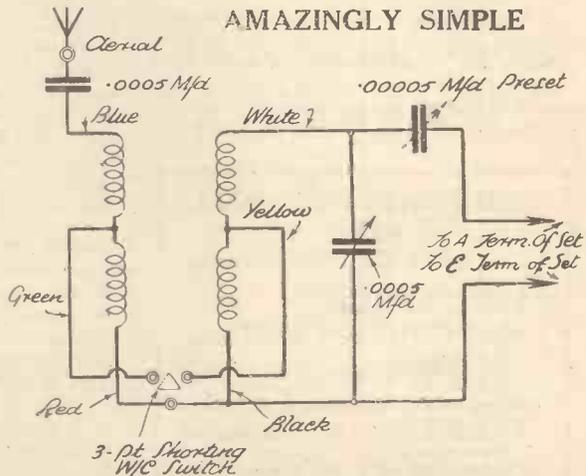
Actually it is the tendency for greater power to be used that is mainly causing the present-time complications. It is not difficult to appreciate the difference between trying to separate two adjacent programmes working on, say, 20 kilowatts, and two the same distance apart in frequency on 100 kilowatts.

It is this station-separating problem that largely accounts for the present-day popularity of the superhet, which, by reason of the principle underlying its operation, has an inherent selectivity not achieved by the simpler types of straight circuit.

### Increasing Selectivity

But there are very large numbers of these straight circuits in use. And very satisfactory they are except perhaps in so far as their selectivity is concerned. The good old three-valver with its two tuned circuits—particularly the less recent types which have not the advantage of screened iron-core coils—do not always manage to rise to the occasion when it comes to separating two powerful adjacent programmes,

### AMAZINGLY SIMPLE



The connections to the dual-range coil are coloured so as to facilitate wiring up. The beginner will have no difficulty in making this invaluable unit.

on the dual-range coil, as you will see from the wiring diagram.

The leads on the coil are all coloured, so that you can make no mistake here. You will need two lengths of rubber-covered flexible wire for the following connections:

(Continued overleaf.)

# TECHNICAL JOTTINGS

Varied aspects of radio discussed from a general standpoint

By Dr. J. H. T. ROBERTS, F.Inst.P.

## Modern Receiver Essentials

**I**N a modern high-efficiency receiver it is practically essential to have not only a volume control—which I suppose every set has—but also a tone control.

In these days, when it is necessary to separate stations on closely adjacent wavelengths, any sort of a decent set capable of receiving a fair number of stations has to be pretty selective. There are all sorts of dodges for securing this selectivity, amongst the principal ones being the bandpass tuning system and the use of the super-heterodyne type of circuit; also the addition of an extra tuned circuit, which can take the form of a little unit, of which the "station separator" is a good example. As well as this we have the screen-grid, pentode and other high-amplification valves.

Given these high-magnification valves and a correspondingly high sensitivity, which enables us to pick out weak or distant stations, it is obvious that we must have some means also of cutting down the volume which we would otherwise get on stronger or nearer stations. This is not only a question of the unpleasantness of the extra loud volume but also the overloading of the valves, which will introduce serious distortion.

## Multi- $\mu$ Screen-Grid

A simple method of volume control, and one which is now very popularly used, employs a multi- $\mu$  screen-grid valve. The grid bias applied to the grid of the valve can be varied at will by means of a suitably arranged potentiometer, and the volume can be increased by decreasing the grid bias voltage and, of course, decreased by increasing the voltage. In actual practice this simply means that the knob of the potentiometer is rotated one way or the other so as to control the volume.

Another method which can be used with almost any receiver, but particularly those having high-frequency amplifying valves not of the multi- $\mu$  type, employs a potentiometer connected across the aerial and earth terminals, the moving arm of the potentiometer, incidentally, being connected to the aerial lead. This method was described in Mr. Rogers' article, "Preventing Gatecrashing," in last week's "P.W."

## Avoiding Distortion

Both of the methods mentioned above have the advantage that they do not introduce distortion: they act by controlling the input to the receiver at the source, and in this way cut out any overloading of succeeding valves.

If you particularly wish to go to refinements you can fit a second volume control which may, for example, consist of a very-high-resistance potentiometer, up to one megohm in maximum resistance, connected across the secondary of the low-frequency transformer, or alternatively you can use one of the special loudspeaker volume controls which are on the market.

## Balancing the Cut-off

Coming to the question of tone control, which I just mentioned, you know that highly selective receivers—and this includes a large percentage of modern sets—have a tendency to cut off the higher musical notes. Against this, however, many output valves, more particularly those of the pentode and Class B type, have a tendency to over-emphasise the top notes. The extent to which these two effects cancel one another varies in different sets, and unfortunately so much so that you cannot rely upon anything in the nature of balance being thus obtained. It is better to make certain by fitting a tone control, so that the tone can be adjusted to individual requirements.

## A Simple Arrangement

A simple tone control arrangement embodies a combination of capacity inductance and resistance, the resistance being variable. An arrangement of this kind connected in the output stage of a receiver provides a convenient method of balancing and controlling the tone. Such devices have, of course, been on the market for

(Please turn to page 405.)

## THE STATION SEPARATOR

(Continued from previous page.)

(a) to one side of the .00005-mfd. preset, and (b) to the moving vanes of the .0005-mfd. J.B. condenser.

When you have completed the wiring, the next job is to join up the unit to your existing set. First remove the aerial lead from the aerial terminal on your set and attach it to the terminal marked "aerial" on the unit. Join the flexible lead which is

### THE PARTS YOU WILL NEED

- 1 J.B. "Popular Log" .0005-mfd. tuning condenser.
- 1 3 inch diam. knob for above.
- 1 B.T.S. coil, type ML/U/1.
- 1 J.B. .00005-mfd. baseboard trimmer.
- 1 Wearite 3 pt. shorting push-pull switch, type G.W.C.
- 1 T.C.C. .0005-mfd. fixed condenser, type M.T.
- 1 Belling & Lee indicating terminal, marked "A," type R.
- 1 Baseboard 5 in.  $\times$  4 in.  $\times$   $\frac{3}{8}$  in. plywood (Peto-Scott).
- 1 Polished wood panel, 4 in.  $\times$  4 in.  $\times$   $\frac{1}{4}$  in. (Peto-Scott).
- Wire, screws, flex, etc.

attached to the preset condenser and marked "to A terminal on set" to the aerial terminal on your existing set from which you have just removed the aerial lead. Join the other flexible lead to the earth terminal on your set. Those are all the connections needed.

Now pull the knob of the wave-change

switch towards you, so that the circular plate on the back of the spindle engages with the three contacts. In this position the long-wave windings of the dual range coil are shorted out, and the unit is then ready for tuning on the medium waveband.

Adjust the tuning control on your set to any station that you know—say, one of the Regionals, or National. Then rotate the knob on the "Station Separator" until you receive this station at its maximum volume. This is to give you an idea of the position at which a given station will come in on the unit. Do this for one or two stations and you will soon find the approximate settings of the separator dial and notice how they correspond with the tuning settings on your receiver.

### Coupling Adjustments

This may sound a little complicated, but in practice you will find it the work of but a few moments. Having got the hang of the tuning on the unit you will soon see what an improvement it makes when you tune in some of the Continentals.

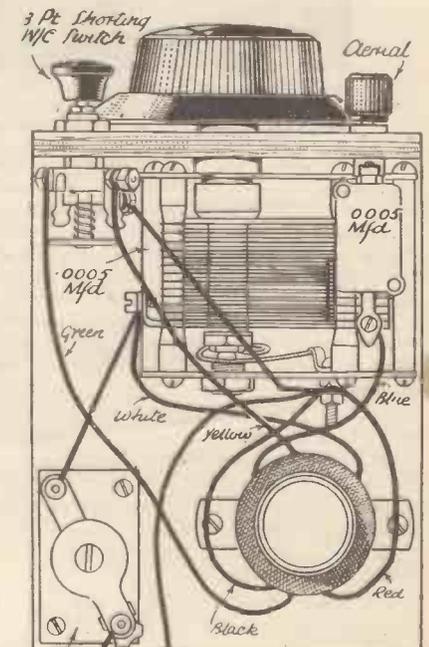
You will find that you can receive them with a clear-cut clarity that you haven't been able to obtain previously.

Juggle a little with the setting of the preset condenser and note the difference which the various adjustments make. Remember that the farther you unscrew the knob—that is, rotate it anti-clockwise—the sharper will be the tuning.

To switch over to the long wave on the unit all you have to do is to press the wave-change switch knob towards the panel so that the circular disc on the spindle disengages from the three contacts.

We feel sure that a very large number of

"P.W." readers will find in the "Station Separator" just the little gadget they have been looking for. It will certainly give many sets a new lease of life. A. J. R.



00005 Mfd. Preset  
To E. Term. Of Set  
To A. Term. Of Set

One of the tags on the .0005 mfd. fixed condenser is bent over and clamped to the shank of the aerial terminal.

# I TRY A METAL CHASSIS

Describing a change-over from panel and baseboard design to the metal chassis idea

AS my extra set of coils hasn't turned up yet—and as I do not yet feel capable of designing my own—I have perforce left the idea of adding a high-frequency amplifier to my set. Instead, I have been very busy with an entirely new—to me, that is—structural layout.

The more I see of other people's designs, the more I am convinced that the all-metal chassis is "the thing." And, by the same token, that the old panel-and-baseboard construction is taking a back seat.

### Improving the Design

Anyone can make a one-valver with nice short leads, all very efficient looking, even "professional." And this can be done, I have discovered, with the panel-and-baseboard idea. But as soon as you start adding low-frequency amplifiers—and I suppose even more so with high frequency—you find yourself with wires all over the shop.

My O-V-1 was rather a sprawl on that 16 in. by 8 in. metal panel and equally large Metaplex baseboard. Indeed, with the resistance-capacity amplifier in circuit the whole thing looked—and let me admit was—a "botch."

I had a spare 16 in. by 8 in. metal panel by me and decided to turn this, somehow, into a small metal chassis. I bent it twice at right angles to form an upright control panel 6 in. high, a baseplate 8 in. deep and a back support 2 in. high. Perhaps you will forgive me for having drawn this out as Fig. 3 (see page 407). The front support I sawed out of a Metaplex baseboard, as shown.

Well, there I was with a home-made

metal chassis—very little trouble to make up and quite cheap, too. The problem was: "How can I squeeze in all the parts for my O-V-1 set?"

I drew out once again my theoretical circuit diagram, which I show as Fig. 1. Here you see a capacity-coupled aerial going to a four-pin, short-wave coil, with series-fed reaction and resistance-capacity coupling to a Harries-type power valve, whose output is through a choke-capacity filter. Looks simple enough—but it happens to represent a vast amount of trial and error on my part.

Determined to put this circuit into "all-metal" practice, I made a start by drilling

which is which when you are twisting the holder round and about.

To get over this I inked the marks "G," "A," "RC" and "E" against their appropriate terminals. Then I played, it seemed for hours, at arranging the parts.

They just would not come right anyhow. My difficulty was mainly in getting both tuning and reaction condenser leads short. I suppose actually this is a common enough problem, isn't it? Anyway, the light dawned at last—and now the tuning is on the right and reaction on the left.

### The Layout Used

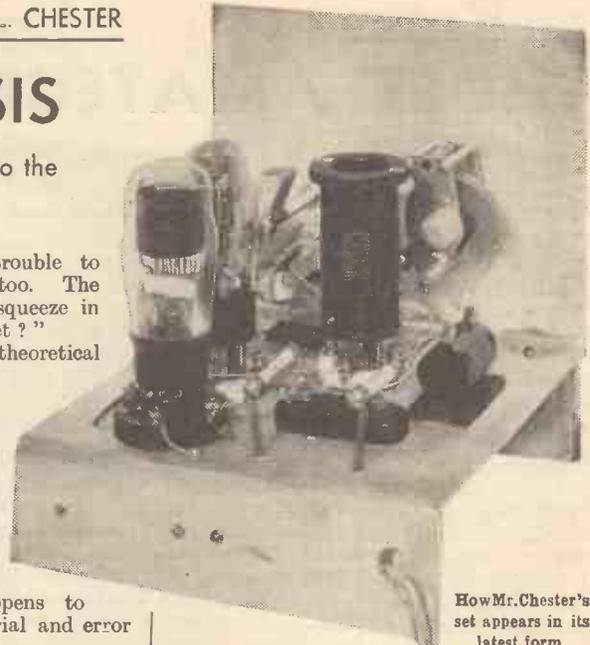
Which, I wonder, is the accepted standard? Or doesn't it matter? A lot seems to me to depend on where your aerial lead-in comes to the set. I sit at a table where the window bringing in the aerial is on my right—and under this condition it is certainly better to have the tuning on the right, with the 'phones terminals on the left.

If now you will look at Fig. 2 you will see how I finally got the main components laid out. The coil holder comes to the left of the tuning condenser, nearly dead behind the reaction condenser, which being narrow allows plenty of room for the insertion of the coil.

Behind the tuning condenser lies the detector valve holder, and behind that the low-frequency-amplifier valve holder. As you see, the short-wave choke is placed to the left of the coil holder, giving a short enough connection. And just beyond the choke is the coupling condenser—again a short lead.

I don't know whether the Editor will have time to get the set photographed for this week's article. If he does you will be able to see how I have managed to keep my high-frequency leads all quite short. The longest is 2 in. and the rest are even less.

(Please turn to page 407.)



How Mr. Chester's set appears in its latest form.

## THE CIRCUIT OF THE SET ABOVE

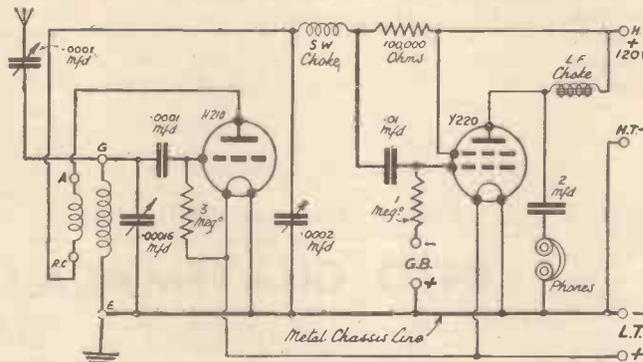


Fig. 1. Note the series aerial inductor. The output valve is of the Harries pentode type.

the panel support for my .00016 tuning condenser and .0002 reaction condenser. Wondered why the centre cutting bit was going a bit stiffly—until I found I had cut a huge 3/4-in. hole instead of the normal 1/2 in. One gaping hole in panel!

I then fixed the tuning condenser on the left and the reaction on the right. And for that little act of thoughtlessness I paid in several minutes of subsequent brain fog. I'll tell why in a moment.

### Coil Connections

With the theoretical before me, I tried laying out my bits and pieces to ensure short leads. I had to fit in the coil holder, the valve holders, aerial pre-set condenser, short-wave choke, coupling condenser—and the low-frequency filter components.

Once more I got muddled with those four-pin coil connections—so difficult to know

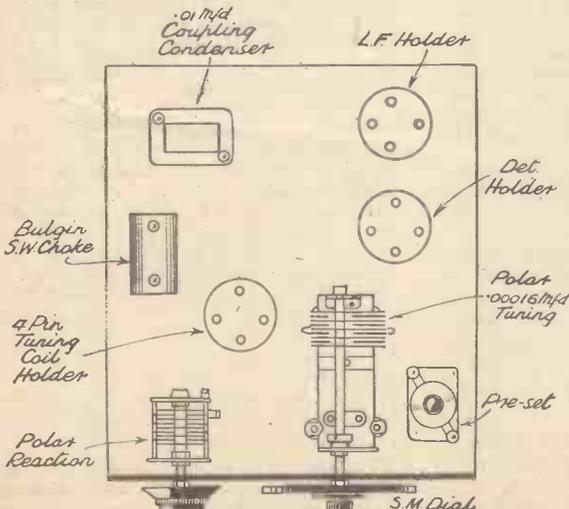


Fig. 2. The layout of the components is shown in this diagram.

## THE DIAL REVOLVES

By LESLIE W. ORTON

## THOSE AMATEUR HOURS

ATTRactions ON THE 20-METRE BAND :: UNCERTAIN  
RECEPTION ON 49 METRES :: DX LISTENING ON A  
MOUNTAIN

**H**Ave you ever had to put up with the endeavours of someone who imagined that he or she (the latter is the worst variety!) was a budding "star"? Shake hands, brother, so have I, and the outcome was that reference to amateur hours was like a red rag to a bull—it made me stamp about in a rage!

