

TWO PAGES OF PRACTICAL POINTERS

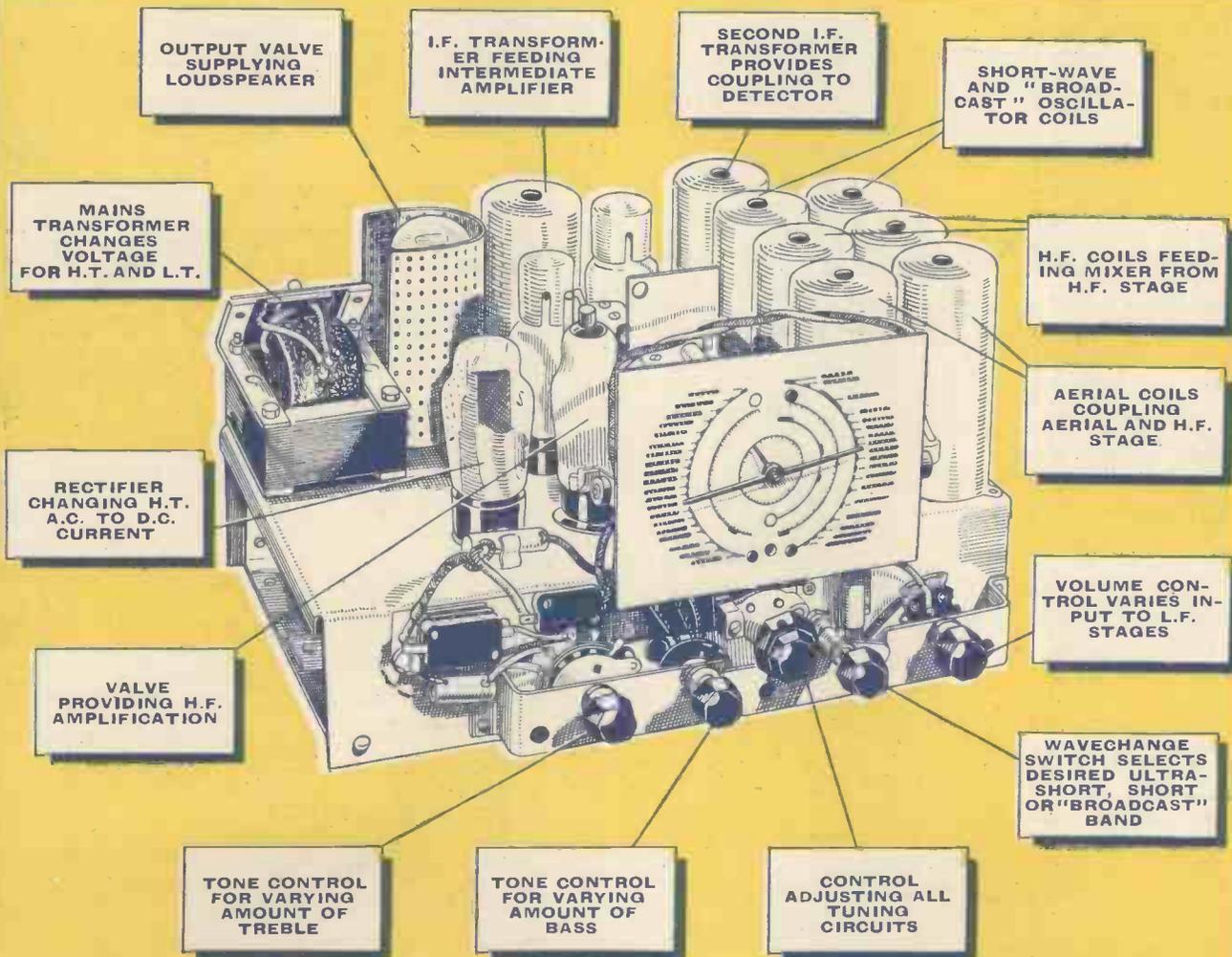
Popular & Wireless TELEVISION TIMES

MAKING A
CHARGING-PANEL

EVERY
WEDNESDAY
PRICE

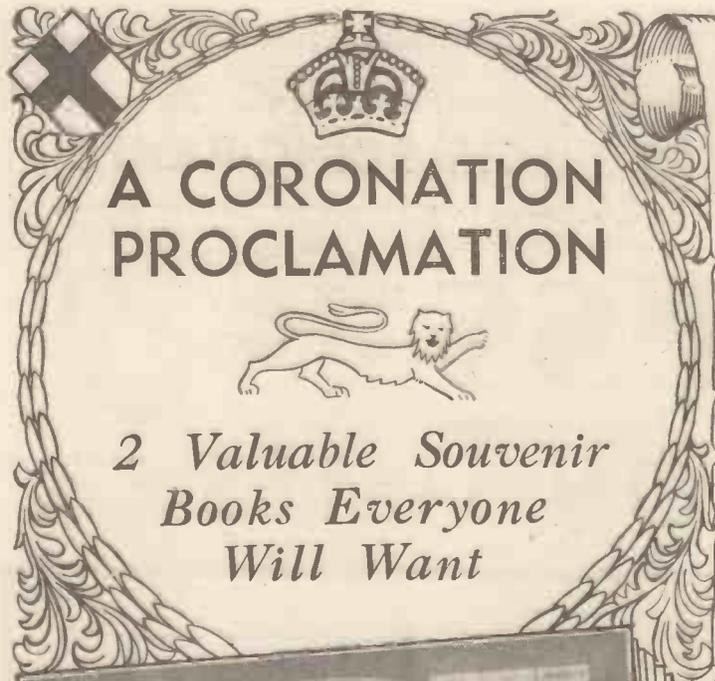
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No. 774,
Vol. XXXI,
April 3rd, 1937.



HOW THE MODERN SET WORKS —SIMPLE NON-TECHNICAL EXPLANATION INSIDE

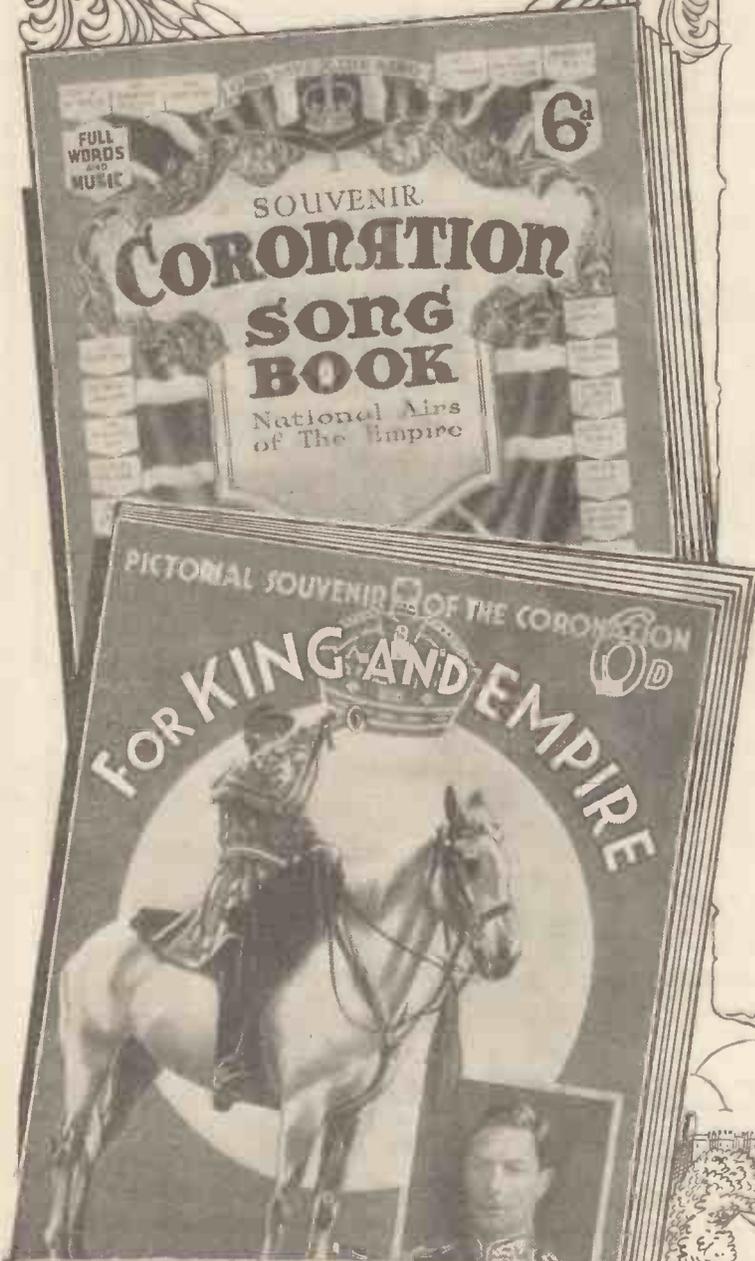
Our cover sketch shows the chassis of the Marconiphone Model 346, a five-waveband receiver covering from 7-2,200 metres, and illustrates the principal parts and their functions.