## Mortified!

Then came disgrace. One fine day I tuned in an excellent variety programme from W2XAF. Can you imagine my feelings when the announcement came and I realised that I had been enjoying an amateur hour? Was I mortified? Hm!—and reformed! Now, believe it or not, I'm suggesting that you gallant fellows tune to one or other of the amateur hours broadcast from the "States."

Willing to risk it? Try anything once, did you say? That's the attitude. W2XAF and W8XK transmit such hours regularly, and I'm confident that you will enjoy yourself listening to them. If you meet me at some future date you may remember this paragraph and, shaking my hand, say "Good fellow," or you may sock me on the jaw and say. . .!

## At Your Finger-Tips

A twelve-hour service of "Yanks" is among the attractions of the 20-metre amateur band offers this week. From all parts of the Continent stations are roaring in as if their lives depended upon it. Why not invest in a little midnight oil? You will have the time of your life if you do.

From 9 p.m. to 9 a.m. the world is at your finger-tips and a little searching will open your eyes and no mistake. Among my most cherished catches are WTOM (presumably a ship); IU5JA, Buenos Aires; X4SA, Puerto Rico; CO2OJ, Cuba; CP4BB, Bolivia; CX2AK, Uruguay; PY2AC, Brazil; VE1JA, VE1AC, and VE3EO, Canada. Envious? I thought you might be!

And as for "Yanks"—well, there seem to be two-million-quadrillion of them! Among my latest catches have been W1BEJ; W1TW, W2DH, W2PK, W4DZ, W5BY, W7BE (something to boast about!), W8XYT, W8VY and W9OM. At this rate I'll soon need a new log book!

Reception is excellent in the early mornings, and as late as 9 a.m. recently I picked up W9SY, Shawnee, Kansas, and W9AC, St. Louis, at excellent strength. Indeed, I was thoroughly enjoying myself when some sweet dame switched on a vacuum-cleaner or hair-drier. I was just beginning to get used to that when a car stopped outside and the driver left it with engine running—that was too much! Exasperated beyond measure I slammed the switch off and stamped from the room!

## A 10-Metre Flash

Have you heard CRCX, Bowmanville, on approximately 10 metres yet? Or

police stations W2XES, Englewood, and W3XAR, Brookline, on the same band? No! Then perhaps you have heard W8XBT, Springfield, or W8XM, Detroit police.

This band is rather dull at the moment, but it's well worth watching, for no film star was more temperamental than it.

## East Versus West

East and West are going it hammer-and-tongs for supremacy in the radio world, and the sparks are flying as a consequence! The centre of the battle appears to be the 25-metre band where JZJ has held its own against all comers. W2XE, WIXAL and a new Cuban station COCY on 25.4 metres have been providing entertaining but not particularly powerful signals.

I wouldn't give a bent dime for the 49-metre band at the moment—reception is about as uncertain as the weather.

## On Top of the World

"Come up and see me some time" appears to be the motto of J. R. of Cheltenham, who does much of his DX listening from the top of a local mountain! Unusual? Perhaps, but that boy has brains as his log shows. He's heard over a dozen



Here are some more stations for your log.

VK's and goodness knows how many W's in the last two months. No, I'm sorry, boys, but I daren't divulge the whereabouts of the mountain, for I can visualise its sides covered with aerial masts if I did!

## A Narrow Escape

I had a narrow escape the other day. I jumped out of the frying-pan into the fire and survived! And this is how it happened. I challenged a friend to tell me of a more attractive all-round entertainment than the amateurs offered. "Try the commercials," he said. My first catch was PLE, Bandoeing, followed by SUV and SUZ, Cairo; FZR, Saigon, and many more stations. I was just beginning to think that I had backed a loser when I tumbled on VK2SU at Cremerne, N.S.W., on the amateur band—and so I still consider it the best for entertainment.

## SHORT-WAVE STATION IDENTIFICATION

By F. A. BEANE

## INTO GUATEMALA AND MEXICO

**I** WONDER what our American cousins would do without the Republic of Guatemala! That may have set you guessing, although perhaps you already know that Guatemala is the chief provider of chicle, the essential ingredient in the manufacture of chewing-gum! But the Republic is not essential to me for its chicle or coffee; the product I like is its plaintive marimba music, and, fortunately for me, I can get quite a lot of it from TGWA, "Radiodifusora Nacional," of Guatemala City, which operates on 31.75 m., and is best heard any Sunday morning until about 09.00. Identification is simplified by frequent reference to the slogan and announcements in English, French and Spanish. Incidentally TGWA verifies reception by QSL card, and if you are very lucky you will also get a generous sample of coffee about three months later!

Still in the capital city we visit the Police, but only to discover their station. TG2X (50.51 m.) which is often heard until 06.00 B.S.T. Fortunately for us they announce in English and occasionally relay the National Police Band. Their slogan is "La Voz de la Policia Nacional." Then there is TGS on 52.45 m., which styles itself "Radiotransmisora de la Casa Presidencial" and employs a five-chime signal; and a TG2 occasionally testing and relaying TG1 on 48.00 m. At the time of writing there does not appear to be any further activity in the Republic, and so we wander into Mexico, where we find confusion among the ranks of the S.W. Broadcasters.

However, at the moment, I can give a few definite details as follows:

**XEBT** (50 m.) Mexico City, a relay of XEB, may often be heard broadcasting until 07.00 and signing off with a long siren wail reminiscent of the films and American Police. Reference is often made to "El Buen Tono," and occasionally we may hear three chimes, cuckoo-calls or a cock-crow.

**XECR** (40.65 m.) of the Mexican Government, Mexico City, is seldom mentioned in publications, but is often very powerful between 00.00 and 01.00 Monday mornings. Prose and music by Mexican composers is given, and English used at frequent intervals. XECR verifies reception with a picture postcard and welcomes reports.

## Excellent Strength and Quality

**XEW** Mexico City is a newcomer of excellent strength and quality operating on about 31.65 m. Listen for it between about 04.00 and 07.00 and note the employment of a four-chime (descending) signal and reference to "La Voz de Latina America." When closing the chime signal is heard at brief intervals and the announcement, in Spanish, is superimposed on a piece of native guitar music, and invariably followed by an English announcement running something like this: "Ladies and Gentlemen, you have been listening to XEW, the Voice of Latin America, in Mexico City; Good-night Folks."

There are many other interesting Mexican transmitters worth trying for, and I propose that we summarise these in the next number of "P.W."

# ON THE

# SHORT WAVES



SHARPENING UP

By W. L. S.

SHORT-WAVE listeners, for many years, have been having an awfully easy time of it. Any old set has been good enough to give results that really pleased—well, anyone who was easily pleased. Above all things, this success of the simpler type of receiver has been responsible for the popularity of short-wave work as a hobby for the home constructor.

For many years a short-wave set just didn't need to be selective. There were plenty of short-wave stations, but they were spread out over such a vast ocean of kilocycles that it was only rarely that two of them clashed.

This state of affairs didn't last long on the amateur bands; more and more stations got on the air in every country in the world, and the selectivity problem started to become really acute. Up sprang "single-signal superhets," and other selective receivers, which alone made it possible for amateur work to continue on its old basis of unlimited numbers of stations and bands of a few hundred kilocycles.

More recently, the enterprise of various commercial concerns and of various governments has been responsible for an enormous increase in the numbers of the short-wave broadcast stations—and so the selectivity problem has arisen once more.

### The Single Valver

Two years ago I was preaching the doctrine that quietness of background was the first consideration in a short-waver. I designed single-valve receivers galore, and readers built them and obtained excellent results—chiefly because of that very quality of background. Certain people

laughed at me and said that sets with only one tuned circuit were bound to be hopeless; at any rate, in theory they were rotten, and if, in practice, they happened to work well, that was just an accident.

Well, I'm unrepentant. I still think I was right then—but I'm not foolish enough to say that the same thing holds good to-day. A single-valver is an excellent set to play with for all sorts of purposes, but it won't stand up to the modern requirements of selectivity.

If you do use such a set—and I include detector-and-L.F. sets in the same category, for I mean any set with only one tuned

circuit—that tuned circuit has got to be extraordinarily good if the set is to give really good results.

### One-Circuit Selectivity

For a tuned circuit to be good, the condenser has to be good, the coil has to be good, the link between them (i.e., the wiring) has to be almost non-existent, and the external damping has to be negligible. That is to say, aerial coupling *must* be loose, even at the expense of signal-strength.

If you have a set with one tuned circuit, and you are bothered with flat tuning you must look to all these points, and the chances are that you will be able to improve its performance quite a lot. When you have done so—and not until then—you had better start thinking about adding another

did with the detector. And remember that you must still avoid the introduction of heavy damping into the detector circuit. This now means that you will have to use loose coupling between the H.F. valve and the detector. You can use six-pin coils and transformer coupling, or four-pin coils with tuned-grid coupling, using a neutralising condenser between the anode of the H.F. valve and the grid of the detector.

The superhet, of course, is another way out. Here the selectivity is gained largely from very sharply tuned circuits in the I.F. amplifier—but, again, you must watch the early stages. The H.F. stages, the detector and the beat oscillator must all be as efficient as you can possibly make them. If they are inefficient, and the I.F.'s very sharp, you will get one kind of selectivity only.

A powerful station very close to you, but some little way off in frequency from the one you are listening to, will no longer break through seriously; but the station next-door in frequency to the one you are tuned to will still interfere, if your "signal-frequency" circuits are poor. The same rules apply—good condensers, good coils, short wiring and low damping. Write these out in block capitals and stick them up in front of you whenever you build a set—unless you have sufficient imagination to think they're there all the time!

### Ganged Receivers

Sets with ganged H.F. stages are a source of trouble unless the ganging is absolutely perfect. In fact, I would go so far as to say that a ganged set out of adjustment, with that beautiful "off-set" tuning that one gets in such circumstances, is generally

worse from the selectivity point of view than a set with only one tuned circuit.

Small aeriels are another thing that will help. One doesn't need to use 100 feet, or even 70 feet, these days. A really nice 30 feet of wire, slung "up in the clear," will give better results all round. Indoor aeriels should be of low capacity—that is to say, even if they are short, they should be well clear of walls and ceilings, otherwise they may be just as poisonous in their effects as an outdoor aerial that is miles too long.

And so, you see, it is not so much the circuit you use as the way you lay it out that governs the set's selectivity.

## NATIONAL 5-METRE FIELD DAY

The following is a list of stations which will be active on the 5-metre band during Sunday, July 4—R.S.G.B.'s "National 5-metre Field Day." It is hoped that there will be many others, but these in the list will definitely be on the air, mostly at high points.

- |                                |  |
|--------------------------------|--|
| G5CD Wendover                  | G5FV Keyingham, Hull                     |
| G5JU Tag Hill, Bristol         | G6LK Pitch Hill, Surrey                  |
| G2DC Liverpool                 | G16YW Mourne Mountains, Northern Ireland |
| G5IJ Horsenden Hill, Middlesex | G5QN Burton Green, Coventry              |
| G6FV Foxes Cross, Whittable    | G2FA Folkestone                          |
| G6UT Abridge                   | G6WJ Wooley Edge, near Wakefield         |
| G6NR Dunstable Downs           | G6DP Frodsham                            |
| G2WS Matlock                   | G16XS Orlock Point, Northern Ireland     |
| G6YJ Near Porth, Rhondda       | G5FS Dundry Hill                         |
| G6GL Wirral                    | G6OK and G6YQ—Summit of Snowdon          |
| G5ZT Near Preston              |  |
| G5BK Malvern Hills             |  |
| G6JZ Whitehaven                |  |

Listeners who hear any of these stations on 5 metres should report at once, either to me, c/o "P.W.," or direct to the R.S.G.B. at 53, Victoria Street, S.W.1.

tuned circuit, which, in these days, means adding a stage of H.F. amplification.

But if your set is obviously inselective, don't just go and slam an H.F. stage in front of it, or the chances are that your new set, for all its two tuned circuits, won't give you more selectivity than you really ought to get with one. So sharpen up your detector first. Shorten the wiring, improve the layout, and use the loosest aerial coupling that you possibly can.

### Use Loose Coupling

When you add an H.F. stage, take as much trouble with its tuned circuit as you

ON THE SHORT WAVES—Page 2.

## POINTS from the POST-BAG

W.L.S. Replies to Correspondents

**T**HREE points from R. H. S. (Cricklewood): (1) Can he use Eddystone condensers, which he has on hand, in the "Simplex" Three, instead of those used in the actual set? Yes, certainly. (2) Have I forgotten about the H.F. unit that I was going to describe? No—a two-H.F. unit is being made now, and will appear as soon as possible. (3) More dope on amateur stuff wanted. (No answer necessary!)

P. M. B. (Wembley Park) comments on the way in which the 20-metre band has been "punk" for U.S.A. amateurs, but not by any means so for South Americans. In proof, he encloses a really terrific list of South American calls heard, including several that are new ones on me. The countries heard include Venezuela, Colombia, Uruguay, Argentina, Chile, Brazil, Peru, and several of the Central American and West Indian localities like Costa Rica, Dominican Republic, Porto Rico, Virgin Islands and Barbados.

He also comments on good reception from Y I 2 B A (Iraq) at all sorts of times when nothing else appears to be coming in, and mentions X G 3 B Y, who announced himself as "near Sardinia." This last sounds a bit doubtful.

### The QSL Racket

R. D. E. (Sawbridgeworth) makes some very sensible comments on the QSL racket. He says, "Re your remarks about W 2 X A D or V K 2 M E cards being too common—I feel the same about this now; but there was a time when I valued them, in the same way as the beginners do now. But we have all got to start. I've a few common QSL's among my 1,450, but don't think any less of them for that."

R. D. E. reports V S 7 J W and V S 7 M P (Ceylon), both on phone, together with a list of thirty-three Australian phones. He also mentions a veri from W 6 X K G on about 11 metres and W 9 X J L and W 3 X E Y on 9 metres—the latter at the Baltimore Radio Show.

L. E. S. (normally of S.E.5) writes from Wiltshire, where the "perfect location" at which he is staying makes him wish he had a portable. He remarks that from his station in London, during fifteen months of listening, he has hardly heard a single worth-while DX station that has not been in contact with a British amateur—or, at any rate, a European. He also comments on the number of British stations who misread the calls of stations heard. He heard the Javanese station P K 1 M X, and a Britisher immediately started up calling "V K 1 M X of Sydney"—rather odd, because there aren't any V K 1's!

L. E. S. points out that the V K 9th district does not come in Zone 17 for the "18 Club"—it is in Zone 16. Quite right.

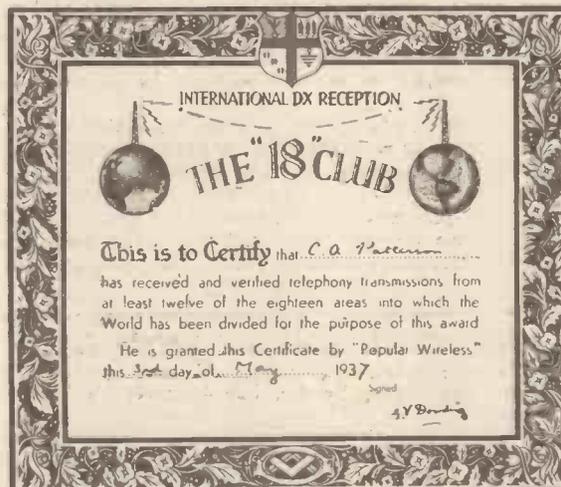
And he says that the full Q R A of J 9 C A, about whom I expressed suspicions recently, is in the new Call-Book. J 9 C A is in Formosa.

J. L. V. (Exeter) says that most of his DX listening is now done between 5.30 and 7 a.m. Energetic soul! But I know how good it is at that time in the morning. He comments on the extraordinary strength of the Australian phones V K 2 X U and V K 2 H F when conditions are anything like right. Other stations mentioned are P K 1 M X, P K 1 G L and P K 4 A I, along with a nice list of V E 5's and South American whatnots. For X G 3 B Y, also mentioned, see previous column.

### Hum when Switched Off

S. J. (Croydon) is improving his detector by easy stages, and now claims to have something absolutely white-hot. And he asks whether readers who run their sets from mains units have ever noticed that there is still some hum there, even with

## THE HALL-MARK OF GOOD LISTENING



Here is a small reproduction of our "18 Club" certificate. The certificate itself is produced on glossy superfine art paper, and full details of how to qualify for it were given in our issue dated May 1st.

the set switched off. This, he says, can always be cured by using choke-filter output. I believe he is absolutely correct.

W. P. (Ulverston) asks about how to join the R.S.G.B. and the B.S.W.L. For the former, apply to the Secretary, R.S.G.B., 53, Victoria Street, S.W.1; for the B.S.W.L., Mr. F. A. Beane, Ridgewell, Essex.

Reproduced on this page is a little picture of the "18 Club" Certificate, just to stir some of you to further activity. The full particulars of how to claim for it were given in the special short-wave number (May 1st), but I will shortly give another list of the eighteen zones and the countries included in them. There are plenty of these fine certificates left, and although we have made it fairly difficult to obtain them, we don't want to have any left at the end of a year! So roll up and claim them.

R. G. S. (Hastings) comments on queer conditions that have prevailed once or twice recently, the South Americans and U.S.A. stations having been all mixed up on 20 metres. This is rather unusual—one set or the other are usually good, but for both North and South to come through really well is certainly a freak.

## Short-Wave NEWS

**J**UST as everyone had stopped moaning about bad conditions, and made up their minds that we had better settle down to a summer of poor results, back they all came again! But it's rather queer, because only those who restrict themselves to broadcast listening on the short waves have ever had the idea that conditions were bad!

They have been bad on the 19-metre band, admittedly; and they have been bad on the amateur 20-metre band, as far as "Yanks" have been concerned; but that's where the badness ends. South Americans by the score have been coming through for night after night, and the recent outbreak of thunderstorms seemed to bring back all the North Americans as well.

I find that short-wave listeners are getting more and more fed up with the indescribable welter of sound that goes to make up the so-called "49-metre band." Extending from the top edge of the 40-metre amateur band up to about 55 metres, there seems to be a sort of radio n-man's-land. The stronger stations which appear in the lists are usually there to time, but all round them are terrific numbers of other stations—mostly Latin-American—which vary so greatly from day to day that it's impossible to identify them without really hanging on and hearing an actual announcement.

### Memory Refreshing

It's surprising how many people don't even bother to listen on that band at all nowadays. I don't, for one, except when I want to refresh my memory about the nasty noise that goes on.

Police transmissions are attracting a lot of attention among listeners who can get up to 140 metres or thereabouts. G T M (Edinburgh) is particularly strong in London; and, of course, the new station G W W at West Wickham, Kent, is making his presence felt in no uncertain way. I wonder how strong he is up in the North? He makes a proper mess of people in Bromley and Hayes who have inselective receivers.

Amateur work on the 160-metre band (while we are up that end of the spectrum!) seems to have received a fresh fillip since National Field Day. Quite a number of stations work regularly up there on week-day evenings nowadays, mostly on C.W., and quite surprising results are being obtained over distances of 200 or 300 miles with low power.

When you're feeling dull "down below," wind some coils to cover 130-200 metres. What with police, amateurs, trawlers and lightships, you will find quite a variety of stuff to amuse you. You will, however, need to cultivate the art of staying up late, because most of the amateurs on 160 metres are very late birds.

W. L. S.

# MICROPHONES ALWAYS TELL THE TRUTH

*Describing the use of the "atmosphere" microphone and how "mike" outputs are blended to produce various effects in the receiver*

JUST as gossips can put an awkward twist to a straight story, so the microphone in the early days of radio did not always tell the truth. In other words, it was liable in some of its moods to make things sound either not so good as, or worse than, they were.

Intensive research by B.B.C. engineers has altered all that.

The microphone that gives you your daily radio programme is now the slave of the studio.

Important progress, this. It has brought to radio an entirely new technique that has radically changed production methods in certain broadcasts arranged by the Variety department in which, very often, there is a large cast of principals, a chorus, effects, a full orchestra—and even an audience.

## Pioneers of the Art

Pioneers in multi-microphone technique, as it is called, Gordon McConnell, B.B.C. producer of operettas, musical comedies and comic opera programmes, and Rex Haworth, technical producer, in co-operation with Dr. F. W. Alexander, of the Engineering Research Department, have evolved a system which nowadays enables them to do to sound what make-up experts do to film faces.

Three years ago, Mr. McConnell was given permission to see for himself how studio opera and operetta were produced from Milan. Before he came home from Italy, however, he went specially to see Dottore Ingnere Tutino, Engineer in Charge of the Milan Broadcasting Station who, showing him over La Scala, demonstrated his multi-microphone-mixing methods in a special listening room two floors below the stage. They were, curiously enough, similar to those used by Rex Haworth.

But it was Tutino's use of the "atmosphere" microphone which was of particular interest, and it was introduced to St. George's Hall technique as soon as Mr. McConnell returned.

A few years ago, sections of the cast for one of Mr. McConnell's productions were scattered—isolated—in various Broadcasting House studios. Each studio had its own microphone, and the network of connecting lines led to a control panel elsewhere in the building from which, by a series of talk-back loudspeakers and cue lights, the producer linked dialogue, music and song into a coherent, continuous story.

## At a Rehearsal

How does the present system work?

Watch them for a few moments during the rehearsal in St. George's Hall of a recent comic opera.

Towards the back of the stage, members of the Theatre Orchestra are spread fan-wise on tiered seats. Tall, slender Mark H. Lubbock, Musical Director of Variety, is upon the conductor's rostrum before them. Behind him, the stage has been extended over the orchestral pit, turning it and the stalls beyond into a wooden plateau.

Upon it are trays of "effects"—shingle, broken crockery, sheets of metal.

About six feet away from the conductor

are three microphones, two mounted on stands, the other suspended from the sides of the proscenium. On a sheet of green canvas on the floor below are figured squares indicating the exact spot at which each artist must stand whenever he or she is broadcasting.

A fourth microphone hangs inquisitively above the orchestra. A fifth, dangling six feet below the lofty roof of the auditorium, is reminiscent of the keyhole eavesdropper.

There may, at times, be a sixth or seventh hanging elsewhere in the building—one perhaps for a narrator, the other either for special effects or to act as a second "atmo-

full value to the final 'ch.' It sounded like 'chur' to me—"

"That must be more slick, more speedy, but keep it clear—"

"Just too much voice there—" and lots of things like that.

Less urgent instructions can wait till the end of the rehearsal; meanwhile, the producer dictates his do's and don'ts to a secretary beside him.

Next to Gordon McConnell, Rex Haworth is mixing the output of the microphones, creating oral illusions, adding atmosphere and reverberation.

And as he operates the controls governing each microphone, his eyes are intent upon the needle of a programme meter above him, whose tell-tale dial shows from second to second the volume of outgoing sound.

## Mixing the Output

All kinds of queer effects are obtained by judiciously mixing microphone output: alone, one "mike" may give an intimate drawing-room "close-up" of a piece of music or dialogue; but when its output is blended with that of another in a different part of the building the effect is so changed that listeners might well imagine that the setting is a vast empty hall or a stone-flagged corridor. All because microphones do tell the truth, reproducing sounds exactly as they reach them. A large part of the skill in multi-microphone technique rests, therefore, in the positioning not only of artists but of each microphone.

During the three years that the technique has grown, recordings have been made of typical broadcast performances during which it has been employed.

Useful comparisons are, as a result, easily available, for the story of progress is preserved in sound.

## SYLVIA WELLING



The well-known stage and concert soprano, who has broadcast several times and who appeared in "Regatta," a recent television revue produced by Dallas Bower.

sphere mike," picking up a different quality of reverberation.

If you look to the left of the back stage, you will see a small building that looks very like a railway signal box of the size which usually equips a wayside station; the simile does not end in appearance, either. For the "signal box" is the silence room, the nerve centre of every broadcast from St. George's Hall, the line junction of each of the microphones, converging their traffic of voices and sounds sent speeding on their way through Broadcasting House to the transmitters.

The sound-proof material of which the box is built excludes from its interior the direct sounds that are coming from the stage. Through its wide range window, artists, orchestra, conductor, can be seen—but they can be heard *only* through the loud-speaker, working during rehearsals on a "closed circuit."

## Microphone Instructions

Inside, you will see Gordon McConnell, script before him, another microphone nearby through which he can talk to anyone on the stage whenever necessary, giving them instructions on points that inevitably arise:

"Don't clip the 'church,' chorus. Give

## B.B.C. STATION CHANGES

COMMENCING on July 4th, there will be certain changes in the nature of programmes sent out by some of the B.B.C. stations. There will also be one exchange of wavelengths.

At present the West Regional and Penmon stations are synchronised and send out a combined programme for West of England and Welsh listeners. On July 4th West Regional will become the Welsh Regional. It will remain on the same wavelength, and Penmon will still be synchronised with it, and will send out the Welsh programme also.

At the same time as this change takes place the present West National, now synchronised with London and North Nationals, will become the West Regional, and cater specially for West of England listeners. Obviously its wavelength will have to be changed and will become 285.7 metres, the present wavelength as the Scottish National. This latter station will take over the old West National's wavelength and be synchronised with London and North Nationals.

West of England listeners, now that they are to have their own Regional station, will have to tune to Droitwich—the long waver—for their National programme.

There will be a special series of programmes for the West of England Region to mark its first week of independent existence.

# PICTURES IN COLOUR

By CARDEN SHEILS

How a double-gun cathode-ray tube can be employed to produce television pictures in colour

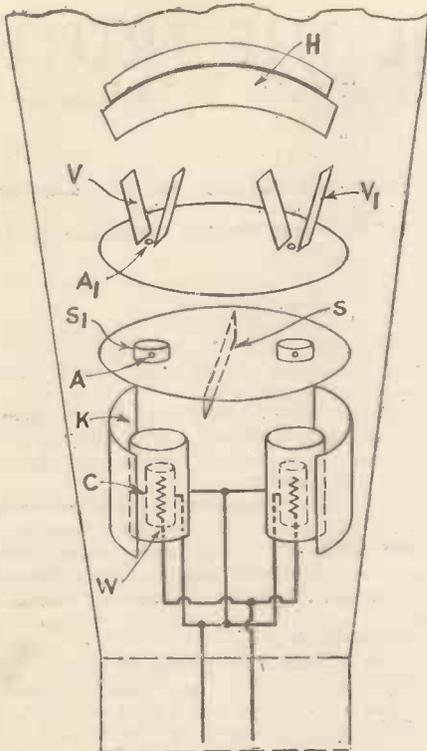


Fig. 1. The electrodes are duplicated and arranged side by side in the tube.

THE transmission of pictures in natural colour is not so far off as some people might think. Although we have taken a long time to get as far as we have, it is the usual story of slow work in the beginning. Once a thing like television reaches a certain stage of development, it is surprising how rapidly it forges ahead and acquires all the finishing touches that make for perfection.

Readers who have seen the regular B.B.C. programmes will agree that many of the items still depend very largely for their effect upon the spoken word. How often, for instance, the commentator adds colour—in every sense of the term—by remarks like these:

"Here, ladies and gentlemen, you see Betty, who is wearing the latest bathing creation in blue and yellow, complete with a wrap of emerald green." Or words to that effect!

Naturally, this kind of picture simply cries aloud to be shown in real colours! It has already been done on the cinema screen, and there is no reason why the B.B.C. should not be able, sooner or later, to follow suit on the fluorescent screen of a cathode-ray receiver.

## All to the Good

The fact that the programmes are now being sent out on the ultra-short waves is all to the good, because colour effects usually require two or more separate sets of signals, which are of course combined together in the receiver. On a six- or seven-metre carrier, this is quite a reasonable proposition, though it would be impossible to attempt anything of the sort on the medium waves. For one thing, it would take up the whole of the available ether space, leaving no room for existing broadcast transmissions, and for another we haven't yet found the right kind of circuit to handle so wide a band of frequencies on the longer waves.

Reproduction in colour depends upon the fact that every tint in nature can be derived from the three so-called "primary" colours, namely, red, green and blue. Yellow, for instance, is a mixture of red and green. In practice it does not matter whether the mixture of colours required to produce a given tint are thrown on to a screen simultaneously, or in very rapid succession. In either case the eye receives exactly the same impression.

Incidentally a pleasing impression of colour can be produced by using only two of the primary colours instead of all three—though of course the results fall somewhat short of the real thing. But by saving one complete set of signals, it greatly simplifies matters, and at least offers us half the loaf—which is better than no bread at all!

## Three Sets of Signals

The ideal scheme of colour transmission, however, calls for three different sets of signals, the first representing the "reds" of the picture, the second the "greens," and the third the "blues." Luckily, we have already at hand photo-electric cells which are able to discriminate between these different colours, so that as the picture is scanned at the transmitting end, one coil will respond only to the reds, another to the greens, and a third to the blues.

The signals may be sent out on three different carrier-waves, which are separately rectified at the receiving end and used to energise three differently coloured lamps, the light from all three being thrown simultaneously on to the viewing screen. Or we may use a single scanning-disc having three different sets of spirals, one fitted with red glass, the second with green, and the third with blue. In this case the three "outlines" are actually thrown on to the viewing screen separately, but they appear in such rapid succession that the eye is "deceived" into seeing only one picture dressed up in natural colours.

For the present we seem to be anchored to the cathode-ray type of receiver, to which the ordinary scanning disc does not apply; so that it is necessary to find some other method of combining the signals.

## Duplicated Electrodes

Fig. 1 shows a cathode-ray tube which has been designed for reproducing pictures on a two-colour basis. As will be seen, the usual set of electrodes is duplicated, so that instead of one electron stream we have two separate ones, produced along parallel paths on each side of the centre-line of the tube.

For instance, the emissive "spot" on the left-hand cathode C, in combination with the Wehnelt cylinder W and reflector K, produces one clear-cut stream. This passes through apertures A, A<sub>1</sub>, in the first and second anodes respectively, and then between vertical and horizontal deflecting plates V, H on to the fluorescent screen. An exactly similar set of electrodes controls the second electron stream from the cathode on the right-hand side of the tube.

## Preventing Interference

The two streams are prevented from interfering with each other by the focusing means already mentioned. In addition, a separating screen S is provided on the lower side of the first anode, and a focusing cylinder S<sub>1</sub> is placed around the upper side of the aperture A.

The fluorescent screen of the tube is made in two portions A, B, which are separated by a dividing band marked Z, as shown in Fig. 2. Scanning parallel to the line Z is controlled by the single pair of deflecting plates marked H in Fig. 1, whilst scanning at right angles to the line Z is separately handled by the two pairs of deflectors, V, V<sub>1</sub>.

The material forming the fluorescent screen of the part A consists of zinc phosphate which gives a red picture, whilst the material covering the part B is of calcium tungstate which gives a blue one.

The two sets of incoming signals, corresponding to the red and blue outlines, are applied to the respective control electrodes of the "twin" cathode-ray tube, so that one picture is reproduced on the part A and the other on the part B. Both are then reflected by mirrors M, M<sub>1</sub> on to a viewing screen P, where they merge into a single coloured picture.

## COMBINING THE IMAGES

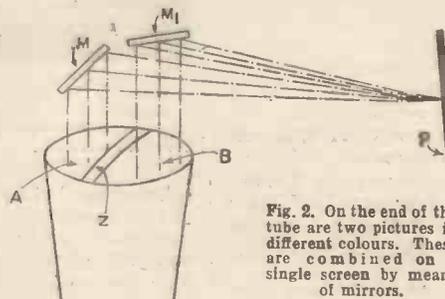


Fig. 2. On the end of the tube are two pictures in different colours. These are combined on a single screen by means of mirrors.

## STARS FOR "MUSIC HALL"

GOOD news for broadcast "Music Hall" listeners. John Sharman has arranged for Flanagan and Allen to appear in his show—their fourth recent appearance—on July 3rd and, in the same programme, ever-popular Bébé Daniels and Ben Lyon will be making their last broadcast in this country before going on a tour of South Africa.

During the Variety performance on July 10th, John Sharman will introduce to listeners a new "team" of his own creation—Lupino Lane, a name known to every theatre-goer, and Mamie Souter, famous for her child impersonations, who will take part in a double act specially written by Douglas Furber.

FROM OUR READERS

# RADIO MAKES PLANTS GROW IN BAD SPOT

The Editor, POPULAR WIRELESS.

Dear Sir,—I feel sure that electricity is a great benefit to flowers. Let me give an instance.

Four years ago I went to live in a newly built house, and, as usual, tried to grow plants in all sorts of places. There was one place, however, where nothing would grow—under my workshop window. One day I removed the earth wire from the water main, where it had been previously, and fixed it to a rod inserted in the ground under the window.

Well, although you won't believe it, I tell you that in three months plants were growing far better there than in more favourable conditions. So what?

G. SHELLEY.

69, Willfield Way, Golders Green, N.W.

## MARKED BY LIGHTNING

The Editor, "Popular Wireless."