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DRINK TO ME ONLY WITH THINE
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HARP THAT ONCE THRO' TARA'S
HALLS
HERE'S A HEALTH UNTO HIS MAJESTY
HOME, SWEET HOME
LAND OF MY FATHERS
LONDONDERRY AIR
MAPLE LEAF FOR EVER
THE MARCH OF THE MEN OF
HARLECH
MEETING OF THE WATERS**

On Sale Thursday, April 1st.



POPULAR WIRELESS AND TELEVISION TIMES

Editor: G. V. Dowding

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

B.B.C.'s REFLECTORS
ALL CONTINENTS
TALK ON TALKS

RADIO NOTES & NEWS

PENMON PAUSES
ABOUT JUNKERS
MORE LICENCES

Are You There ?

GRAND news from the Post Office. Their engineers have ordered a television transmitter for attachment to the ordinary telephone service.

When its tests have been successfully passed the telephone caller may look to a future when he will not speak to a blank wall—relieved only by hints on What To Do in Case of Fire or Accident—but he will have a little likeness of the person at the other end to look at.

Besides making for truth in telephoning, this will deal a death-blow at the antiquated phrase "Are you there?" You can hardly look a chap in the eye while deploying that old-time telephonic gambit.

Reflected Programmes

FOUR new masts to the north of the London National aerial at Brookmans Park are almost the only outward sign of the B.B.C.'s latest stunt. The masts carry "reflectors," which are being used in an attempt to turn back this station's programmes from a northward path, and persuade them to seek the sunny south instead.

There is a two-fold advantage to be gained—the prevention of interference with Scotland's 261.1-metre station; and the strengthening of London National towards the South Coast.

Listeners living to the south of London who find that the Little National's strength is excessively undulatory should not despair or swear; the experiments will soon prove something or other, and reports already have a promising note about them!

Borrowing Two Wireless Stations

IN all the radio ups and downs that I have recorded in my time, I remember no instance comparable with the recent "borrowing" of the Milan and Florence stations.

It is part of the duty of the B.B.C. engineers at Tatsfield to watch the working of European stations; so when a complete

stranger started to announce himself as "Radio Verdad" the Tatsfield people sat up and took notice. "Verdad" is the Spanish word for truth, and the announcements were in Spanish, reporting the news of the civil war there.

Inquiries at the B.B.C. elicited the information that the transmitters used were those of Milan and Florence.

Six Continents Hook-Up

FURTHER details of that amateur hook-up of six continents, when each spoke to all, and all to each, on short waves, give the credit of having suggested the

minutes, and every continent had heard every word from every other continent.

The European representative in this remarkable chit-chat was Fred W. Miles, of Kenilworth. Good going, Fred.

Talk on Talks

AN American friend of mine, whose world-wide travels would make the Wandering Jew's best efforts look like a mere afternoon stroll, tells me every time I see him that the B.B.C. talks are better than all the rest of the world's put together. And though I dearly love a dig at the B.B.C. rib, I fancy that his statement is incontrovertible.

Certainly the B.B.C. takes the utmost trouble to get the highest possible standard; they have just appointed a Talks Advisory Committee to make suggestions, and to assist in planning attractive series.

Sir Walter Moberly is chairman, and the members include Miss Rose Macaulay, Miss Megan Lloyd George, M.P., Professor Julian Huxley, and Mr. A. P. Herbert, M.P.

I suggest that the Talks Committee might give us a talk about how they talk about the talks.

Wireless Potpourri

SIGNOR TOSCANINI will receive £8,000 for the ten broadcast concerts he is to conduct in New York, and his income-tax will be paid by the broadcasting company, says the "Daily Telegraph." But for the six concerts he will broadcast in this country in May and June he is to get £3,000, which works out about £300 a concert cheaper.

Hull Fire Brigade has fitted wireless on one of their fire engines, so that even when going to blazes it may be in constant touch with headquarters.

The Turkish Ministry of Works has given the contract for the erection of two high-power radio stations at Ankara to Marconi's.

(Continued overleaf.)

WHAT THEY DO IN THE STATES



The main studio at W W J, Detroit, is not unlike a modern movie theatre, plenty of room being provided for an audience to see the actual broadcasting.

scheme to W 4 D L H, who in private life is one Bill Barkhart, of Goulds, Florida.

Bill called up the All-Continents Round Table, and asked V U 2 C Q (Bombay) to carry on; Bombay checked in, and turned over to S U 1 C H (Cairo); Cairo checked in, and handed over to H K 1 Z (Colombia); Colombia checked in, and turned over to G 5 M L (England); the Englishman checked in, and turned over to V K 4 L O (Brisbane).

Brisbane checked in and finally handed back the Round Table Conference to Bill of Florida. It took exactly twenty-one

.....
NEXT WEEK : PRACTICAL PICK-UP HINTS AND TIPS
.....

RADIO STATION HELPS TO CUT DOWN CHICKEN STEALING

The British firm had to face keen foreign competition, for the contract is worth about £210,000.

Penmon Pauses

THE brand-new, gleaming, shining, glowing, glistening station at Penmon, North Wales—opened just the other day, and acclaimed as a last-word wonder of radio perfection—has blotted his copy-book. And blotted it in a way that has not been equalled since "What Katy Did At School."

This breakdown of Penmon's was no technical hitch, but a great blue-black blot on the B.B.C. escutcheon. We could forgive a new station for a mere halt, a slight breach of promise, a rift in the lute. But how can we forgive a yawning gulf extending from Monday to Wednesday?

The excuse, we have been assured by silken-voiced announcers, is that there was a failure in the power supply. We are not amused.

Are You a Junker ?

ABSOLVE me, I pray you, from any political prejudice, when I ask if you are a Junker? For I use the work not in its Prussian-blue sense, but merely to denote a person whose disposition (or attic-accommodation) impels him to preserve and retain possession in perpetuity of Old Junk.



Myself, I am no Junker; and when I recently remonstrated with a friend

for keeping four or five of his discarded radio sets in his attic he surprised me by telling of an acquaintance who has hoarded no fewer than eight old radio sets—from a crude crystal contraption to a nice little short-wave unit which had received the *coup de grace* from the S.T.800.

Can any other accumulator of the ex-radio receiver claim to more than eight radio has-beens in store? And if so, are his reasons sentimental or Scottish?

SEASIDE CONCERT PARTIES

Arrangements are now being completed for a ten-weeks' summer tour of the seaside concert parties by Harry S. Pepper, well known to listeners as the producer of the White Coons and the Kentucky Minstrels. His journeyings will begin at Southsea during the first week in July and, probably with Davy Burnaby as travelling companion, he will make his way eastwards along the South Coast, thence up the East Coast as far as Hunstanton in Norfolk, where the tour will end during the second week in September.

February Figures

THE Postmaster-General has been using his listing and adding machines again; and he finds that during February his Department issued 802,829 radio licences to applicants, a net increase during the month of 21,597.

When the month of February March-ed out the total number of British licences in force was 8,090,341. This was a record. At the end of February 1936, the total

was 7,573,793, so the increase over twelve months was thus 516,548. "That's a demmed handsome figger," as the old Marquis used to say.

Those B.B.C. Ultra-Shorts

THAT proposal for ultra-short-wave high-quality transmitters, which was referred to recently in "P.W.," seems to be hanging fire before the plaudits of the multitude have sunk to the R1 audibility level.



It appears that the B.B.C. has the transmitter ready all right, but they hesitate to put it into service until the trade has indicated that the supply of the ultra-

short receivers is equal to the possible demand.

This "After-you, -sir" — "No, -after-you, -sir" business is embarrassing, and unnecessary. If the egg had always waited for the chicken to lay it, and the chicken had always waited for an egg to hatch from, the poultry-farming industry of to-day would not have been in a condition of comparatively constant productivity.