Dear Sir,—I would like to tell of an experience I had with lightning. I had just got into my tea when my wife said, "What's the matter with the wireless?" "I don't know, it was all right at dinner-time."

I went over to the corner where the cabinet was, switched on—no sound. Went over it, tried everything. I was about half an hour fiddling with it. I got the headphones. There was a storm coming on, and the wireless had been switched off. A blue light seemed to light up the corner. I got a bit of a shock from the lightning. When I took the headphones off, being a bit thin on top, I had the marks of the phones across my head. Now when there is lightning about I connect earth to aerial!

H. R. V., Sen.

Liverpool, 19.

## WHICH IS THE REASON?

The Editor, POPULAR WIRELESS.

Dear Sir,—As an interested follower of

Readers' Page topics, it seems to me the controversy about the "QSL" racket will never reach a satisfactory conclusion until the "racketeers" come to the real reasons for their insatiable thirst for these unusual mural decorations. Among the spate of arguments in favour of veri-collecting, I can recall no single instance where the purely altruistic intention to be of use to the transmitter has been advanced; the aim seems to be definitely selfish, a proof of one's prowess at the receiver. But, to be completely impartial, I must say that, like the anti-frothblower cranks, the anti-veri-merchants would appear to have no other reason to advance against the practice than that they don't do it themselves.

All the same, it would be interesting to learn what is the real motive behind this etheric brotherhood of pasteboard chasers. What impels them to send reception reports in exchange for the sometimes weird and wonderful cards from across the world (and many more from across the street, of course)?

Has the fact that verification is closely related to veracity anything to do with it? Do the veri-hunters keep the cards up their

Gardening readers will be particularly interested in this experience of a fellow reader.

sleeves, triumphantly to flash them out before the eyes of their sceptical friends who aren't convinced that one can get the back blocks of Saskatchewan on one valve, a couple of bent hairpins and unlimited optimism?

Are many cards collected purely for their artistic value as modernist mural decorations? Does anyone collect them because of a financial obstacle in the way of their obtaining a more orthodox wallpaper?

Do any veri-misers keep their hoard under the floorboards, to be fetched out and gloated over in the wee dark hours? Are the more impressive ones mounted and hung in the baronial hall along with the other trophies of the hunt? ("Got him with a single-valve, my boy!")

And, finally, is there any owner of a vast collection of veris who honestly can say that the cards have been a secondary consideration to his desire to be helpful to the transmitter, and that he would have sent reports just the same had no veris been forthcoming? It would certainly be very interesting to know these things.

A. E. ROSE.

75, Brendon Street, Long Eaton, Notts.

## NORTH OR SOUTH?

The Editor, "Popular Wireless."

Dear Sir,—According to the laws of magnetism, like poles repel and unlike poles attract. The north pole of one magnet attracts the south pole of another magnet, and vice versa. If a bar magnet is suspended, it will come to rest pointing North and South; that is because of the earth's magnetism. The North Pole of the Earth's magnet attracts one end of the little magnet, and the South Pole of the Earth attracts the other end of the little magnet. The end of the little magnet which points North is named the North Pole, but actually it must be the South Pole, because it is the North Pole of the Earth's magnet which attracts it, and

according to the laws of magnetism a north pole attracts a south pole.

If this is right, all the magnets in the world are wrongly named; where they now write "north" on one end, they should write "south," because where they write "north" they mean the pole which the Earth's North Pole attracts, which according to the laws of magnetism must be the south pole of the little magnet.

M. MOWBRAY.

26, Alteryon Road, Newport, Mon.

[An interesting point. Very often the north pole of a magnet is described in full as "the north seeking pole." For the purpose of convenient reading of a compass it would not be helpful if the pole which turned approximately towards the geographical north were called the South Pole.—ED.]

## HEREDITARY

The Editor, POPULAR WIRELESS.

Dear Sir,—Although I have only been taking your paper for about nine months, I am very much impressed, and join with many thousands of other readers of your wonderful paper in congratulating you. I am only fourteen years old, but have already made three "P.W." sets. The "Simplex" Two, Mr. L.

Chester's One-Valvor and, believe it or not, a two-valver described in an edition of "P.W." for the year 1924!

The explanation of this is that while rooting about in a disused storeroom, I found a pile of books. After removing about two inches of dust, I saw the cover of a 1923 "P.W." staring at me! I discovered later that my thirty-years-old brother had been taking "P.W." since its birth.

I am very interested in, short waves, and find your articles extremely interesting and useful. My friends at school are all interested in your paper, and their names have appeared before in it often enough. But now, as I am itching to go into that little hut at the bottom of the garden, which is crammed full of wireless sets, parts (and wire), I will "can it."

NICHOLAS CARRINGTON.

Long Meadow House, Coombs Road, Bakewell, Derby.

## WANTED BY ANOTHER

The Editor, "Popular Wireless."

Dear Sir,—I read with interest a letter from your reader, John B. Lowe, in May 15th issue, and have only just plucked up enough courage to write. I am in an exactly similar position to him. I am sixteen years old and have read "P.W." for four years, but have not yet been able to find a set to suit my pocket-money. I should welcome such a design as mentioned by your reader.

I find all your articles very interesting, and wish you and "P.W." every success.

T. E. OGDEN.

426, Stockport Road, Denton, Lancs.

[Our research dept. is now working on the idea referred to in this letter.—ED.]

## MAINS S.W. WORKING

The Editor, "Popular Wireless."

Dear Sir,—Having been a reader of "P.W." for the last three years, I wish to take this opportunity of congratulating you on such a fine publication. The articles by Leslie W. Orton and F. A. Beane fill a long-left gap in S.W. news.

I would like to make one suggestion (and I think that many more readers of your paper would agree with me), that a few circuits of mains short-wave sets, such as 1v.2's or 0v.2's, described by our old friend "W. L. S." would be met with great enthusiasm. I am quite aware of the fact that there are people who say that mains sets on S.W.'s do not work as well as battery, but I think a mains set properly constructed and well screened, should work quite as well as a battery set.

W. COLCLAUGH,

Member British S.W. League 316.

31, Lancaster Garden, Ealing, W.13.

P.S.—I should like to get in touch with any reader in my district, T N X.

[W. L. S. will be dealing with some matters relating to all-mains short-wave receivers very shortly.—ED.]

## A NEW H.M.V. SET



This model 499 A.C. receiver is a six-valve all-world instrument. It is produced at 14 guineas.

# PRODUCER WHO WAS ONCE HIS OWN FLY-POSTER

Ernest Longstaffe, of the B.B.C., talks of Then and Now

PICTURE first a young man, little more than a boy, grinding music out of a rather ancient piano at one of the earliest cinema shows in this country.

Then picture him, his face wet with perspiration, pedalling a decrepit bicycle in the full heat of Summer along the dusty roads of rural England. Behind his saddle hangs a pot of paste with which, as he reaches the village, he sticks notices to trees and walls, announcing "a stupendous variety show in the Schoolroom to-morrow night."

Finally, picture him smiling contentedly as he watches from an express train the endless rows of radio aerials that stretch from leaning masts and chimney stacks to the homes of England to-day.

These glimpses of Ernest Longstaffe, author, composer, conductor, and one of the senior producers of the B.B.C. Variety Department, give at least a perspective of his life.

## The Bottom Rung

"I always look back to the days when I played that piano as a time when I tried desperately hard to get my foot on the bottom rung of the ladder," he said. "Putting radio shows on the air is, to-day, my top rung. It may sound curious, but nothing does me more good than to see all those little clothes-prop aerials at the back of house after house. They seem to emphasise how great the opportunity we producers have of getting in close touch with people, making them happy, snatching them from their worries for an hour or two, giving them music and laughter which they would never otherwise have.

"Of course, the bottom rung was important at the time. The proprietor of the show was a patriarchal professor of phrenology who gave entertainment composed of 'pictures' and turns such as handbell ringing and Indian club swinging. One of my duties, by the way, was to fit up the stage, and as we were playing one night shows—well, we were pretty busy.

"The next rung up a ladder which at times seemed abominably steep involved driving in country carts in Somerset and Wiltshire with baskets of stage curtains packed up in front; each of these journeys followed my trip on that bicycle the day before, booking the schoolroom in the next village and fly-posting the show. What meant a lot at the time was this: the show belonged to me—but not for long. It was a genuine, hall-marked flop.

## Globe-trotting Times

"The years between then and now have had their disappointments, their successes, their happiness and sadness. For a part of the time I was globe-trotting, touring companies in India, Burma, Ceylon and the Far East. Then there were those

extremely happy years with shows in good old Lancashire and the North generally. Producing shows for several seasons on the North Pier at Blackpool made me a firm believer in the North's good taste for broad, healthy comedy and for 'a bit o' good singin'.' If the North likes a show it's usually a reliable guide.

"But let's forget yesterday."

In his quaintly shaped office at the top of winding stone stairs, which begin below the stage of St. George's Hall, London's old theatre of mystery, and end on the fifth floor, Ernest Longstaffe pointed to a wad of notices hanging on a wall. Each was a cast sheet of a new show.

## TO BE BESIDE THE SEASIDE



A Pye Baby "Q" portable "doing its stuff." This practical little set improves any picnic or other outing.

"Let's talk of to-day, instead.

"My particular mission is trying to find new radio stars, artists who may be clever and very experienced in their pro-

## A BROADCASTER FOR GUERNSEY

Operating on Short Waves

SOME six weeks ago rumours were current in Guernsey and also in Alderney that spies had been detected in Alderney. There were rumours that Diesel engines had been found in a disused castle, and that these were intended for enemy submarines in case of war.

Now the situation has been cleared up. The engines were for the motive power of a broadcasting station. For the last ten days, Radio Alderney, as it will be known, has been broadcasting on a wavelength of 49.9 metres; the programmes have consisted of music, no call-sign or name having been announced.

The situation is now an interesting one, for those responsible for its construction are not prepared to admit that a licence from the General Post Office is necessary. Radio Alderney, Ltd., who have erected that station, applied some five weeks ago

for permission to erect the plant. This was granted by the Royal Court of Alderney. Advocate Randel, Chairman of Radio Alderney Ltd., said: "We are not certain whether the Post Office has jurisdiction over this area, but we have now communicated with them. It is perfectly true that we have been operating on a wavelength of 49.9 metres and on several other wavelengths, trying to choose the best channel."

Thus a broadcasting station of considerable power has come into being in a disused castle in Alderney. Its future is as yet unassured, but it is intended to be used as a commercial broadcasting centre, radiating over practically the whole of Europe.

## Not Always Lucky

"For heaven's sake though," he says, "don't imagine that I am always lucky. I have my flops, too. Not every artist, even when 'groomed,' is necessarily a success at the microphone; even excellent stage performers just don't 'happen' on the air sometimes, largely because their ability may consist of facial expression, mime, or some other peculiarity that is strictly visual. Personally, I never consider it essential to put an artist before a microphone in a studio to find whether he or she will be a good broadcaster. A five-minute audition in the office will tell at once whether a comedian is funny or not, whether a singer can sing or not, whether an instrumentalist has some outstanding quality."

Not so difficult, perhaps, when you consider that Ernest Longstaffe has been waving a baton, hopping about stages, writing songs like "When the Sergeant-Major's on Parade," and producing shows, in "little one-lamp" Corn Exchanges and Market Halls, then at theatres in the provinces—from the smallest to the greatest—and finally in the West End, for more than a score of years before he came to Broadcasting House.

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## NEXT WEEK

Full details for building a short-wave superhet-converter for running from A.C. or D.C. mains. Makes your set into an all-mains all-waver



## THE 1937 MIDGET PORTABLE

(Continued from previous page)

and the strip of plain wood on the baseboard is on the same side as the plain strip on the panel. The loudspeaker baffle fits inside the panel and baseboard, on the side remote from the "plain strips." It should be fitted so that its face is flush with the baseboard, and one-sixteenth of an inch inside the edge of the panel. It is fixed by two screws through the front of the panel, and one

### YOUR SHOPPING LIST

- 2 J.B. "Dilecon" .0005-mfd. tuning condensers.
  - 2 J.B. 3-in. knob-dials for above.
  - 1 B.T.S. .0005-mfd. solid dielectric reaction condenser, with insulated bush and spindle.
  - 1 Bulgin on/off switch, type S.80.
  - 1 Bulgin W/C switch, type S.126.
  - 1 B.T.S. screened coil, type ML/S/1.
  - 1 T.C.C. 2-mfd. fixed condenser, type 50.
  - 1 T.C.C. 1-mfd. fixed condenser, type 50.
  - 1 T.C.C. 1-mfd. tubular fixed condenser, type 250.
  - 2 T.C.C. .01-mfd. tubular fixed condensers, type 250.
  - 1 T.C.C. .0002-mfd. fixed condenser, type S.
  - 1 Dubilier 50-mfd. electrolytic condenser, 12-v. wkg., type 3016.
  - 1 Dubilier .0005-mfd. fixed condenser, type 690 W.
  - 1 Dubilier .0003-mfd. fixed condenser, type 690 W.
  - 1 Dubilier 2-meg. resistance, 1/2-watt type.
  - 2 Dubilier 100,000-ohms resistances, 1/2-watt type.
  - 1 Dubilier 50,000-ohms resistance, 1/2-watt type.
  - 1 Dubilier 20,000-ohms resistance, 1/2-watt type.
  - 1 Dubilier 10,000-ohms resistance, 1/2-watt type.
  - 1 Dubilier 300-ohms resistance, 1/2-watt type.
  - 1 Wearite H.F. choke, type H.F.J.
  - 1 Varley L.F. transformer, "Nictet" 3-5/1.
  - 2 Clix 7-pin chassis-mounting valve holders with screw terminals.
  - 1 Clix 5-pin chassis-mounting valve holder with screw terminals.
  - 1 "Metaplex" baffle-board, 8 1/2 in. x 7 in. x 3/8 in. (Peto-Scott).
  - 1 "Metaplex" baseboard, 14 in. x 6 1/2 in. x 1/8 in. (Peto-Scott).
  - 1 Plywood panel (polished front, "Metaplex" back) (Peto-Scott). 9 in. x 6 1/2 in. x 1/8 in.
  - 1 Plywood base for accumulator carrier, 4 1/2 x 2 3/4 in. x 1/8 in. (Peto-Scott).
  - 1 Plywood block for mounting accumulator carrier, 4 1/2 in. x 2 in. x 1/2 in. (Peto-Scott).
  - 4 Plywood strips (two 13 in. x 1 in., two 8 1/2 in. by 1 in.) for aerial frame (Peto-Scott).
  - 1 Piece 18-gauge aluminium for valve panel, 15 1/2 x 2 in. (Peto-Scott).
  - 1 Piece 24-gauge aluminium, 14 1/2 in. x 1 in., for accumulator carrier (Peto-Scott).
  - 1 Piece 18-gauge aluminium for screen, 9 in. x 4 1/2 in. (Peto-Scott.)
  - 2 Belling & Lee accumulator spades.
  - 2 Belling & Lee wander plugs (H.T.+, H.T.-).
  - 1 oz. 36-gauge D.S.C. copper wire (Peto-Scott).
  - 10 ft. 18-gauge T.C. wire (Peto-Scott).
  - 2 Lengths 1 1/2 m.m. insulating sleeving (Peto-Scott).
  - Screws, flex, 6 B.A. nuts and screws, etc. (Peto-Scott).
  - 1 W.B. loudspeaker, type 37 B.P.
- | VALVES.                         |                            |                            |
|---------------------------------|----------------------------|----------------------------|
| V <sub>1</sub>                  | V <sub>2</sub>             | V <sub>3</sub>             |
| Mazda S.P.210 (Metallised)      | Mazda S.P.210 (Metallised) | Mazda Pen.231 (Metallised) |
| H.T.<br>120 volts.              |                            |                            |
| L.T.<br>2-v. Exide, type P.O.2. |                            |                            |

through the bottom of the baseboard. If everything fits correctly, the baffle-board may be removed, but the panel left attached to the baseboard ready for the components to be fitted.

The valve panel is made from a piece of 18-gauge aluminium, 15 1/2 in. x 2 in. Mark out and drill before bending. Once again a centre-cutter was used to cut the holes for the valveholders, so if you do not possess such a tool you will have to use a fret-saw. A fret-saw will cut aluminium quite well,

if it is done carefully. Of course, you can mark out the holes and drill small holes close together round the circumferences, and then tap out the centres, cleaning off the rough edges of the holes with a round file. The bending should be done in a vice. All the bends are right angles.