Radio for Transatlantic Service

IT was a long time ago that I gave you the tip as to the probable site of a transatlantic air-base being at Rynanna, on the mouth of the Shannon. Opposite the village of Foynes the powerful wireless station which I predicted is coming into being, and some interesting long-range tests have recently been carried out on short waves with the new Empire flying-boat Cambria.

The indications are that Rynanna will serve a two-fold purpose—it will clear messages from the flying-boats as they ply between Ireland and Newfoundland; and will also be equipped to give them their bearings from wireless direction-finding apparatus.

I shall be interested to hear from any ocean-going hawks among my readers who may be able to throw light upon Rynanna's test performances.

Who Stole Dat Chickun ?

YOU would not suppose that there is an affinity between radio broadcasting and chicken-stealing, would you? Yet there is one famous broadcasting station in America that owes much of its popularity to its insistence upon undisturbed slumber for all perchers upon hen roosts.

The station in question is WLS, Chicago — "The Farmers' Friend." Every year the gangsterettes of the Chicago suburbs unlawfully annex from neighbouring hen-coops some £1,000-worth of feathered



friendliness—to the great indignation of the poultry farmer, and annoyance of the cock of the roost. But station WLS fights this form of crime by asking all victims to notify it, and by broadcasting full particulars as soon as received. In this manner excessive ornithological enthusiasm has been considerably restricted, to the greater glory of WLS, and to the satisfaction of Mr. Orpington Buff.

IN TOWN TO-NIGHT

A. W. (Bill) Hanson's well-known Saturday feature, "In Town To-night," makes its last appearance on Saturday, April 3rd, until Coronation Week. The following few statistics, relating to the production since it was first put on the air, may interest listeners who tune-in regularly each week to hear what Mr. Hanson has to offer: Half-hours broadcast, 122; Characters who have taken part, 3,000; Items broadcast, 900; Hours of rehearsal, 500; Staff engaged in production, 4; Outside assistants employed in searching for suitable items for inclusion in the feature, 3; Studios used, 610.

"When de Moon am Yaller . . ."

DOES the moon affect the strength of radio reception over long distances?

Many observers have formed the opinion that the best time for feats of DX legerdemain is

when the new moon excites the ecstasy of lover and of poet; but such observers have a certain hesitation in proclaiming their belief, because the sceptical wit always retaliates with "moon-struck," "lunatic," and similar terms unhappily associated with the orb of night.



Scientists, however, have been entering in their little red books some interesting examples of new-moon signal strength.

I shall be interested to hear from any knightly combatants who crave to break a lance in favour of this fair theory.

Our Youngest Broadcaster

A GREENOCK reader who occasionally favours me with a discursive three-ha'porth of correspondence smote me hip, thigh, and funny-bone this week, by inquiring if I knew who was the youngest British broadcaster. For the life of me I couldn't have said, but he supplied his own answer by reminding me of the same-day baby who gurgled and spluttered at the opening of the Glasgow Royal Maternity and Women's Hospital last April.

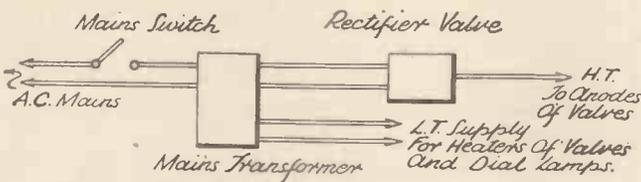
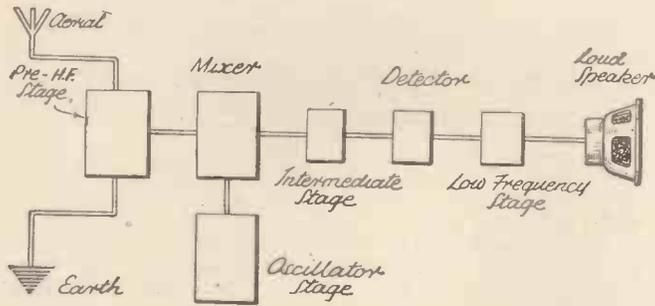
This was interesting; but more was to follow. For after explaining something about Heart of Midlothian's league position, paying tribute to the Queen Mary's magnificent appearance when she went down the Clyde, and giving Scottish Regional a couple of back-handers, my circumlocutory correspondent went on to say that this cradle-crooning baby has been named after the Lord Provost who introduced him to the radio audience.

Best wishes, Baby John; but it's a crazy world you've landed yourself into, ma bairn!

ARIEL.

YOUR SET— How it Works

A simple, non-technical chat about the "innards" of an all-mains superhet.



These two step-by-step sketches show the various stages in the modern superhet; the lower sketch illustrating the mains supply portion.

THERE is a very marked difference between home constructors and the average commercial set owner. The home constructors—or at any rate a larger percentage of them—are interested in radio as a hobby and go out of their way to learn everything they can about it. They want to know exactly what each component in the set does, and probably get far more fun out of radio than the commercial set user. The latter is what might be termed "a listener" purely, and apart from switching on his set and adjusting the controls he knows very little about it.

SUPERHET CIRCUITS

But all commercial set users are not tarred with the same brush, and there are a goodly number who are keen to know something of what happens inside their sets.

This week we are devoting a certain amount of space to a chat about the "innards" of the average commercial design. This chat we may say has deliberately been kept non-technical. By far a greater proportion of commercial set designs are superhets, and a very large percentage are of the A.C. mains type, so perhaps this is the best type to deal with here, although it should not be forgotten that all superhets work on exactly the same principle, whether battery, A.C. mains or universal designs.

Take a glance at the stage-by-stage sketch on this page. You will see a little square marked "Pre-H.F. stage," and attached to it are two symbols representing the aerial and earth.

PRE-H.F. STAGES

Now a great many superhets, particularly the latest models, have pre-H.F. stages. These are simply magnifiers or amplifiers, which in addition to improving the range of the set also increase its selectivity or ability to

separate one programme from another (that is, one wavelength from another). What happens is this: the programme arrives at the aerial, passes down the lead-in wire into the aerial coil of the set and through this coil to earth. The aerial coil consists usually of two windings, and in passing through the first winding our programme produces voltages in the second winding, which is placed near the first winding. This second winding is tuned by having a variable condenser joined across it. Naturally, when the programme we want arrives at the aerial it does so along with a host of other programmes, which we don't want. And it is the duty of this aerial coil to start the preliminary sorting out so that we are left with the

enclosed in metal containers, usually of aluminium, which are popularly called "cans." These aluminium cans are merely for the purpose of screening one coil from another so that no interaction between the stages can occur and so upset things. Often the valves themselves, or certain of them, have metal screens over them for this same reason.

The tuning condenser in the modern set is invariably of the ganged type, that is to say, the various sections are joined together on to a common spindle and operated by one knob.

This is merely to save multiplication of controls and to make the set easy to handle.

THE MIXER

Immediately after the pre-H.F. stage comes the "mixer." Now the function of the mixer, or as it used to be called the first detector, is very complicated, and so we will not pretend to go into it too deeply, otherwise our discussion will become technical.

Speaking rather superficially, the mixer has to mix two frequencies together and then pass the resulting frequency on to the next stage. It is, therefore, a frequency changer.

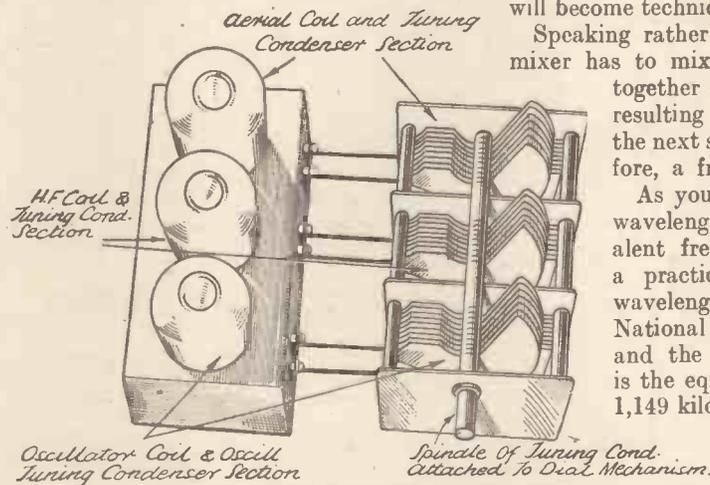
As you all know, every wavelength has an equivalent frequency. To take a practical example, the wavelength of the London National is 261.1 metres and the frequency which is the equivalent of this is 1,149 kilocycles. It would

be better if we could always talk in terms of frequency, but unfortunately the term wavelength has become

so general that it will probably always remain with us. But for the purpose of explaining the action of the mixer stage we must use the word frequency in preference to wavelength.