All we have to prepare now are the accumulator carrier, and the mounting block for same. The mounting block is simply a piece of wood 1/2 in. thick, measuring 4 1/2 in. x 2 in. The base of the accumulator carrier is a piece of wood 3/8 in. thick and measuring 4 1/2 in. x 2 3/8 in. (preferably plywood). The aluminium strip fitted round the base is fixed by means of 3/8-in. brads, the bottom edge of the aluminium being flush with the bottom face of the base.

Fit the mounting block to the baseboard 1 1/8 in. from the back edge, and 1/8 in. from the unmetallised strip. It may be fixed by means of 3/4-in. panel pins, or 3/4-in. countersunk wood screws. Fix the accumulator carrier on top of the mounting block, so that it is flush with the inner edge of the block, but overlaps the outer edge as shown in the wiring diagram.

#### Fitting the Valve Holders

That concludes the preparation of all the "bits and pieces," and the next job is to finish the valve panel.

First of all, fit the valve holders by means



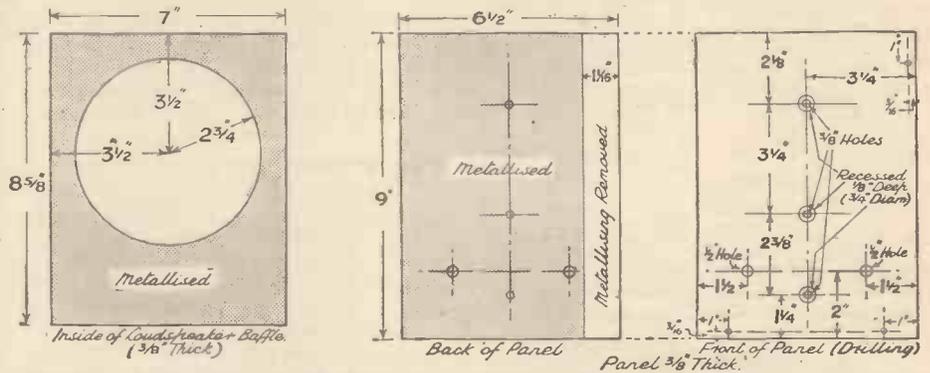
#### GOOD SELECTIVITY

With its two tuned circuits and directional frame the selectivity of the Midget is such that no difficulty should be met with in separating the various programmes.

chassis, namely the panel and baseboard. Mount the panel components. There are no points to note here except in the case of the switches. The back nuts of these should be removed, otherwise the bush is too short to allow the front locking nuts to be fitted. Mount the baseboard components as nearly as possible in the position shown in the diagram. Complete the wiring as far as possible without fitting the loudspeaker and valve panel.

Next fit the valve panel in position. The position of the fixing foot on the baseboard is clearly shown in the wiring dia-

### CONSTRUCTIONAL DIMENSIONS YOU WILL NEED



These three sketches tell you all you want to know about the control panel and speaker baffle. Note that a portion of the metallising is removed from the back of the panel.

of 1/2 in. x 6 B.A. cheese or round-head screws and 6 B.A. nuts. One of the V2 valve-holder fixing screws is also used for mounting the .0003-mfd. grid condenser, as you will see by referring to the diagram. The remaining fixing hole in this condenser has a 6 B.A. screw and nut fitted to it, which is used as the H.T.+ anchoring point. Now wire the valve panel except for the wires which connect it to the remainder of the assembly. The valve panel may now be put aside for the time being.

Fit the loudspeaker to its baffle-board and connect the 10,000-ohm resistance and .01-mfd. condenser to terminals 1 and 3, but do not tighten them.

We now come to the main part of the

gram. The position of the fixing foot on the panel is not so clear, however, as the valve panel has been displaced to show the components on the baseboard. The top edge of the fixing foot is 1/2 in. from the top of the panel. The outer edge of the foot is on the line where the metallising of the panel finishes. Having fitted the valve panel, complete the wiring between same and the panel-baseboard assembly.

#### Completing the Assembly

Fit the loudspeaker assembly and make the necessary connections to the terminals 1 and 3. Before fitting the frame aerial, insert the valves in their appropriate

(Continued on next page)



# RANDOM RADIO REFLECTIONS

By Victor King

UNION JACK CUTS OUT FOREIGN STATIONS! :: REACTION AND CRYSTAL SETS :: THOSE OLD COMPONENTS

## FLAG SELECTIVITY

DID you hear the B.B.C. broadcast that bit about the magic flag? In case you didn't, I'll repeat it. Anyway, I think it deserves to be enshrined in the written word.

It appears that a listener in India tied a Union Jack to his wireless mast. The result was that all foreign stations stopped



★  
He tied a Union Jack to his mast and all foreign stations stopped coming in on his short-wave set.  
★

coming in on his short-wave radio set. And he could hear only the Empire stations, louder and clearer than ever and without any interference.

After the Coronation decorations had been dismantled in his town he pulled down the Union Jack and the foreign stations and all the interference at once swept in.

This was given as an item of news by the B.B.C., and no comment was made.

Mind you, I should feel very diffident about making any comment. Funny things happen in this jolly old radio of ours. For instance, I remember a man living in Leeds, who built himself a straightforward two-valve set. But he was able to receive only one station on it. And that wasn't his local station as you might think, but an American medium-wave station. W G Y, I think it was.

Can you beat that? I know that this is absolutely true, because that miracle set-builder communicated with "P.W.," who were sufficiently intrigued to send a man along to examine the outfit.

And the investigator reported back that there was no hokey-pokey about it. The set simply wouldn't take a squeak from anywhere day or night—except from W G Y, of the United States of America, at full loudspeaker strength, just as though it were next door. That went on for about a month. Then the set was dismantled during some tests, and when again brought into commission it acted quite normally.

That business cured me for all time of disbelieving anything, however strange.

So although that Union Jack yarn sounds just too fantastic, well—

## OSCILLATING CRYSTAL SETS

SOME seven or eight years ago one heard a great deal about reaction with crystal sets. That may sound a bit potty to some of you younger readers, but it is a fact. By means of special crystal detectors, coils and little batteries it was said that a crystal circuit with reaction was not only possible but actually could be made by anyone.

For some reason or other I didn't achieve much success myself in that direction, but I seem to remember that a good many amateurs did. If there happen to be any of them reading this paragraph I would be mighty grateful if they would drop me a line telling me what sort of results they got.

I am toying with an idea which requires a reaction effect, but not necessarily the amplification that can be obtained from a valve in this way. If it could be obtained with the relatively simple apparatus that these "oscillating crystal sets" used to use, it would be a distinct advantage.

The only circuit that I can unearth fails to give even the tiniest squeak, however I wangle it. All those reaction crystal sets were pretty tricky outfits though, I believe, and I have a vague recollection of experimenting with them for ages to get only fleeting effects.

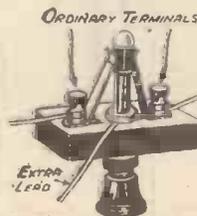
However, perhaps someone with a better memory can help me out.

## REGARDING VALUES

HOW far radio manufacture has advanced during the past few years! It doesn't seem so very long ago that experienced constructors ignored the figures printed on components and either measured their values themselves or got some friend to do it for them.

Condensers with .0003 mfd. stamped on them might be anything from .0001 to .01, and 2-meg—so-called—resistances, anything from 100,000 ohms to 5 megohms.

## A SIMPLE CONVERSION



There must be many constructors who number among their spare components at least one two-point switch of the type illustrated in this sketch. Frequently the need arises for a three-point switch, as for instance, in certain wave-change arrangements and in circuits employing variable-  
mu valves where it is necessary to break the grid-bias connection as well as the L.T. when switching off the set to prevent the grid-bias battery from slowly discharging itself through the potentiometer resistance element.

The conversion of a two-point switch into a three-point type is a simple procedure. The only modification required is the addition of an extra lead which can be clamped beneath the nut through which the spindle passes, as shown.

And I really have encountered errors as bad as that. But, of course, there were a few manufacturers who were turning out very accurate stuff. Nowadays, though, such are in the great majority. Thus has the mass-production of radio gear advanced. You pay very much less for it and get a vastly superior quality.

All this is by way of being a prologue

to a warning not to use old bits and pieces in your modern circuits, unless you know their pedigree pretty accurately. There appears to be an enormous lot of cheap radio stuff about just now. Just where it comes from, I don't know. Maybe, it is from old sets that have been accepted in part exchange and subsequently broken up. Well, some of it may be quite O.K., but, on the other hand, I happen to know that some of it is not.

How do I know? Because I bought some. Five bobs' worth from a second-hand shop in the East End of London. And I got a bargain. It was a boxful, assorted. One of several in the window. There were three grand old heavy-duty switches which just fitted in with some gear I am assembling. I'd have paid five bob each for the things. It was seeing those that made me lay down my money.



★  
"The set wouldn't take a squeak from anywhere day or night—except from W G Y...."  
★

As for the rest of the stuff, that was mostly just junk, and quite useless junk at that. Fixed condensers that would have made passable resistances, and resistances that read infinity on my "megger." One little thing that looked quite like a grid leak and had "2 megs." hopefully stamped on it proved to be nothing but a small black tube of "muckite" with a brass cap on each end.

There may have been a "pencil line" element drawn in some time and later rubbed out. The prize was a variable condenser which now reposes in the "P.W." Research Dept.—if the lads therein haven't thrown it into a W.P.B.

It seemed to be O.K., though the vanes swung rather loosely. But the only connection between the moving vanes and their terminal was via the spindle and its bearing at one end. So much dust had got into this that no contact as such existed. And so cunningly bad was the design that if you swung the vanes a million times it wouldn't have done any "self-cleaning."

A fault like that might not be spotted by every constructor. That's why I say you might buy trouble if you fall for a bargain offer in old components.

## ADVICE TO INVENTORS

THIS is the title of a book published by Frederick Warne and Co., Ltd., at 2s. Written by an old friend, K. Trevellyck Hardman, it deals with the "Pitfalls in the Sale and Protection of Inventions," and should be read by all actual and potential inventors. I hope to be able to discuss this interesting work at greater length on some future occasion.

# MARCONI—THE MAN AND HIS WIRELESS

## Chapter V—AS TRIUMPHANT AS A CAESAR

Marconi reveals new possibilities for his invention—He reports yacht races off Irish coast by wireless—Queen Victoria invites him to Windsor Castle—Messages a Queen wanted sent and received—Royalty awed by wireless—An interview on the outlook—Defying the earth's curvature—Fooling the theorists—He discusses directional waves—First wireless service for lightships—Italy recognises Marconi and begs him to return—Patriotically he heeds the call.

**M**ARCONI'S renown was spreading. Newspapers were telling more and more about the young Italian and his work. New commercial possibilities were foreseen almost daily for the invention, in fact, the applications of wireless to business were featured in predictions as well as further scientific advances. For example, why should wireless not speed the news? It could flash dispatches from remote regions beyond the reach of telephone, telegraph and cable, and in more civilized areas the ether might supplement them.

Marconi saw the possibilities and he gave an inkling of what his invention might do in this respect, when in July, 1898, he accepted an invitation to wireless bulletins of the yacht races off the Irish coast.

Already he had conducted a series of experiments under the patronage of a French Commission between a station he built at Wimereux, France, another at South Foreland Lighthouse and a third on the French battleship Ibis. Both transmitters sent messages to the Ibis, the replies from which proved beyond doubt that messages could be sent and received from a station in motion.

It was the *Daily Express* of Dublin that introduced a new fashion in newspaper reporting by arranging to have the races observed from a steamer, the *Flying Huntress*, used as a mobile station from which Marconi should describe the progress of the yachts.

The wireless men were still labouring under the idea that the higher the aerial the better would be the results, so from a 75-foot mast they suspended an aerial wire, which they figured would radiate messages to Kingstown, even while the steamer was twenty-five miles off shore.

The receiving mast at Kingstown was 110 feet high. As fast as the bulletins were received they were telephoned to Dublin, enabling the *Express* to print full accounts of the contest as soon as the races were

over, and while the yachts were far beyond the range of telescopes on shore. During the regatta more than 700 bulletins were broadcast to the printing press.

If wireless had failed in this test of its career the Press might have lampooned it. But Marconi succeeded and won the backing of a powerful agency—the newspapers. Editors realised that wireless brought them news while it was still news on

man from Italy and his so-called toy of the air.

By permission of the Prince of Wales several of the messages were made public:

August 4, 1898.

*From Dr. Tripp to Sir James Reid.*

H.R.H. the Prince of Wales has passed another excellent night and is in very good spirits and health. The knee is most satisfactory.

August 5, 1898.

*From Dr. Tripp to Sir James Reid.*

H.R.H. the Prince of Wales has passed another excellent night, and the knee is in good condition.

These messages were intercepted by a vertical antenna suspended from a 100-foot mast at Ladywood Cottage on the grounds at Osborne House. The aerial on the yacht was attached to the mast, 83 feet above the deck. The lead-in wire ran down into the saloon, one corner of which served as a wireless cabin.

Royalty aboard, notably the Prince of Wales, the Duke of York and [the Princess Louise, anxiously watched the instruments that were talking back and forth with the shore. They marvelled most at the fact that signals could be sent and answers received while the yacht was in motion. And even rain or fog did not stop them.

In the meantime the Needles station was becoming quite famous. Overhanging Alum Bay was the Needles Hotel alongside which towered Marconi masts braced against the winds as new symbols of safety for the men who went down to the sea in ships. From the halyard a wire dangled to a window of the wireless room, where seashore visitors caught their first glimpse

of the flashing sparks as they enacted the mystery of talking through space.

Two matter-of-fact young men, whom a visitor described as doing something simple, adjusted the instruments. One of them worked a long, black-handled key up and down. Every time he touched it a bluish spark crashed and leaped an inch or more between two metal balls of a spark gap atop a large induction coil. He was saying something to the operator at Poole, eighteen miles away. It was a noisy

(Continued overleaf.)

### AN HISTORIC OCCASION



This photo was taken in 1930, when the great inventor spoke direct to Australia by radio from his yacht, the "Elettra," at Genoa. His speech was picked up by the Sydney broadcasting station and relayed by loudspeakers installed in different parts of the city.

the spot where the event happened. It was not long after this that Marconi was invited by Queen Victoria to establish communication between Osborne House on the Isle of Wight, and the Royal Yacht Osborne with the Prince of Wales aboard, in Cowes Bay. The Queen was anxious for frequent bulletins in regard to the Prince's injured knee. Marconi lost no time in installing the equipment. Within sixteen days more than 150 messages of a strictly private nature were transmitted with success, bringing new laurels to the young

## MARCONI—THE MAN AND HIS WIRELESS—Continued

machine but that seemed to add to the witchery and romance of wireless.

A short-lived spark jumped the gap when a dot was the signal. The dash was a longer stream of the spark. One terminal of the induction coil was linked with the aerial lead-in and the other knob was connected with the "earth" to form the so-called "ground." Press a key, flash a spark and it was picked up miles away.

That's all there was to wireless in the beginning!

A guest at the station looked out across the water, which was dull under a grey sky. He found something uncanny in the thought that the young man at the key, who seemed as far as possible from a magician or supernatural being, was flinging his words across the waste of sea, over the schooners, over the feeding cormorants to the dim coast of England yonder down the map.

It all seemed so simple, but not so easy to teach the world how to do it.

Marconi was busy now at the Poole station, where he and Dr. Erskine Murray, one of his assistants, were trying to unravel more of the ethereal mysteries. It was there that Cleveland Moffett, an American correspondent, found them; Marconi and his electricians granted one of their first interviews.

"How about the earth's curvature?" inquired Moffett.<sup>1</sup> "Or doesn't that amount to much just to the Needles station?"

"Doesn't it though," exclaimed an engineer.

"Look across and judge for yourself. It amounts to 100 feet at least. You can only see the head of the Needles lighthouse from here, and that must be 150 feet above the sea. And the big steamers pass there hulls and funnels down."

"Then the earth's curvature makes no difference with your waves?"

"It has made none up to twenty-five miles, which we have covered from ship to shore; and in that distance the earth's dip amounts to about 500 feet," replied the electrician. "If the curvature counted against us then, the messages would have passed some hundred feet over the receiving station; but nothing of that sort happened. Therefore, we feel reasonably confident the Hertzian waves follow around smoothly as the earth curves."

"And you can send messages through hills?" asked Moffett.

"Easily. We have done so repeatedly."

"And you can send in all kinds of weather?"

"We can."

"Then if neither land nor sea nor atmospheric conditions can stop you, why can't you send messages to any distance?"

"So we can, given a sufficient height of wire. It has become simply a question of how high a mast one is willing to erect. If the height of the mast is doubled, a message can be sent four times as far;

if trebled the message will go nine times as far. In other words, the law established by our experiments seems to be that the range of distance increases as the square of the mast's height. To start with you may assume that a wire suspended from an eighty-foot mast will send a message twenty miles. We are doing about that here."

"Do you really think it would be possible to send messages from the Eiffel Tower to New York through the ether and get an answer without ocean cables?"

"I see no reason to doubt it," answered one of the Marconi men. "What are a few thousand miles to this wonderful ether, which brings us our light every day for millions of miles?"

Royalty as well as news correspondents was becoming deeply interested in Marconi; wireless in war would be ideal for quick communication, unhampered by the enemy. Wires could be severed but there would be no means of cutting, shooting or blasting electromagnetic waves. Various nations were casting envious eyes on the Italian and his wireless.

Interviewers invariably asked: "In



Courtesy, Marconi's Wireless Tel. Co., Ltd.  
A replica of Marconi's first experimental apparatus which used parabolic reflectors for radio transmission and reception. With such apparatus he demonstrated in Italy, in 1895, the possibilities of beam transmission, and confirmed his results before representatives of the British Post Office and military authorities at Salisbury Plain in September, 1896, when he communicated over a distance of 1½ miles.

what direction do you expect your invention to be first utilised?"

"The first may be for military purposes, in place of the field telegraph system," replied the inventor. "There is no reason why the commander of an army should not be able to communicate easily with his subordinate officers without wires up to twenty miles. It would be equally useful for the admiral of a fleet."

Usually he was reminded that his system was not secret. The queries of the doubting public or military men, however, did not discourage him. He was aware that it was natural for many to believe lack of secrecy in his system was a drawback to its practical use on a large scale. Who would want their private messages eavesdropped upon by anyone who owned a receiving set and understood the code? What good would such a blatant system be in wartime? The enemy could listen-in!

The inventor retaliated that admirals, generals and the public could always protect themselves by sending messages in cipher. Furthermore, the range of the signals might be restricted by lowering the aerial mast or by reduction of power output. On the other hand a boat in distress

would want everyone to hear its call. Laws might be passed to protect the contents of a commercial or even a private communication.

"I believe one of the greatest uses to which these instruments will be put will be signalling in wartime," repeated Marconi, little realising that in seventeen years a great conflict involving twenty-three nations would devastate the world while thousands of listening-in posts eavesdropped on every word and cipher that wireless carried through the heavens.

Do you use stronger induction coils as you increase the distance of transmission? he was asked.

"We have not up to the present, but we may do so when we get into the hundreds of miles. A coil with a 10-in. spark, however, is quite sufficient for any distances under immediate consideration."

Do you think you will be able to send directed messages very much farther than you have sent them already?

"I am sure we shall," replied Marconi. "It is simply a matter of experiment and gradual improvement, as was the case with the undirected waves. It is likely, however, that a limit for directive messages will be set by the curvature of the earth. This seems to stop the one kind but not the other."

And what will be the limit?

"The same as for the heliograph, fifty or sixty miles."

And for the undirected messages there is no limit?

"Practically none. We can do a hundred miles already. That only requires a couple of high church steeples or office buildings. New York and Philadelphia with their skyscraping structures, might talk to each other through the ether whenever they wish to try it. And that is only a beginning. My system allows messages to be sent from one moving train to another

moving train or to a fixed point alongside the tracks; to be sent from one moving vessel to another vessel or to the shore, and from lighthouses or signal stations to vessels in fog or distress."

Marconi foresaw one notable case where the directed waves might serve humanity.

"Imagine," he said, "a lighthouse or danger spot in the sea fitted with a transmitter and parabolic reflector, the whole kept turning on an axis and constantly broadcasting impulses in the ether—a series of danger signals."

"It is evident that any vessel equipped with a receiver could get warning, perhaps by the automatic ringing of a bell long before her lookout could see a light or hear a foghorn. Furthermore, as each receiver gives warning only when its rotating reflector is in one particular position—that is, facing the transmitter—it is evident that the precise location of the alarm station would at once become known to the mariner. In other words, the vessel would immediately get her bearing, which is no small matter in storm or fog."

The English Lightship Service, having faith in Marconi's predictions, authorised  
(Please turn to page 408.)

<sup>1</sup> McClure's Magazine, June, 1899.

# TELEVISION TOPICS—Collected by A. S. Clark

## "TELEFRAMES"

Items of general interest

### AMERICAN TELEVISION FOR RUSSIA

THE Soviet television centre is expected to start up at the end of this year. The transmitter, we hear, is to be supplied by an American firm, and is identical with gear which has already had considerable experimental testing on the air.

If the gear is good enough to start a service in Russia, Americans will be even more puzzled to decide just what is the real cause of the hold-up of a public service in U.S.A.

### POINTS IN THE R.C.A. SYSTEM

The following are interesting items concerning the experimental studio broadcasts of television being carried out by the R.C.A.-N.B.C. combination in America.

Demonstrations are prefaced by a short film showing the insignias of R.C.A. and N.B.C. against a background made up of Radio City skyline, and announcing "a demonstration of N.B.C. Telepictures."

A small red signal light, visible from both the front and the back of Iconoscope electron camera, flashes red as soon as the Iconoscope "comes on the air," to warn performers and others in the studio that the camera is joined up to and modulating the vision transmitter.

Engineers use light meters to test whether various parts of the face, and so on, are reflecting sufficient light.

Peculiarly enough, the camera used for close-ups is always farther from the subject than the "full-length" camera. This is because the "close-up" camera is fitted with a telephoto lens.

### A FUTURE PROBLEM

The reception of television signals at distances over 50 miles from the station is considered good, if extraordinary, these days. In the future, with many stations working, it will probably be good if it can be avoided, otherwise the problem of interference may well prove as big as that of television itself.

### THE MURPHY RECEIVER

Here are one or two technicalities concerning the Murphy television receiver which was referred to last week.

A common frequency changer is employed for the sound and vision signals.

The time bases are arranged on the balanced gas-discharge scheme. Each employs one thyratron and two valves.

Two distinct chassis are to be employed. One will be suitable for use up to fifteen miles from Alexandra Palace, and the other for distances over fifteen miles. The latter is a more sensitive unit, but does not cover quite such a wide band of frequencies as the other chassis.

### A HUMAN CONNECTION

A prominent American radio journal, in discussing what the radio engineer of the

future should study if he is to specialise in television, places considerable importance on a thorough knowledge of the human eye. The similarity between the human eye and television is already considerable, and it is suggested that there are possibilities of future developments coming from a further adoption of the human-eye principles.

### SPARE THE TUBE

Users of television receivers will often find that when a bit of adjustment is called for in the picture, the desired result can be achieved with the contrast control as well as the brilliancy control. When this is the case always use the contrast control if it would mean increasing brilliancy to get the desired effect with the brilliancy control.

The life of the tube will thus be lengthened. It is always desirable to keep brightness down as much as you can without spoiling the pictorial result.

## AN EFFICIENT LAMP REFLECTOR

IN experiments associated with light-cell operation and television purposes, it is usually necessary for the experimental light-source to be provided with some type of reflector in order that as many as possible of the illuminant's rays may be made to converge upon the experimental apparatus.



The reflector part of this gadget is made from a cocoa or similar tin.

For many such purposes, an excellent reflector may be made entirely without cost. Take a large cocoa or coffee tin, remove its lid and in the metal base of the tin cut a circular aperture large enough to enable the article to be slipped over an ordinary lamp-holder and to be secured in position by means of an ordinary retaining or "shade" ring. Now, by means of a pair of shears or a strong pair of scissors, cut away exactly one half of the coffee or cocoa tin, leaving, of course, the circular base intact.

The reflector will now be complete. Such an article will be seen in the accompanying photograph, and, from a glance at the illustration, it will be evident that a reflector of this type has many inherent possibilities in connection with photo-cell, light-ray and allied experiments.

## A VISIT TO THE TELEVISION SHOW

AT long last London is to become really television conscious. At the Science Museum, at South Kensington, has opened a special television section showing the growth of television during the last ten years, and, more important still, giving really good demonstrations of modern television.

I went to a "private" view the other day. I have been since to a "public" view, and am still pondering over the definition of "private." There were about 6,000 people at that first view, and I saw and heard a great deal more on my second visit.

It is a fine show. With one exception the whole thing is laid out with a good eye to educational value and to the necessary publicising of commercial television.

### Demonstrations on Actual Programmes

There are eight booths in which modern cathode-ray receivers can be seen working either on films transmitted before your very eyes in the upper room (which is mainly devoted to theoretical demonstrations) or direct from the Alexandra Palace. Then there is a miniature theatre in which the Scopphony system of projected television can be seen.

The eight booths in which normal commercial receivers are to be seen—but without their trade names—are occupied by Cossor, H.M.V., Ferranti, Baird, Marconi, Murphy, G.E.C., Pye; and they all give a very fine show. I must not say here which I thought was the best, but if you go and look you will be able to draw some very useful conclusions regarding the brightness and clarity of the various receivers.

They were all good, however, and I have not the slightest grumble about any of them. The film and the radio-ed B.B.C. stuff from Alexandra Palace both came over perfectly, and if there is anybody you know who is still sceptical about television for goodness' sake drag him along to the museum and let him see for himself.

I am now going to take a certain firm to task about one of the exhibition pieces. The firm is Baird, and while their receiver downstairs gives a perfectly clear and brilliant reproduction of modern television they do all they can—unconsciously, of course—to crab television by their upstairs demonstration—at least that is how it strikes me.

### The Upstairs Section

Up in that portion of the show are all sorts of "working models." We have the Ediswan tube, showing in a very clear manner how the thyratron valve makes the spot jump backward after every line has been traced, and the tube "ticks over" perfectly. We have the Cossor full-size film transmitter working to supply the downstairs demonstrations and at the same time showing how the television programmes are monitored.

We have a Baird show in which the old-fashioned 30-line television with disc scanning is demonstrated as the beginning of the modern science. All that is good and useful.

Yet at the end of the Ediswan stand, with merely a notice that states it is Baird cathode-ray reception, we have the same old 30-line transmission that you can see in an adjoining booth as an historical relic, but being reproduced by a cathode ray tube.

(Please turn to page 403.)

# SEEN ON THE AIR

NEWS AND VIEWS ON THE TELEVISION PROGRAMMES  
BY OUR SPECIAL RADIO-SCREEN CORRESPONDENT

L. MARSLAND GANDER

IF I followed the example of a distinguished colleague I should now retail my adventures on a motor-tour through six European countries, during which I covered 2,500 miles and a good time was had by all. However, I feel that I am not yet so exalted that while professing to write about one thing I can devote an article to something else and still satisfy my public.

Therefore my subject must be television, and I attack it with renewed zest after two weeks' absence. I returned to London to find television entering upon new and more exciting phases. I found Wimbledon tennis on the screen in my home and a first-class television exhibition attracting between 2,000 and 3,000 people daily in the West End.

The Television Exhibition at the Science Museum is dealt with elsewhere in these columns, but I feel impelled, with the Editor's permission, to return to the subject to pay my personal tribute to the organisers of the exhibition and particularly to Mr. G. R. M. Garratt, of the Science Museum. It was urgently necessary that somehow or other television should be presented to the public in an impartial way and on a non-commercial basis. The Science Museum Exhibition recognises not only a duty to the exhibiting manufacturers, but also a wider duty to the public. There is no attempt, as at the last Radio Exhibition, to conceal the names of sets. There is also as comprehensive an historical section as could, I should think, be assembled anywhere in the world.

## Queues to See Demonstrations

Long queues of visitors have been waiting daily at demonstration times to see the eight cathode ray receivers and the big screen Scophony receivers. This is the first full opportunity given the public for a comparison of results. What interested me most was that of the eight different cathode ray sets, five showed a reflected picture and three a direct picture on the end of tubes mounted horizontally.

That is the great problem of the moment for the manufacturer. Shall the tube be mounted horizontally or vertically? If the tube is vertical and a reflected picture is shown then the whole apparatus can be self-contained in a cabinet little larger than a radiogramophone. But, says the other school of thought, there is considerable loss of light in the reflected picture.

To overcome the loss of illumination manufacturers have lately been concentrating on mirror improvement. I now have it on

the best authority that a front-silvered mirror is 97 per cent. efficient. This seems to me to swing the balance in favour of the reflected picture. But on the whole, I think, on the evidence of practical results as appraised by the eye we must reserve judgment.

The Scophony picture is undeniably impressive on the screen 5 ft. by 4 ft. I have already described it for readers of "P.W.," but it must be remembered that the pictures seen at the Science Museum are actually being picked up over the air from the Scophony transmitter at Campden Hill, while I saw a land-line demonstration. The Scophony transmitter which is sending these excellent pictures to Kensington was expressively described to me as of "one flea power." Actually, it is using 100 watts, little enough to overcome local interference.

## The Scophony Pictures

Visitors should clearly understand that the Scophony picture is on a definition of 240 lines at 25 pictures a second. This is not the London standard laid down by the Television Committee and used by the B.B.C. from Alexandra Palace. As I have already hinted in these notes, the problem of bringing Scophony up to the 405-line standard is connected with the synchronising signals transmitted from the Palace, and the B.B.C. is already working on the subject. There is every hope of a solution and may it be a speedy one, in the best interests of television.

Of the eight cathode ray sets I have tested four, built by the same manufacturers, namely the G.E.C., E.M.I., Cossor, and Baird. Two interesting newcomers are the Ferranti and the Murphy. The Ferranti set shows a direct picture. The Murphy set (reflected picture) is housed in an unusually attractive cabinet, which has several novel features. For instance, it is switched on by raising the lid, and the knobs on the surface of the cabinet fit into special sockets in the underside of the lid. Murphy, in this exhibition model seemed to be using a slightly smaller tube than the most popular size.

It was a stroke of luck for the exhibition organisers that the B.B.C. began its tennis broadcasts from Wimbledon. Readers may recall that I prophesied in these notes that Wimbledon would be the next job for these O.B. vans.

I saw the first day's play at home, and have never watched a programme with more exciting promise. But at the same time the pictures were not so good as those of the Coronation Procession, and I feel that we have

not yet seen the best that can be done with Wimbledon. The B.B.C. was using the wireless link for the first time. It is a distance of 12½ miles from Wimbledon to Alexandra Palace. The 1-kilowatt transmitter was on a wavelength of 5 metres.

The Wimbledon transmissions necessitate breaking into fixed studio programmes from time to time. This is a more serious matter than interrupting sound programmes, and is one of the many minor perplexities of television. A carefully rehearsed visual item can be pretty thoroughly wrecked by haphazard interruption. Naturally, Wimbledon must take preference, but the B.B.C. will have to devise a light orchestral feature programme which will stand the shocks of sudden fade-outs and not offer too sad a contrast when restored to the screen.

And here I must register an emphatic protest at that abomination—the word "Interval"—flung on to the screen as a dismal anti-climax after every dip into Wimbledon. I shall count it a big step forward when that word and the painful gap disappear.

The first match I saw was that between Bunny Austin and the Irish giant, Rogers. Two (alternate) views were generally shown, one of Austin's half of the court with England's No. 1 in action and the other a full view of the court from greater range. The long distance shot made the court and players too small; the closer view, though it cut off half of the court up to the net, was more satisfactory. At the time of writing I do not know whether it is possible, by means of telephoto lenses, to give still closer views of the players, but this would be an improvement.

## Proper Use of Television

The other match I saw, that between Crawford and Menzel, was decidedly better from the point of view of television. I had a vivid impression of Crawford's effortless style and the leisurely movement which seems to produce such devastating results.

Still, whatever criticisms I may have made, I am certain that this is the proper use of television, the ideal type of programme. As the last stages of the tournament approach, interest in television will be built up, until the final may repeat the triumph of the Coronation.

Wimbledon is extending the hours of transmission. On the first day there was to have been an additional transmission at 4.30, but owing to local interference in the neighbourhood of Alexandra Palace this was cancelled. The extra hour of film in the mornings will not be introduced until after the television holiday.

## MR. JOHN SCOTT-TAGGART LEAVES FOR U.S.A.

TO STUDY LATEST AMERICAN DEVELOPMENTS IN RADIO AND TELEVISION

Articles in "P.W." will continue as usual

Readers will be interested to hear that Mr. John Scott-Taggart recently left for the United States in order to study at first hand the latest developments in television and radio generally. He will be returning before the autumn. He has in hand an important work on television and has been making studies recently on developments in France, Germany and Italy by visiting those countries. Readers can look forward to deriving the benefits of the thorough preparation that precedes all the writings of our eminent contributor.