When the programme which we want to listen to has passed through the pre-H.F. stage, it is applied to another tuning coil and tuning condenser, which separate it still further.

(Continued overleaf.)



GANGED TUNING SIMPLIFIES OPERATION

Commercial superhets and most home-constructor designs these days have ganged tuning, the individual condenser sections being attached to a common spindle, to which is fixed the dial mechanism. This practice, of course, greatly simplifies the handling of the set.

programme we want clear of all those that we don't want. The voltages across this second coil are applied to an amplifying valve, which magnifies them and passes them on to the next stage in the chain.

This completes the pre-(or preliminary) H.F. stage, which you will see consists of a coil, tuning condenser and an amplifying valve.

In practice all the coils in the set are

YOUR SET— HOW IT WORKS

(Continued from previous page.)

Then having survived this additional sorting out, our programme reaches the mixer valve. Now coupled to this mixer stage is another stage known as the "oscillator." This part of the set comprises a coil and tuning condenser, adjusted to a frequency (or wavelength if you like) which is always slightly different from that of the programme to which our pre-H.F. and mixer circuits are adjusted. The oscillator tuning condenser is attached to the same spindle on the ganged assembly as the other two condensers and rotates with them, being controlled by the main-tuning knob on the set. And another point is that no matter what wavelength (or frequency) we tune the set to, the difference between the frequency of the oscillator and the frequency to which the set is tuned is always the same. This is fixed by the designer of the set. The mixer valve does a very clever piece of work: it takes the frequency of the programme we want to listen to and the frequency which is deliberately injected from the oscillator stage, "mixes" them and passes the resulting frequency—called the "beat" frequency—into the next part of the circuit.

THE INTERMEDIATE AMPLIFIER

This portion is known as the intermediate stage, and its job is to magnify the programme still further. But you will note that a big change has taken place. What we are now magnifying is not the initial wavelength, but the new one produced by the mixing together of the initial frequency with the frequency of the oscillator. Our intermediate stage is magnifying the difference between these two frequencies, which boiled down is merely a new wavelength of somewhere around 600 metres.

The intermediate stage has no tuning condenser, because it deals with only one frequency and this is always the same no matter what station we decide to tune-in. The intermediate stage consists of a magnifying valve and two intermediate transformers, one before and one after the I.F. valve, these being screened in just the same manner as the other coils in the set.

COMBINED-FUNCTION VALVE

Some superhets have two intermediate stages, but these are the more expensive types, and of course give greater amplification. These days it is common practice to use one of the multi-electrode valves to perform the

functions of mixer and oscillator. Here you have really two valves in one, and of course the use of one of these multi-valves saves space and money.

THE DETECTOR

After being further amplified by the intermediate stage or stages our programme arrives at the detector, and here it undergoes a further change. Previously if you had connected a loudspeaker in the circuit you would have heard nothing

low-frequency impulses are passed on to the final valve in the chain with the minimum amount of distortion.

One of the most important factors in the design of a radio set is that of avoiding anything which will distort the original broadcast programme. Otherwise, as you will readily appreciate, the final result from the loudspeaker will be nothing like the original.

The final valve, or output valve as it is called, has to handle voltages many thousands of times greater than those which existed in the first place in the aerial coil of the set and, consequently, must be specially designed for the purpose.

Its job is to supply power to the loudspeaker, and it is often also referred to as a power valve.

SUPPLYING THE POWER

So far we have said nothing about the supply of electricity from the mains which is, of course, necessary to operate the valves. As you know, your set is provided with a mains plug attached to a length of flexible wire. The mains plug is joined to the house supply via a wall or lamp socket, and the other end of the flex, which goes into the set, is joined to the mains transformer.

This is a component which consists of an iron core upon which are wound several windings. The mains electricity goes to the primary winding, and this is normally adjustable by means of a plate having sockets, or a switching device, to provide for different mains voltages. Usually the set is already adjusted when you receive it, this work having been carried out by your local dealer, who will be well acquainted with the voltage of your particular mains.

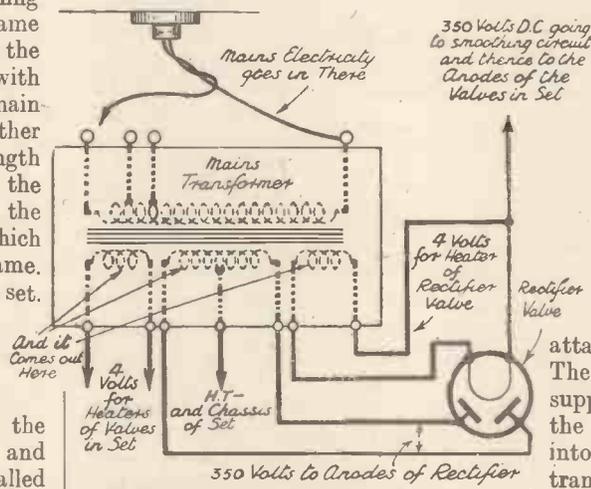
The mains electricity in flowing through the primary winding induces current in the other windings, which are proportioned according to the jobs which they have to do. For example, there will be one winding for supplying four volts to the heater of the rectifier valve. Another winding for supplying the H.T.

voltage on the anodes of the rectifier valve; and still another winding for supplying the heaters of the valves in the set.

The duty of the rectifier valve is to change the A.C. current into direct current, because the anodes of the valves in the set always have to be supplied with D.C. But the D.C. which leaves the rectifier valve is what may be termed "raw," and if used in this state would result in a violent hum in your loudspeaker. So, in order to get rid of

(Please turn to page 96.)

FROM MAINS TO SET

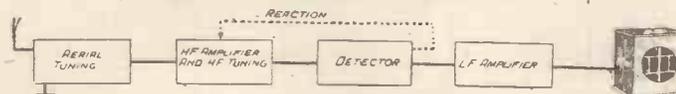


The mains A.C. supply is fed straight into the primary winding of a transformer—a device which changes its voltage by stepping it up or down according to the particular part of the circuit it has to supply with power.

at all because the frequency has hitherto been much too high to operate the speaker diaphragm.

The detector changes the form of our high frequency oscillations and passes them on as low frequency impulses, which can now be rendered audible when they have undergone further magnification.

A "STRAIGHT" CIRCUIT



The stage-by-stage arrangement of a "straight" circuit. This type of circuit is employed for a mains set using three valves, whereas the superhet needs four valves or more. There is no oscillator or mixer stage in a straight circuit.

FINAL MAGNIFICATION

To achieve this we have to use what is called a low-frequency stage, and its job is merely to increase the strength of the low-frequency impulses so that they will move the diaphragm of the loudspeaker.

There are several methods of low-frequency amplification, sometimes a transformer is employed, but it is more usual to use what is called resistance coupling in the modern set. This is simply a number of resistances connected together in a certain way so that the

ON THE

SHORT

WAVES



MORSE—AND OTHER MATTERS

By W. L. S.

THERE are signs of a Great Awakening! In other words, readers seem to be in danger of becoming Morse-conscious (I was afraid that word would materialise one of these days).

My correspondence indicates that they realise now that Morse isn't merely something used by amateur transmitters who can't afford to use telephony, but that it is a means of communication with a thrill of its own.

You would be surprised at the number of "hams" who stick to Morse work because they prefer it to telephony. There are even

friend to waste hours sending to you, when all over the short-wave bands there are thousands of stations sending out Morse of all speeds, all shapes and all sizes for every minute of the twenty-four hours?

Pick on a station sending fairly slowly. Never mind if you can't copy more than one letter in every five that he sends. Pick out those letters that you can get, put them down and stick to it. It won't be long before you find that you are nearly able to copy the whole thing.

Fig. 2 shows what readers have asked for, an oscillator using an ordinary triode and an L.F. transformer. The secondary should be connected across the grid circuit and the primary across from the plate to H.T. positive. The phones should be connected across the primary—not in series with it. Fixed condensers of various sizes, across the grid circuit, will enable you to vary the frequency of the note until you come across one that you like the sound of.

The key, of course, is connected in the H.T. circuit, either in the position shown or else between H.T. negative and L.T. negative.

I have my own particular fad about teaching people Morse. I don't run them straight through the alphabet, but I do it on the "build-up" system. By this I mean the following sort of procedure: Start with a dot, "E"; add another, "I"; add yet another, "S"; and a fourth, "H."