This is Mr. Scott-Taggart's fifth visit to the United States, where he is almost as well known in radio circles as in this country. While he is away his articles for "Popular Wireless" will continue as usual.

## TECHNICAL JOTTINGS

(Continued from page 388.)

some considerable time. Usually the effect is that the rotation of the control knob in one direction reduces the bass and thereby, apparently increases the treble range, whilst the rotation in the opposite direction causes the opposite sort of effect. If you are not already using one of these components it is well worth while to consider it, especially as it can usually be fitted without any modification of the existing circuit.

### Slow-Motion Drives

Most sets nowadays are fitted with vernier or slow-motion tuning dials and, indeed, this is very necessary in view of the high selectivity prevailing in present-day sets. Some of the slow-motion dials used are quite elaborate; from an engineering point of view, works of art. For short-wave tuning it is if anything more necessary to have very accurate adjustment of the tuning than it is for medium or broadcast wavelengths. The reason for this is that with a short-wave receiver you are mostly working about the point of oscillation, so requiring you to give extra care to searching for stations.

### Short-Wave Tuning

One of the things which first strike people who take up short-wave reception, after having been accustomed only to broad-

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All inquiries concerning advertising rates, etc., to be addressed to the Advertisement Offices, John Carpenter House, John Carpenter Street, London, E.C.4.

The constructional articles which appear from time to time in this journal are the outcome of research and experimental work carried out with a view to improving the technique of wireless reception. As much of the information given in the columns of this paper concerns the most recent developments in the radio world, some of the arrangements and specialities described may be the subjects of Letters Patent, and the amateur and the Trader would be well advised to obtain permission of the patentees to use the patents before doing so.

cast reception, is the extra care and delicacy involved in tuning. It takes a bit of getting used to and at first may seem rather tiresome.

But once you get into it you will find that, in view of the very large number of stations which can be picked up and the enormous distances over which reception can in favourable circumstances be effected, short-wave reception has an interest all of its own.

### Looking Back

Looking back ten years to the early days of broadcasting, one would hardly have thought in those days that within the space of a few years such marvellous value in radio receivers could be placed before the public. I can distinctly remember a friend of mine about ten years ago paying £60 for a well-known receiver which I regarded at that time as nothing less than plutocratic. It was necessary to pay that sort of price in order to get what was then regarded as a really good set.

To-day you can obtain a set for ten, fifteen, twenty pounds which will do very many times as much as this set costing £60 did then.

### Result of Mass Production

These great improvements are not only due to the invention of all kinds of new highly efficient valves—although that has contributed very greatly to the extra performance which can be offered—but also to a large extent are due to the marvellous way in which manufacturers have got down to mass production and have simplified the construction of sets so as to cheapen production costs. It is difficult to make an actual estimate, but I should think it is no exaggeration to say that for every pound spent on a radio set to-day you get in efficiency performance and general service and satisfaction at least twenty times what you got for your pound ten years ago.

### Choke Coils

A point about choke coils used for high-tension smoothing is that they should be able to maintain their inductance whilst actually passing the intended current. Extra inductance usually means increasing the D.C. resistance and, of course, you cannot afford to go too far in this direction. Therefore, you want to be careful in your selection of a choke, choosing one which will give you a sufficiently high inductance value for the purpose—and the choke must be so designed that it will maintain this value when passing its rated current—and at the same time will not have too high a D.C. resistance.

### Mechanical Hum

A further point with regard to the choke—and for that matter the same applies to a transformer or any other similar inductive component—is that the laminations of the core, or whatever form the core takes, should be really tight. There is nothing more annoying than the transformer or such-like component which gives out a steady hum in unison with the A.C. frequency, owing to the laminations not being properly screwed up—or screwed down.

## CLUB NEWS

### SOUTHALL RADIO SOCIETY

A successful Direction-Finding Contest was held near Oxford on June 13th, when in spite of terrible weather conditions more than thirty competitors from radio clubs all over the south of England took part.

Mr. H. G. Swann (Southall) repeated his success in the recent Golder's Green Society's contest, and the other teams in the first six were led by Messrs. Black (Golder's Green), Leister (Golder's Green), Rapsey (Southall), Childs (Golder's Green), and Pye Radio (Cambridge).

The transmitter was operated by Mr. Douglas Walters (G 5 C V), the Southall President, while the judging was performed by Mr. George Exeter (G 6 Y K) and Mr. Tyler.

The Southall Society is now engaged in a series of experiments designed in an attempt to explain the peculiar effects felt when direction-finding on waves of the order of 40 metres.

Readers who feel they can assist should write to the Hon. Sec., Mr. H. F. REEVE, 26, GREEN DRIVE, SOUTHALL.

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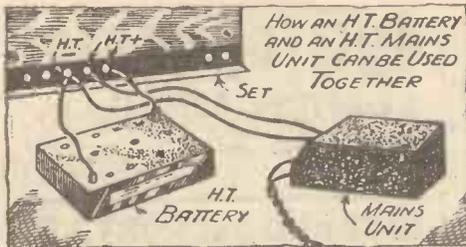
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How you can combine a mains unit and dry battery for supplying your set with H.T.

# PRACTICAL POINTERS

Hints and Tips for the Constructor

## MIXING YOUR H.T.

It is possible to run one set with several different supplies of H.T. at the same time. This fact is one which should be thoroughly understood by all listeners, for it enables all kinds of extemporary arrangements to be made if necessary.

Curiously enough, it would appear that many listeners consider it difficult, if not actually dangerous, to employ two H.T. batteries to boost up the output of a mains unit.

We say curiously because all whose acquaintance of radio goes back a decade or so know that in the early days the problem was to run more than one valve from a single source of H.T. supply.

At first each valve in a three-valve set, for example, had to have its own independent H.T. supply, and you may encounter old diagrams showing this.

### Arrangements Possible

Of course, H.T., especially if derived from the mains, needs to be handled carefully. But, given reasonable care, it may amaze many that quite a number of mixing arrangements are possible.

Let us now leave generalities and see what can be done in particular instances. Supposing we have a large set and a small mains unit which is incapable of supplying all the H.T. current needed.

To delay the obvious but initially rather expensive step of purchasing a larger mains unit, one or more of the valves can easily be fed by an H.T. battery while the small mains unit continues to supply the others.

It does not matter a scrap what type of unit is used. A.C. or D.C. All you have to do is to



During the summer it pays you to keep an eye on your earth efficiency. If you use an earth tube, saturate the surrounding soil with water when the weather is dry.

connect one of the H.T. plus terminals in the set to a plus socket of the H.T. battery, and the minus socket of this to the H.T. minus terminal of the set. (See our illustration of the arrangement.)

You will naturally choose that H.T. plus terminal which feeds a suitable valve or valves. You will have to bear in mind the voltage required and current taken by the various valves, and arrange the battery and unit in accordance with their individual output potentialities.

It is better to use the battery for H.F. and/or detector valves, especially if there is any "hum," because this will be less pronounced

if the mains unit feeds the L.F. end of the set. That is, in most cases.

But the most useful of all mixed H.T. schemes is when it is required to boost up the available H.T. voltage.

Perhaps there are D.C. mains of 110 volts and a round 150 is desirable for an output valve. But, of course, the battery must be capable of supplying the current demanded by that valve.

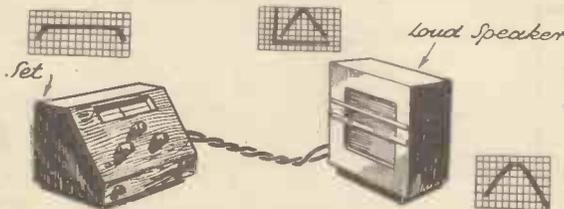
The connection is simple. Join the negative of the H.T. battery to the positive output of the mains unit in question and the positive of the battery to the H.T. plus terminal of the set. That is all.

## OVERALL RESULTS

An illustration on this page clearly shows how effectively a poor quality loud-speaker can ruin the results given by an otherwise perfectly sound set.

Three curves are shown, and these are

## USE A GOOD SPEAKER



This little sketch is intended to show you how a good set may be throttled by an inefficient speaker. The curves indicate the falling off in the response.

designed to depict the condition of the energy at different points of the outfit.

The set has what is known as a "straight-line output." That is to say, it provides equal amplification to all frequencies. The middle C note of a piano is rendered with the same comparative strength as a top note of the violin or the bottom note of the 'cello.

### FALLING OFF

Of course, the "curve" is not absolutely straight, it "falls off" a little at both ends, but it is perfectly straight over the greater part of the useful frequency scale.

The loudspeaker, on the other hand, deals very unevenly with the various frequencies and its curve shows a serious falling off at both ends.

The result is that the set's "straight line" is absolutely mangled. But it is wrong to say that the output of a set can never be better than the curve of its speaker.

Obviously, there may be cases when the output of an inefficient set might be largely compensated for by a loudspeaker giving a kind of "inverse distortion" in comparison with that of the receiver. But it would be in the nature of a coincidence and it is not wise to reckon

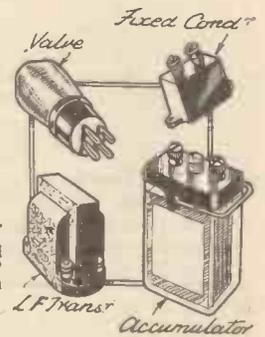
on that happening. The adjustment of tone in such a way is rather a haphazard method of working.

## DO RADIO COMPONENTS WEAR OUT?

YES, some components do tend to wear out. We suppose all would in the course of centuries, but most of them will last the proverbial lifetime.

Valves, dry batteries and accumulators are generally reckoned to be the only "perishables" of radio. But they are all accessories.

Of the components the only ones to have more or less



Which will live longest? What do you think?

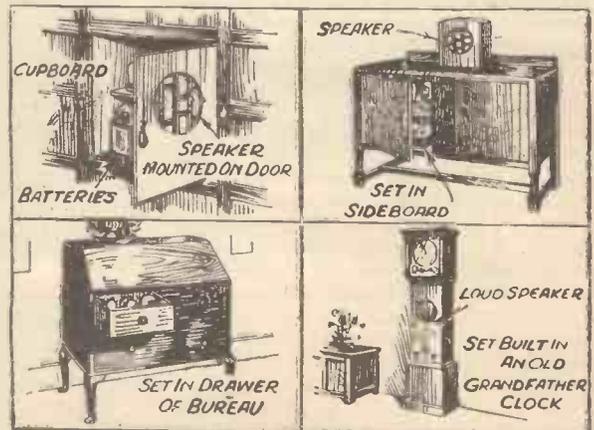
definite lives are those which are so made that chemical action can take place.

Soldered joints may crystallise, contacts corrode, thin wires break, etc., but these, we suppose, are faults in manufacture. Nevertheless, they do happen.

At one time it was considered that all fixed condensers, except perhaps mica dielectric types, would inevitably decay. And it is true that breakdown could be reasonably anticipated after a couple of years with almost any of the earlier ones.

But we believe modern manufacturing methods make fixed condensers move into the "last for ever" class. And the same applies to L.F. transformers.

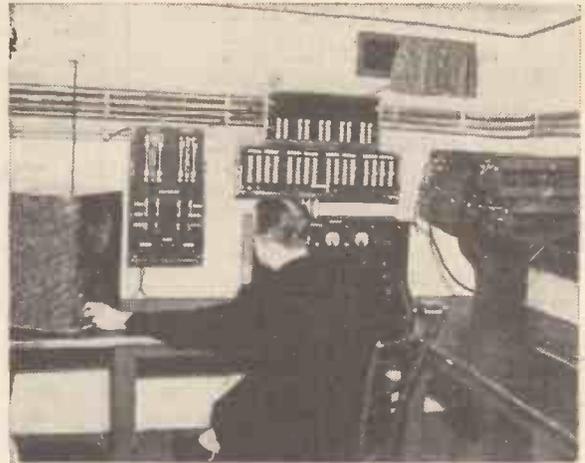
## A CHANGE FROM A CABINET



Constructors who find cabinets to match up with their other furniture either difficult or too expensive, might try one of the schemes illustrated here.

# BROADCASTING FROM LA SCALA

The greatest care is taken with the relays from this world-famous opera house



The control room below the stage at La Scala. Radio Milan's chief engineer, Mr. Tutino, is at the controls.

TO broadcast a performance from one of the world's most famous opera houses is no simple undertaking. Reputation built up during the course of years must be upheld. The distant listener must realize that he is listening to La Scala and not just to a relay from any opera. No discordant sound, no whisper from the prompter, no rustling of the music may go over the microphones, as otherwise the impression of a perfect performance might be marred.

For many years the Scala directors refused point-blank to permit performances to be relayed. It was only three years after the opening of the Milan station that the Italian broadcasting company succeeded in obtaining permission to put up their microphones. Puccini's "Tosca" was the first opera to go out from La Scala into the ether. Since then relays have taken place at regular intervals, in fact, as often as once and twice a week during the Scala's short season.

### The Secret of Success

To the visitor with technical understanding the apparatus used for relaying the Scala performances may seem primitive compared with equipment used in other European cities. But the Italian broadcasting engineers prefer to leave well alone although they periodically try out new apparatus. But to introduce a new microphone or a new amplifier is a momentous decision, as the once-found balance must

not be upset. Experience and personal supervision by Milan's chief engineer are the secret of the successful relays from La Scala. Mr. Tutino is one of Italy's broadcasting pioneers. Formerly a naval officer he joined the broadcasting company at the opening of the Rome station in 1924 and has been at Milan ever since 1925.

He has personally monitored every single relay from La Scala. His method is painstaking and exacting: he attends the last rehearsals to be quite sure of the score, and then on the day of the relay he sits down in the little control cabin two stories under the surface of the stage and concentrates on his loudspeaker. He fades the microphones in and out without the help of a score, as he enjoys an excellent memory for music. He believes this to be the ideal method: to have an engineer with musical understanding at the controls and not hamper him with a written score, but to let him know the opera by heart and so leave both hands free for operating.

Six microphones are employed at La Scala: two next to the orchestra conductor, two in the footlights on the stage, one opposite the conductor above the orchestra, and a sixth which is permanently installed under the stage box in the third circle.

A. A. G.

Underneath, of course, there is a bit of a tangle of leads—but does that matter? They are all battery leads and associated connections, anyway. The anode resistance and grid leak for the resistance coupling, by the way, are held "in the air" by short wires, covered with systoflex where they pass through the chassis.

### It Worked Right Away

At the last minute I remembered I must make provision for the phone connections. So I fixed two of my baseboard mounted terminals on the wood support at the front of the chassis—and again made sub-chassis connections to the "innards."

Came the fateful test. I don't want to boast—but it worked right away. I seem to be lucky or something. Rome came roaring in on the middle-sized coil—so loudly I wished I had my loud speaker, which is on order still.

I took my aerial direct to the "free" terminal of the pre-set, my earth to the negative terminal of the accumulator. And, of course, I can't be bothered with a filament switch.

With the smallest coil plugged in I twiddled around and, at 52 degrees precisely on my 0-to-180 degrees scale, in came the wonderfully invigorated Wayne station, W 2 X E on the 16-metres band. I followed the Thursday morning broadcast by Columbia from a school where the kids certainly know how to sing the old songs.

### No Hand Capacity Effects

A few comments. The rebuilding of the set into a chassis has definitely proved worth while. Hand-capacity effects are now just nil. And I dare to suggest the sensitivity is greater. With the H.210 valve I get a bit of a "squawk" with reaction—but with the D.210 there is no trace of the trouble, although there is a slight loss of signal strength.

Well, for the moment, I am a hot fan for the all-metal type of construction. I feel I am on my way now, with a background of sound practical experience that will stand me in good stead for the shape of things to come. Exactly what shape they will be I don't know. But you shall hear, all in good time. Meanwhile, I should like to hear from anyone interested in my adventures.

## MY SHORT-WAVE ADVENTURES

(Continued from page 389.)

I do think it worth while spending half an hour or so juggling with the components. By checking constantly with the theoretical it becomes easy to work out exactly how to place the parts for short wiring.

Underneath my little chassis, at the back, I have bolted the choke and condenser for the output filter. This, I believe, is good practice—anyway, it solved my problem as to where they might go.

### Those "Earth Returns"

The drilling of the metal and the bolting down of the parts is a job I personally enjoyed far more than the "woodwork" of panel and baseboard construction. Possibly one feels that one is more of an engineer working with metal, nuts and bolts. To me, anyhow, it has been a great satisfaction.