An Easy Method

Now go back to "E" again. Add a dash, "A"; another dash, "W"; and a third, "J." Back to "E" again. This time add a dash, "A"; and now add dots, giving you "R" and "L."

Then you can go back to "E," add a dot to get "I," and build up after that with dashes. The alphabet thus reveals itself as a collection of "series," such as E-I-S-H, E-A-W-J, E-A-R-L, E-I-U-F, T-N-D-B, T-N-K-Y, and so on.

It may sound complicated to you, but it certainly produces results when put into practice.

So much for Morse; now for "other matters." First of all, I should mention that I am continually being asked to publish more and more about the amateur transmitters. I was under the impression that they spoke for themselves and created more impression that way than I could possibly do. But, as an overwhelming proportion of readers seem to be more keen on amateur work than on broadcast listening, I must bow before the storm and give more space to amateur doings.

But I do *not* intend to give a lot of

technical data on transmitters. Some people seem to want it, but, after all, they have only to read the magazines specially published by the various national radio organisations as their official organs. Most of the articles that I read on transmission seem to be re-hashed from some of these sources, from "The Guide to Amateur Radio" or from "QST" and the A.R.R.L. handbook. And any original ideas I may have on the subject of transmission are hardly what the readers of "P.W." want, since the transmitters among them are undoubtedly members of some transmitting society or other.

"Single-Signal" Superhets

Another little crop of requests that have come in have concerned the "Single-Signal" superhets. Readers accuse me of often mentioning these receivers without explaining what I mean by them. This, definitely, is "coming shortly," so please be patient.

MAKE YOUR OWN MORSE

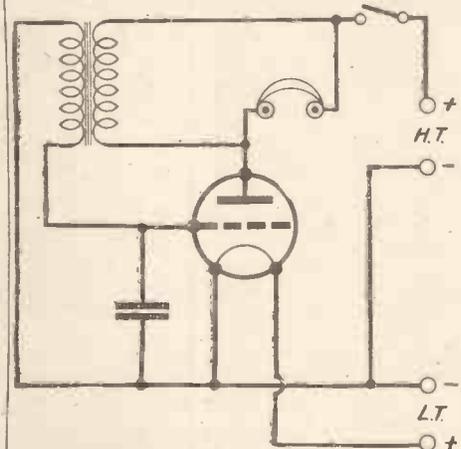


Fig. 2. Here is an oscillator for those who want to practise Morse without listening to actual stations.

A set, too, is coming before long, but it won't be a single-signal superhet! One reader who spotted me "on the air" heard me talking about my own, and jumped to the conclusion that it was a home-made affair. I confess, unashamedly, that it isn't. It's a genuine, dyed-in-the-wool commercial receiver. Forward, those with bricks!

The last matter I want to mention is "Points From the Postbag." It is becoming increasingly difficult to answer every letter in that feature, and I frankly haven't time to do a lot of postal correspondence. So, if you want information, please make your letters short and come to the point.

PRACTISE ON SIGNALS

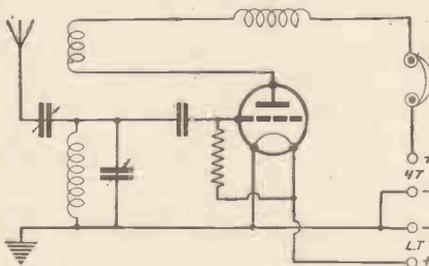


Fig. 1. W.L.S.'s little joke—a single valve short-wave circuit, which he says is the best "valve-oscillator" for those who wish to learn Morse. You can soon learn it by listening to the thousands of short-wave stations which are continually sending out messages at all hours of the day and night.

some who like it because they think it gives a more "personal" contact with the other fellow.

After all, Morse is not just a mechanical collection of dots and dashes. One man's "fist" differs from another's, and how well we know it, sometimes! And one man's way of expressing himself when he is using code is very different from another's.

Recognising Friends By Their Touch

I can recognise radio friends in all parts of the world by the way they handle a key, and by the things that they say with it. And this is more than one can say of telephony work nowadays, for every voice from the U.S.A. sounds alike to me!

To return to the point, though: There seems to be a universal desire to know the quickest and easiest way of learning Morse, and many readers have asked for a diagram of a valve oscillator to use instead of that primitive instrument the buzzer.

I must have my little joke, and I have drawn Fig. 1 as the answer to their question. The best "valve oscillator" for learning Morse is undoubtedly a single-valve receiver covering the short-wave bands. Why rig up an oscillator and a key and get some poor

ON THE SHORT WAVES—Page 2.

POINTS from the POST-BAG

W. L. S. Replies to Correspondents

THE other day "P.W.'s" office-boy brought a pile of letters into the office in which I spend my days, and a colleague beamed brightly at me and inquired, "Any more for Miss Garbo, please?" It will take me a long time to live that down, although I carefully pointed out that my "fan-mail" was not answered by sending a signed photograph to each reader; and that "Miss Garbo" didn't have to read through letters of twenty-two pages to find out what on earth the point was!

I leave you to dig out the hidden meaning from the above paragraph.

C. R. B. (Ely) made up the "Simplex" Two from the "repeat" description recently published, and reports excellent results already. But he adds that his wife regards me as "Public Nuisance No. 1," because of odds and ends of wire, etc., left about the floor. Why blame me, O wife of C. R. B.? I don't leave wire about the floor—it would be more than my life is worth! But then, I was well brought up.

W. H. S. (Winsford) has heard Y T 7 K P on phone and wants to know where he is. The answer is Yugoslavia, but I haven't got his full QRA. The Radio Amateur Call-Book is published in the States, but the R.S.G.B. (53, Victoria Street) lays in a stock of each issue for members, and generally has a few left over for non-members. You may, however, have to place your order and wait for the next issue.

J. R. (Winchmore Hill) inquires, "Does one have to send a reply coupon with a report if one wants a QSL-card back? And if so, where can this be obtained?" No—one does not have to send one. With some foreign stations, unfortunately, the reply coupon carries no weight whatever. You can try though, and the coupons will be supplied over the counter at the nearest post office.

A "Chain-Letter" Try-On

R. H. (Norwich) goes further and asks whether there is any way of sending a report so as to make sure of getting a verification back? No, there isn't. The most pestilential "try-on" that ever came my way was a request for a QSL, accompanied by one of those daft "chain-letter" things. If I didn't send on nine copies to nine friends, all sorts of dire things were to happen to me; but they were nothing to the bad luck that would come my way if I didn't send a QSL-card.

I put the whole lot in the waste-paper basket. That was nearly a year ago, and up to date I haven't suffered from boils,

measles, cold feet, or any of the other threatened catastrophes.

No, the only reasonable thing to do is to make sure that you send reports that are of some value to the station concerned. Then you'll be pretty sure of a nice reply. R. H.'s other query is for a nice simple diagram of a transmitting circuit; but I've already explained that I can't do this sort of thing.

Can Anyone Help?

L. G. C. (Maidstone) reports a station signing Q M 8 Q U, calling Swedish stations on the 80-metre band. It sounds a funny call, but he is quite positive about it. Can anyone elucidate? L. J. C. wants to make the adaptor described round about Show time last year, but intends to place a band-setter and band-spreader side by side on the panel. He enquires whether this will be O.K. I should say that it would be excellent.

S. P. (Barnsbury) passes on the note that the programmes from J V N (Tokio) are now radiated on 27.93 metres and 25.40 metres simultaneously. He also asks for some "dope" on "single-single" receivers!

THE BEST TIMES TO LISTEN

APRIL—MAY

	10-20 metres	20-32 metres	32-50 metres
Australia and N.Z. . . .	0800-1100	1100-1500	0600-0900 1700-2000
North America	0600-0900 1500-2300	2000-0300	2300-0600
North America (West Coast)	0600-0800 1700-1900	—	0500-0700
Central and South America	2100-2400	2300-0200	0000-0400
South Africa	1500-1800	—	1800-2000
Asia	0800-1000 1400-1600	1500-2000	—

This table shows how to plan your listening on the various short-wave bands. As far as possible, the times (which are in G.M.T.) apply both to amateur signals and to broadcast transmissions. The 10- and 20-metre amateur bands have been grouped together, as they are "alive" at about the same times during this part of the year.

I presume he means the siggle-sniggle—no, single-siggle; well, an American superhet, anyway. For further information, turn to previous page.

S. J. (Croydon) suspects that he lives near me (now what made him think that?), and is worried because he can get only an R2 signal from the Alexandra Palace, and knows that I get R9's. Judging by his description of his gear and aerial, I think he must be more badly screened than I am.

He adds, by the way, that Mr. Darlington, who is in charge of short-wave broadcasting at Schenectady, has sent across some report sheets for him to fill in. Mr. Darlington is pleased to receive reports on W 2 X A D or W 2 X A F, provided that they cover (a) carrier strength (R scale); (b) fading; (c) noise—static, etc., but not man-made; (d) interference and jamming; (e) overall readability (QSA code).

Many thanks, S. J. That's a model for readers to work to.

Short-Wave News

What the Amateur Bands are Doing

THE days between March 20th and March 28th were about the most interesting for short-wave listeners that I have ever known. It was not until after the A.R.R.L.'S DX contest on C.W. was all over that I realised there was another one for phone only. And were there some stations on the air? I didn't know there were so many phone amateurs in the world. The 10-metre band was packed tightly with them during the C.W. contest, but during the phone contest! Some of them were throwing out their code numbers with such slickness that it was not always easy to grab at their call-signs.

The next item is that 80 metres has been producing international DX once more.

Funny, but none of us seems to look on 80 metres as a DX band nowadays, although most of us know that the first contacts with Australia and New Zealand were made not so far from that wavelength in 1924-5. V K 3 M R, well-known Australian station, has been getting signals into Europe on "eighty," and W 6 C X W, famous Californian, has also been in contact with G 2 P L of Cambridge.

With the appalling state of mush and chaos that 40 metres has got itself into nowadays, it's a wonder that more people don't start doing a little useful work on 80. But we hardly look upon that as "short waves" nowadays. The fact remains that short waves haven't a monopoly on DX. I have just had another letter from my friend in Australia, and his list of European broadcasting stations heard on 200-500 metres is amazing.

New highspots of DX on 10 metres remind us that the other end of the spectrum isn't so bad, though. G 5 M L worked K 6 M V V (Hawaii) on phone recently, and contacts with W 6, W 7 and V E 5 are becoming quite commonplace.

5-metre DX

A certain Californian station received an R7 report from this country when his aerial was lying on the ground. The sore spot is Asia, which doesn't produce many 10-metre signals even when its inmates' aeriels are well up in the air!

Five-metre DX is getting nearer and nearer. Another British station has been heard in the States, and several Americans have been heard over here, but the first two-way contact has yet to materialise (unless it has arrived before this appears in print). Many R.S.G.B. members are confident that two-way DX work on 5 metres will be a commonplace affair before many years have passed.

W. L. S.

FROM OUR READERS

SNOW—A STORM—THEN GOOD RECEPTION

A reader wonders whether his reception of Japan was due to the unusual conditions under which he was working



The Editor POPULAR WIRELESS.

Dear Sir,—We hear a lot about "freak reception." I wonder if this is a case in point.

I was listening to-night on an old 2-valve set (1 det. and 1 L.F.), which is fitted with an old "all-wave" coil, tuning down to approximately 20 metres. After twiddling around somewhere about the 31-metre band I was astounded to hear Tokio, Japan! He announced several times, and said they would play some convivial songs. The time was given as 5.28 a.m. when they closed down—it was about 8.30 p.m. here.

Now all this is the more surprising when I tell you that my aerial had been broken down at the mast end by the snowstorm and lay stretched across the garden. Yet here was Tokio of all places coming through on the loudspeaker at quite comfortable small-room strength.

Shortly before this reception we had a slight thunderstorm, a few flashes of lightning and a few claps of thunder.

Is there any connection between this storm, my aerial lying on the snow-covered ground and the reception of Tokio, Japan, on an old 2-valve set?

Perhaps other readers may be able to let me know if they received Tokio on this date between 8.0 and 8.30 p.m.?

Yours faithfully,

T. E. PRESTON.

6, Treafoad Lane, Birmingham 8.

THE QSL DISCUSSION CONTINUED

The Editor, "Popular Wireless."

Dear Sir,—My letter anent the collection of QSL cards and verifications appears to have put the cat among the pigeons with a vengeance. I think, however, that some of the correspondents have misunderstood at least part of my letter, and I hasten to clear up the following points:

First, the reports were sent to Amateur stations, and did not include any broadcast stations whatsoever.

Secondly, I have been accused of submitting scanty and/or inadequate reports. In reply to this, I can only mention the data which appears (and is duly completed) on my reporting cards: (1) Call sign; (2) Fone or C.W.; (3) Date and time G.M.T.; (4) QSA,—R,—T—; (5) Fading (QSB); (6) Keying (QSD); (7) Frequency variation (QRH); (8) Note variation (QRI); (9) Interference (QRM); (10) Atmospherics (QRN); (11) Quality; (12) Modulation; (13) Description of my receiver; (14) Weather; (15) Description of my aerial; (16) Conditions. Also several

lines are allowed for miscellaneous remarks. If the foregoing details do not comprise an effective report, then I await instruction on what does!

Thirdly, and finally, the reports were, to the best of my judgment, sent to interesting or unusual stations, and in many cases to stations specially asking for reports.

There is one point, however, which may account at least partially for the low percentage of verifications received, viz. the reports were strictly accurate, and quite candid. Barely readable fone of poor quality was not reported as "Your FB R7 fone OB," and similarly, T2 R4 C.W. was not described as "Ur T6 (or even T8) R8 C.W. sigs." In particular, any variation in note or frequency was also candidly commented on, a fact which perhaps does not please many of the recipients!

In conclusion, I must say that I have yet to meet that *rara avis*, the amateur who returns reply coupons and sends his card via return Air Mail. I still hope on!

Yours faithfully,
R. B. WEBSTER.

Launt House, Carlton Road, Workop.

P.S.—Since my last letter, I am pleased to report a considerable improvement in the percentage of veri's received from my last batch of reports. Note the following:

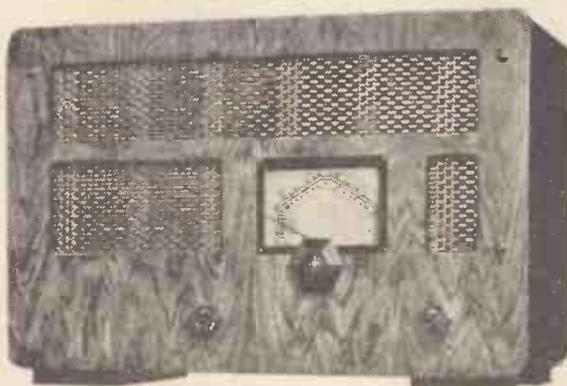
Reports to Gilbert and Ellice Islands. 5—Veri's received 10.

Reports to Western Samoa 6—Veri's received 12.

Reports to Tristan da Cunha 4—Veri's received 9.

And others too numerous to mention, but in similar proportions! *Verb. sap.!*

A MARCONIPHONE ADDITION



This new Marconiphone three-valve battery receiver is priced at 7½ guineas. The H.T. consumption is 8½ milliamps total, and a sensitivity control ensures perfect local station reception.

"THE DIAL REVOLVES" PRAISED

The Editor, POPULAR WIRELESS.

Dear Sir,—I wish to express my sincere appreciation for the article appearing in the current POPULAR WIRELESS—an article most entertainingly written and certainly a feature of interest which I shall look forward to while it lasts. I am, as a reader of your journal, taking the liberty of respectfully suggesting that articles of the type written by Mr. Orton tend to arouse the enthusiasm of the average reader, if only by the literary style they are written in.

Yours faithfully,
IDWAL KINSEY.

8, Court Street, Maesteg, Glam.

A GUINEA

is paid each week for the best letter sent in by a reader (Mr. T. E. Preston gets it this week), and there is no reason why you should not win one. Anyway, it's worth having a shot at.

If you have had any interesting radio experiences—and who hasn't?—or if you have any opinions of general radio interest to ventilate, send them along to "P.W."

These pages are open to readers every week, and from each batch of correspondence we select those letters which we consider to be of the greatest general interest to other readers.

So don't hold back! Remember you may get a guinea

FOR YOUR LETTER

SOME MORE MEMORIES

The Editor, "Popular Wireless."

Dear Sir,—Re Mr. Murray's letter, "Popular Wireless," of March 6th, and his suggestion of having a "Do You Remember?" series. I think this would prove a very popular feature amongst readers old and new, and disclose some still very interesting facts. How times have changed! Many readers will remember the days of the good old basket coils, the very important variable grid leak, and filament resistances.

The wholesale use of the last named, for example, is recalled in the "Popular Wireless" Twenty-Four Valve Set for listening-in to Mars. This was a receiver comprising twenty stages of H.F.—Detector, and three note mags.