Then came the wiring up. Having spent so much preliminary time arranging the components, the first part of this job was extremely easy. I got my tuning and reaction condensers wired up in no time—of course, only one lead being needed for each as the earth connection was made automatically by the spindle fixings.

Revelling in the ease with which "earth returns" could be made, perhaps I overdid the business of bolting down short bits of wire from nearby component terminals to the metal chassis. But you must forgive me—it is still a novelty.

When it came to connecting the low-tension-positive terminals of the valve holders together, I refused to use a 2 in. length of my bare tinned-copper wire—

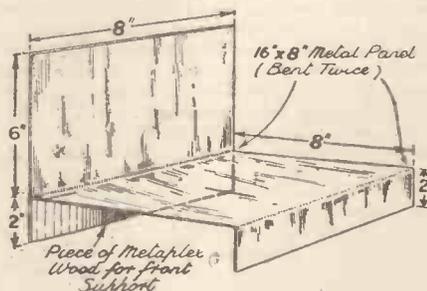


Fig. 3.—Details of the metal chassis referred to by Lionel Chester this week.

instead I took a rubber-covered flex lead "sub-chassis." This rather tickled my fancy, so that at the slightest provocation I dived underneath the chassis with "hidden" leads.

I wish you could see the set now. It looks so utterly devoid of complication.

## MARCONI—THE MAN AND HIS WIRELESS

(Continued from page 402.)

In December, 1898, establishment of wireless communication between the South Foreland Lighthouse at Dover and the East Goodwin Sands lightship, twelve miles distant. The incentive was to test thoroughly the utility of the Marconi instruments. Those anxious for results did not have long to wait. A heavy sea battered the lightship on April 28, 1899, carrying away the bulwarks; the mishap was reported to shore and assistance was quickly dispatched. That might be called the first S.O.S. Two months later the steamer R. F. Mathews collided during a dense fog with the East Goodwin Lightship; wireless summoned lifeboats to rescue the crew.

Practical and immediate applications of wireless were discussed far and wide. But there were still many sceptics. A professor at Clark University wrote to S. S. McClure and urged him to avoid announcing in his magazine such absurdities as wireless, for it made the periodical ridiculous. It was a source of relief for those who had confidence in Marconi to look back to the early days of the telegraph and telephone; they, too, had been ridiculed by doubting Thomases.

The astounding fact about Marconi is that he did not conceive wireless piece by piece or merely stumble upon each succeeding development. The very spark of his genius is embedded in his historic replies to interviewers in 1898. The answers he gave at this early date reveal that he foresaw wireless as it would be developed thirty or forty years later. And he would devote the next three decades of his life to polishing these ideas of the '90's and making them practical. He realised the importance of short waves and ultra-short waves. He had visions of the "wireless lighthouse," the radio direction finder and the radio beacon before the dawn of the twentieth century.

### Italy Takes a Hand

Reports went back to Italy, to the Government, to the Minister of Marine, to King Humbert and Queen Margherita. Italy, the land that sent its native son Columbus away to beg support from a foreign country, would never make a mistake like that again. Yet, it was on the verge of doing so. The Italians foresaw the possessiveness of the British and were quick to realise the folly of turning their backs on Marconi.

A "missionary" was dispatched to England to convince him that Italy had faith in him. Dinners were held in his honour and medals presented under Italian auspices, but by this time the Italian emissaries encountered resistance; the English Marconi Company naturally enough rather resented Italy coming upon the scene to capture the glory that had been nurtured under the Union Jack.

The Italian Minister of the Navy dispatched a message to Marconi in England extending an invitation to continue his research under the auspices of the Italian Government at the Naval Arsenal of Spezia. The cruiser San Martino was assigned to participate in the experiments.

Heeding the call, and delighted with the recognition of his native land, the inventor

of wireless, as triumphant as a Cæsar, returned home.

## NEXT WEEK

### TWO CHAPTERS

#### CHAPTER VI

### FRANCE CALLS FOR PROOF

The English Channel's challenge to Marconi—He makes "sparks" leap from France to the cliffs of Dover—Historic bulletins—Marconi turns his attention to duplex wireless—He demonstrates how waves can be separated by tuning—The value of a famous patent No. 7777—Marconi Company plans expansion ashore and afloat.

#### CHAPTER VII

### AMERICA BECKONS MARCONI

James Gordon Bennett extends an invitation—Marconi accepts and plans to report international regatta by wireless—He arrives in New York—Impressions of Marconi by reporters—The yacht race begins—Marconi flashes bulletins to the *Herald*—Conversations with news men—Interest of Army and Navy aroused—Preece congratulates Marconi and reviews progress of wireless.

### A VISIT TO THE TELEVISION SHOW

(Continued from page 403.)

If it were stated that the tube was showing 30-line television on a cathode-ray tube and that the demonstration was to show what was done with cathode-ray tubes some years back it would be quite O.K. As it is, however, one is forced to the impression that one is looking at modern cathode-ray reception, and the equally inevitable conclusion that it is ghastly. I advise Mr. Baird to have more explanatory cards printed and to label this part of his show, or many people seeing it will jump to the conclusion that television is still in the crude state; many may not even bother to go downstairs to see the demonstrations of modern television if there is a crush.

Label that demonstration plainly, let everyone know that it is a cathode-ray museum piece and all will be well.

Enough of criticism. I found the whole show most interesting and instructive. The people on the stands are only too pleased to explain it all to the visitors. You can ask

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questions about the Alexandra Palace transmitter and its aerial, about the Cossor film television transmitter, about scanning from G.E.C. or Ediswan, you can go and see how Baird did his early televising, using a wax image and a 30-line disc. Then you can go downstairs to see what is offered to the public to-day.

Don't judge television by the programme material though. It is not fair. Television has been started by the B.B.C. with little enough money behind it. The programmes may not always strike you as particularly interesting. But that is not television's fault. Go to the museum—it's in Exhibition Road, South Kensington—and see for yourself what can be done in the way of providing radio entertainment in the home, and remember that the programmes will improve as the number of television set users increases.

If you could go back to the 1922 radio sound programmes now you would realise what I mean. There is one difference, television to-day is technically more perfect than was sound radio in 1922. But the programmes may not relatively be better produced, and you must make allowances there.

The Exhibition will be open till September. The admission is FREE, and the hours are 10 to 6 on Monday, Tuesday, Wednesday, and 10 to 8 on the remaining days except Sundays. On Sundays the show is open from 2.30 till 6.

### A Useful Book

As you go in you will be offered a small green book. It costs 6d. Spend the money, it's worth it. The book contains a really well set out history of television in technical form. It will tell you heaps about the various steps that you did not know.

At the Radio Exhibition this year we shall all have an opportunity of seeing and hearing television sets in their special listening-rooms. There will be none of the hush-hush business that has attended it in the past. But don't wait for the radio show. There is a lot at the South Kensington Museum that will not be shown at the Radio Show, and now is the time to go and see it.

Television has come to stay, to develop, and it is only a matter of time before it will be as common to own a television receiver as it is to-day to have a radio set. You will see why at South Kensington, so don't miss this free show.

K. D. R.

## A NOVEL MICKEY MOUSE RECORD

IF you 'phone the London office of Walt Disney—Mickey Mouse, Ltd.—you will hear a piping voice say "Mickey Mou-use!" Joyce Hilder, the 21-year-old telephone operator, answers every call in this cheerful way, as it is the policy of the Walt Disney organisation to put everybody at ease.

But what will happen if a successor to Miss Hilder has to be found? In order to provide against this contingency Mr. George Kamen, Walt Disney's European representative, has just paid a visit to the H.M.V. recording studios and made a special gramophone record in which he says "Mickey Mouse . . . Mickey Mouse . . . Mickey Mouse . . ." again and again in the pleasing lilting way he wants 'phone operators to adopt. This record will be kept on hand for the guidance of all 'phone girls employed by Walt Disney—Mickey Mouse, Ltd. A copy is being sent to the Mickey Mouse offices throughout the world, so that, wherever you may be, if you have occasion to ring the firm you will be greeted by that same smile-in-the-voice "Mickey Mou-use!"

Alas, this unique "His Master's Voice" gramophone record cannot be added to the famous range of "H.M.V." Mickey Mouse recordings, for it is not for sale.

# The RADIO Bulletin

Up-to-the-minute news concerning the radio industry

A COMPACT portable is always an attractive proposition, since it is the one type of receiver which can be used anywhere, whether indoors or in the open.

McCarthy Radio, Limited, have produced a new portable employing a special reflex circuit which it is claimed gives results equal to a five-valve set. Fitted with a permanent-magnet moving-coil loudspeaker, this receiver is entirely self-contained and is available in three colours.

It is fitted with a carrying handle, and turntable and weighs 16½ lb., including batteries. The H.T. current consumption is given as 7.5 milliamps. The price is 6 guineas.

## NEW MAINS TRIODE-HEXODE

A further addition to the Cossor range of valves is announced. This is an A.C./D.C. frequency changer, and is listed as the 202 S.T.H. It is an indirectly heated triode-hexode, comprising separate triode and hexode sections with a common cathode. It costs 15s.

The characteristics are: Heater volts, 20; heater current, 0.2 amp.; mod. anode voltage (max.), 250; mod. screen voltage (max.), 100; mod. grid voltage, -1.5 to -10; oscillator voltage (max.), 100.

## TWO DE-LUXE RECEIVERS

H.M.V. have just released two new models. The first is a six-valve all-world de-luxe receiver, and is known as the Model 499 A.C. It is priced at 14 guineas, and incorporates a fluid-light tuning indicator. The stations shown on the wavelength scale are arranged neatly in columns and are extremely easy to identify. There are over seventy names on the medium waveband alone.

On the short-wave range the scale is calibrated in half metres and has an effective length of 13 in., a feature which greatly facilitates tuning on these higher frequencies. The knobs of this new receiver are of an entirely new type, having flanges

to obviate the cabinet being scratched by the finger-nails.

The second receiver is a six-valve superhet transportable battery receiver, and is styled the Model 464. Costing 15½ guineas, it is a two-waveband set having an A.V.C. circuit with two pentodes in the output stage. A pre-H.F. stage ensures high sensitivity.

The undistorted output is nearly two watts and the H.T. current consumption approximately 12 milliamps.

An automatic grid-bias system is employed, and two H.T. batteries having a combined voltage of 168 are used. The cabinet is mounted on a concealed turntable, and recesses at the sides provide convenient carrying slots. The illuminated tuning scale is placed at an angle and bears the names of the principal European stations.

Provision is made for the connection of an additional speaker, gramophone pick-up, and, if required, an external aerial and earth.

## RADIO FOR "THE LONELIEST ISLAND"

Tristan da Cunha is a tiny island in the centre of the South Atlantic, and has no electric mains or facilities for accumulator charging. Batteries can only be obtained once a year when the annual mailboat calls.

Therefore, from the radio point of view, it must be admitted that the island inhabitants are not treated at all well. But they are going to have a radio set in spite of the many difficulties of current supply.

This has been made possible by Messrs. E. K. Cole, the well-known set makers.

An all-waver of the "No H.T." type has been presented to the Rev. H. Wilde, who is on furlough from the island. This set requires no H.T. batteries and is operated entirely from small accumulators. These will be kept fully charged by means of a small wind-driven generator.

Reception conditions should be very good on the island, and arrangements have been made for Messrs. E. K. Cole to receive reports on the results obtained.

## THE SZECHWAN STATION

IN the course of last year a 10-kw. broadcasting station was completed and opened in Szechwan, provincial capital Chengtu (near the Tibetan frontier). Chengtu is the seat of a Chinese and of a Canadian Mission University, and has always been the cultural centre of the province. The transmitter is about five miles from the town outside the walls, which are 33 ft. high and about 25 ft. thick.

The Chinese Ministry of Communication is responsible for the transmitter, which was built by Telefunken. The station stands on a disused burial ground. The aerial masts, which are 300 ft. high, contrast curiously with the richly carved and typically Chinese entrance gate to the transmitter buildings. A wavelength of 536 metres is used to provide entertainment and instruction throughout the vast province, which is roughly the size of Germany and as thickly populated. An aerial power of 10 kw. is employed.

The broadcasting studios are in the centre of the town, which has 860,000 inhabitants, and they are close to the post-office buildings.

A. A. G.

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# "P.W." SHORT-WAVE STATION LIST

*Wavelengths and other details of many of the stations you can hear on your short-wave receiver*

Wave-length.	Station.	Call-Sign.	Power.	Wave-length.	Station.	Call-Sign.	Power.
13.93	Pittsburgh	W 8 X K	40	31.09	Lisbon	CT I A A	2
13.93	Daventry	G S J	10-50	31.13	Rome	2 R O	25
13.94	Wayne, New Jersey	W 2 X E	10	31.25	Moscow	R W 9 6	20
13.97	Daventry	G S H	10 50	31.27	Radio Nations	H B L	20
15.93	Bandoeng, Java	P L E	60	31.28	Philadelphia, Pa.	W 3 X A U	10
16.86	Daventry	G S G	10-50	31.28	Sydney	V K 2 M E	20
16.87	Bound Brook	W 3 X A L	35	31.28	Huizen	P C J	20
16.88	Huizen	P H I	23	31.32	Daventry	G S C	10-50
16.89	Zeesen	D J E	5-50	31.32	Lyndhurst, Australia	V K 3 L R	1
16.89	Wayne, New Jersey	W 2 X E	10	31.35	Millis, Mass.	W I X K	10
19.52	Budapest	H A S 3	20	31.36	Bombay	V U B	4.5
19.57	Schenectady	W 2 X A D	18	31.38	Zeesen	D J A	5-50
19.60	Daventry	G S P	10-50	31.45	Zeesen	D J N	5-50
19.62	Buenos Aires	L R U	5	31.48	Jeloy	L K J I	1
19.63	Zeesen	D J Q	50	31.48	Schenectady, New York	W 2 X A F	30
19.65	Wayne, New Jersey	W 2 X E	10	31.55	Melbourne, Australia	V K 3 M E	1.5
19.66	Daventry	G S I	10-50	31.55	Daventry	G S B	10-50
19.68	Radio Colonial, Paris	T P A 2	12	31.58	Rio de Janeiro	P R F 5	12
19.70	Podebrady, Prague	O L R	30	32.88	Budapest	H A T 4	5
19.71	Huizen	P C J	20	38.48	Radio Nations	H B P	20
19.72	Pittsburgh	W 8 X K	40	48.78	Winnipeg	C J R O	2
19.74	Zeesen	D J B	5 50	48.86	Pittsburgh	W 8 X K	40
19.76	Daventry	G S O	10	49.02	Wayne, New Jersey	W 2 X E	10
19.82	Daventry	G S F	10-50	49.10	Daventry	G S L	10-50
19.84	Vatican City	H V J	10	49.18	Chicago, Ill.	W 9 X F	10
19.85	Zeesen	D J L	5-50	49.18	Bound Brook	W 3 X A L	35
22.00	Warsaw	S P W	10	49.20	Johannesburg	Z T J	5
24.52	Reykjavik	T F J	7.5	49.26	Hong Kong	Z B W 2	2
25.00	Moscow	R N E	20	49.50	Philadelphia, Pa.	W 3 X A U	10
25.23	Radio Colonial, Paris	T P A 3	12	49.50	Cincinnati	W 8 X A L	10
25.27	Pittsburgh	W 8 X K	40	49.59	Daventry	G S A	10-50
25.29	Daventry	G S E	10-50	49.67	Miami	W 4 X B	2.5
25.36	Wayne, New Jersey	W 2 X E	10	49.67	Boston, Mass.	W I X A L	20
25.36	Lisbon	CT I A A	2	49.83	Zeesen	D J C	5-50
25.38	Daventry	G S N	10-50	49.90	Bogota, Colombia	H J 3 A B H	1
25.40	Rome	2 R O	25	49.92	Podebrady, Prague	O L R	30
25.45	Boston, Mass.	W I X A L	20	49.96	Montreal, Canada	C F C X	6
25.49	Zeesen	D J D	5-50	50.00	Mexico City	X E B T	1
25.53	Daventry	G S D	10-50	50.00	Moscow	R W 5 9	20
25.60	Winnipeg	C J R X	2	50.26	Vatican City	H V J	10
25.60	Radio Colonial, Paris	T P A 4	12	51.28	Maracaibo, Venezuela	Y V I R B	25
28.99	Buenos Aires	L S X	12	51.72	Caracas, Venezuela	Y V 5 R C	1
29.04	Ruyssede, Belgium	O R K	9	70.20	Kharbarovsk	R V I 5	20
30.43	Madrid	E A Q	20				