Twenty-four filament resistances alone were used on this set; all components, even to terminals, were mounted on a large ebonite panel, about three feet square and weighing somewhere about thirty pounds. I believe this receiver was at that time the largest in the world. What a difference in design of the set of 40-day!

It is some sixteen years ago since I caught the radio fever, and I have kept it ever since, from the humble crystal set to the present all-electric superhet, but what an experience in the gap between! It was after I became a "fully fledged" radio fan that the transatlantic tests came to the forefront, and I still treasure to-day my first two-valve set with which I tried to pull in American and Australian signals in 1922, although it was some time later before I achieved my object.

To get down to 100 metres in those days was a great feat, although many well-known amateurs solved the very important high-frequency problem and worked on a still lower wavelength with remarkable results.

From then I became a real DX hunter and devoted all my spare time (including bed-time) to the short waves. Occasionally I would break away to the ever-increasing improvements on the broadcast side, and I built many of the sets described in "Popular Wireless."

Then I wonder how many remember the £100 offered by "Popular Wireless" for improvements on Dr. J. H. T. Roberts' "Thermopile" Unit.

Yes, Mr. Murray, newcomers to "P.W." have missed quite a lot.

B. TAYLOR.

10, High Street, Quarry Bank, Staffs.

THE DIAL REVOLVES

By Leslie W. Orton

Ultra-short-wave Schedules :: Poor Reception from the East :: Information Wanted from Readers

BEFORE me I have a list of schedules straight from the horse's mouth, or, to be precise, from America! A list, my lads, which should set you fervently searching in the region of 10 metres.

Now before proceeding, I wish to emphasise an important point. I naturally endeavour to ensure that all schedules, etc. are accurate. But occasionally a station changes its schedule suddenly and then, believe it or not, I get the brickbats! So, though the following schedules are accurate and likely to continue so, please write to the stations if they alter transmissions, for I'm not responsible!

10-Metre Schedules

Here are the details promised above in as brief a form as possible:

W 2 X D U, New York, relays **W A B C** on Saturdays and Sundays from 11 p.m. to 2 a.m., and during the week from 5.30 to 10 p.m.

W 4 X C A is reported to relay **W M C**, Memphis.

W 8 X W J, Detroit, operates on Sundays from 1 to 5 p.m. and on weekdays from 11 p.m. to 5.30 a.m.

W 8 X A J, Rochester, relays **W H A M** daily from 12.30 to 5.05 p.m.

And, would you believe it, they all operate upon the same frequency, the chosen wave being 9.494 metres!

Now there is your bottled schedule and, remember, I'll be delighted to hear how many of those stations you tune-in, also details of new stations, schedules and so on, so that I may pass them on to the benefit of mankind in general.

After reading a recent article of mine, J. R. (of Cheltenham) sat down and tuned-in **W 9 X A Z** right away, and he has heard them every night since! That is the attitude I like. He reports that the station relays the N.B.C. programme except for occasional local advertisements.

A Hot Time

What a flutter occurred the other day when the Spanish ship *Mar Cantabrico* bringing shells, etc. from America, was bombarded and set on fire in the Bay of Biscay! Frantic SOS calls were transmitted—and, boy, oh boy; who wouldn't send out frantic calls if he were abroad a ship full of explosives and on fire? Talk about the boy who stood on the burning deck—he had a tame time compared with the crew of that ship!

Confusion was created among the radio operators of Europe because, for prudence' sake, the Spanish ship disguised (not very

effectively!) as a Newcastle boat, used the English call (**G J P R**) when sending out the SOS, causing, you may remember, quite a stir in this country. I was reminded of all this by hearing references made to the affair from several short-wave stations on the 40-metre band—hear them?

Reception

Reception from the East, like the curate's egg, has been bad, and I have had to listen extra hard for Japanese transmissions and Eastern stations in general.

The other day I tuned-in **J Y K** on 22.04 metres at poor strength. The name of this station reminds me of a cross-word puzzle. Ever heard it? It is *Kemikawa-Cho*, Chibaken—looks more like a code than a name!

Although the Easterners are poor, North and South American stations have been raising the roof, and I have listened to all the usual American stations (**W 2 X A F**, **1 X K**, **3 X A U**, **8 X K**, etc.) at good loudspeaker strength. When I miss the evening paper I tune-in to **W 1 X A L**, Boston, and hear his monster bulletin—and though I take it with a grain of salt I enjoy myself, and that's the great thing!

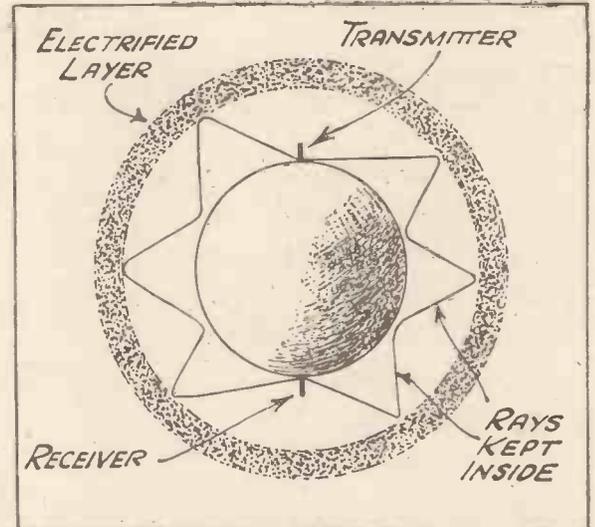
I have had a wonderful selection of Latin-American stations to choose from—all are still coming in well—including **C O C Q**, **C O C E**, **C O C X**, and **C O C H** in Havana; **H J 1 A B B**, **4 A B B** and **2 A B C** in Colombia, and many Venezuelan and Dominican stations.

Your Call, Sir

The Americans make a habit of listening to telephone stations, but we in England find a greater thrill in hearing amateurs "chin-wag" across the world than to listen to conversations meant for two sets of ears only. Nevertheless, if anything out of the ordinary is broadcast over the telephone service you can bet that we are all ears! Take a tip—**W E L** and **W Q P**, at Rocky Point, on 33.52 and 21.58 metres, and **W M A**, Lawrenceville, on 22.4 metres, have been heard conducting interesting tests lately.

Have You Received—?

I admit that my curiosity is partly responsible for the request which I am about to make. In many station lists a number of stations are regularly given, and being



This sketch shows clearly how a short-wave programme spans the world by reflection from the Heaviside Layer and earth. Note the two paths on opposite "sides" of the earth.

unable to receive them myself—and knowing no one who has—I am wondering whether the stations still operate. So, boys, if you have heard **V E-9 B K**, **9 C A**, **V P B** Colombia, **Z H I** Penang, or **V U C** Calcutta, lately, or know of their whereabouts, will you let me know? I'd like to shake hands with you!

Tea For Two

China is noted for its tea, but it was left for Manchukuo to adopt "T" in its call signs! Before me I have a report from a Newcastle reader who has heard **T D D**; **Shinkio** (I hope I've spelt it correctly!) on 51.5 metres, 'phoning **J V U** between 10 and 11 a.m. Earlier in the year he heard **T D E** on about 28 metres, 'phoning **J V O** around 7 a.m. This enthusiast appears to pull in the Easterners hand-over-fist. Here is hoping that this news will enable readers to duplicate his reception. What I want to know is, how do we identify the stations when heard?

HELPING THE BEGINNER

One of the attractive features in this week's splendid Free Gift Number of "Popular Gardening"

This week, **POPULAR GARDENING** presents its readers with another Free superb Flower Study in natural colours. The beautiful Jubilee Gem Cornflower is the subject of this plate; instructions for sowing are included on the back.

On sale now, price 2d., this issue of **POPULAR GARDENING** is a special "Sowing and Planting for Summer" Number, featuring practical articles to help you attain a lovely garden in the summer. These include "Border Carnations to Plant Now," "The Best Early Flowering Chrysanthemums," "Making a Strawberry Bed," etc. The new illustrated feature for beginners is proving popular, and the pictures throughout the number help to simplify the garden work, which is now seasonal.

TO SHORT-WAVE ENTHUSIASTS
Watch Popular Wireless

THERE ARE MORE GOOD THINGS
FOR YOU

COMING SHORTLY



Don't erect your aerial in such a manner that the horizontal portion is brought into contact with the branches of trees.

YOUR AERIAL

MODERN radio receivers operate with ample margins of power. Wireless has ceased to be an experimental juggling with infinitely small energies and inefficient amplification.

The energy collected by even a high and effective aerial from a powerful transmitter is still small, but present-day valves and components make much more of it.

Therefore, the listener who is unable to erect an aerial equal in efficiency to a Marconi station antenna need not feel that he is suffering from a hopeless handicap.

As a matter of fact, there has been a great deal of exaggeration in regard to aerial requirements in the past, and there was a time when aerial efficiency assumed the proportions of a fetish.

Then this question of height. An odd foot or so of height doesn't matter one scrap—so long as it is a solo factor and not one of a bunch.

Single Faults Unimportant

We can, with advantage, emphasise this point. There is an old Scottish saying that "Many a mickle makes a muckle," and it aptly applies in this instance.

A radio outfit which possesses a whole host of minor faults will give pretty poor results, even though any single one of those faults alone might have little or no appreciable effect.

On the other hand, it is often necessary to compromise, or, at least, it may be more convenient to do so, and in such a case it is as well to be aware of the relative importance of the various factors concerned.

For example, when installing an outfit there may be numerous problems to be solved, and, let us say, an outdoor aerial of a highly efficient nature might be difficult to install.

Well, we would say that it is more to the listener's advantage to buy the best set he can afford than to budget for a disproportionate expenditure of money on an aerial.

In any case, quality ought to be con-

PRACTICAL POINTERS

HINTS AND TIPS WHICH WILL SAVE YOU TIME, TROUBLE AND MONEY

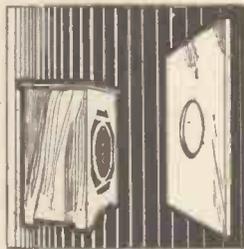
sidered before volume and mere numbers of stations.

However, all this must not be read as an argument in favour of aerial neglect. If an aerial must be technically poor in size and form because of space or other limitations, it should at least be as efficient as is possible in the circumstances.

WHY A BAFFLE IS USED

THE lower the note the more elusive it becomes. The high notes are more amenable to discipline, as it were. With a sharply angled loudspeaker cone diaphragm, the high notes are ejected almost like the rays of a searchlight.

In other words, they are very directional in character. On the other hand, the low notes tend to travel from the diaphragm in all



★
Unless a loud-speaker is placed in a cabinet or mounted on a baffle the bass response will be conspicuous by its absence.
★

directions. They even try to wander sideways and round to the back.

In order to reduce this a baffle-board can be employed to make the path between the front and back of the diaphragm longer.

A cabinet has the same effect and is of a more generally convenient form. If the cabinet could be totally enclosed except for its front aperture, the "baffling" would be good, although trouble from "box resonance" would have to be anticipated. A small cabinet with an open back is equal to only a small baffle in its effectiveness.

WHAT ARE THOSE NOISES?

SOME of the odd noises heard in a radio set from time to time are apt to be confusing to those without long wireless experience.

After months of comparative quietness, peculiar sounds are apt suddenly to burst into prominence.

These may be due to any one of a number of causes. It might happen that a neighbour has installed a violet-ray outfit or even an X-ray. Such devices as these set up harsh, crackling noises of persistent, unvarying volume.

Then, again, listeners near the coast or large rivers may suddenly receive interference from ships' wireless transmitters.

Electrical apparatus such as vacuum cleaners, refrigerators and so on will often generate noises in wireless sets, but generally not over an extensive area.

It is difficult to discover whether a noise is due to an internal fault in a set unless both aerial and earth are disconnected. Even then, in the case of a mains set, a great number of

peculiar sounds originate through irregularities in the mains supply.

THAT MAINS LEAD

THE lead with which a mains set is connected to a power point carries the full voltage of the mains.

In view of the precautions taken by installation engineers to render the house wiring trustworthy and safe, it is obviously necessary to be careful with wiring extensions which are "plugged in."

It is a dangerous practice to run ill-protected leads of a more or less considerable length and allow them to lie untidily on the floor.

Adequately protected flexible cable should be employed.

And the lead ought to be kept just as short as is possible, and the set so placed that it is impossible that any strain will be imposed on its mains-connecting lead or that it will be trodden underfoot.

WATCH THAT NEEDLE!

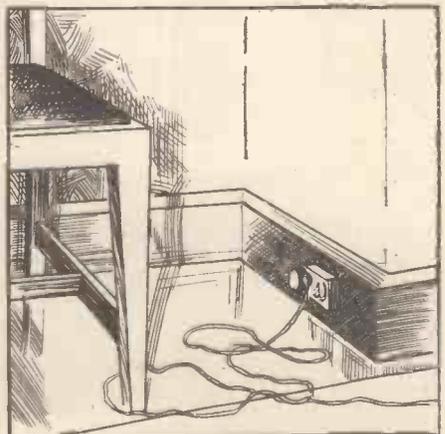
EVERY battery set-user could with advantage provide permanent employment for a milliammeter. Connected up in the manner we shall indicate, it will show at a glance whether or not the set and batteries are in good order.

It is not necessary to purchase an expensive "moving-coil" instrument, because it is not wanted to give precision measurement.

A cheap milliammeter with a printed scale will prove adequate.

However, it must be capable of covering a fairly wide range. Aim at a range up to a

KEEP IT SHORT



Keep your mains lead reasonably short and make sure that the wire used is well insulated.

quarter or third greater than the total H.T. current consumption of the set.

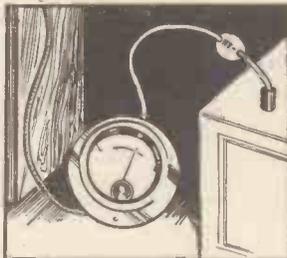
Suppose you have a three-valve set and, according to the maker's specifications, the valves take 2, 4 and 8 milliamperes at the H.T. and G.B. voltages you commonly employ
(Continued overleaf.)

PRACTICAL POINTERS

(Continued from previous page.)

The total is 14 milliamperes. So a milliammeter registering up to 20 milliamperes will be suitable. It doesn't want to be more or the needle movement will be restricted.

The milliammeter should be connected between the H.T. negative terminal of the set and the H.T. negative plug of the H.T. battery, so that all the H.T. current passes through it.



★
A milliammeter is a most useful instrument and enables the condition of the valves to be checked up at will.
★

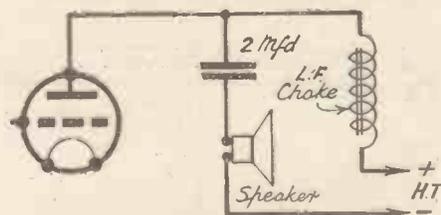
USING A LOUSPEAKER FILTER

FILTERS take two forms, viz. the output transformer and the choke-condenser. Most modern moving-coil loudspeakers incorporate a transformer but this will be at the far end of the loudspeaker leads and will not, therefore, be of any use in providing a filtration of H.T. current out of these leads.

In some cases it will be possible to take the transformer off the speaker and use it at the receiver end of the leads. In this instance the speaker leads will be between the transformer secondary and the speech coil itself.

It should be noticed in passing that it doesn't matter if there is a transformer in any one or more of the loudspeakers

SIMPLE CONNECTIONS



The theoretical arrangement for an output filter. The choke may have a value of about 20 henrys.

used; a filter in no way upsets the output of the set.

The audio-frequency current remains more or less the same, and does not become abnormal.

The most popular form of filter is that which employs an L.F. choke and a fixed condenser.

In the case of a pentode valve a special pentode choke should be used.

We will describe the way in which a filter works, as this will make it easier for readers to apply filters to their sets. It will be appreciated that slight differences exist which render it difficult for us to give detailed practical directions which can be applied to every one of the hundreds of different receivers which have been made and sold during the past few years.

A small diagram appears on this page, and it shows the theoretical circuit of a choke-condenser filter.

The "H.T. plus" indicates the positive H.T. socket on the H.T. battery or mains unit. Normally the speaker transformer is joined between this and the plate of the valve—in fact, directly in the anode circuit.

Therefore, all the current which flows from the H.T. battery (or unit) through the H.T. positive terminal of it indicated in our diagram flows through the transformer.

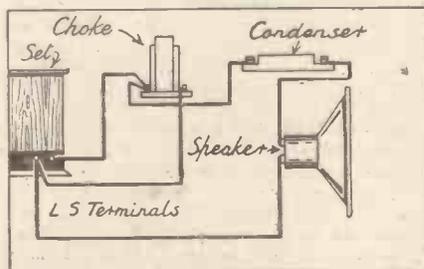
The filter obviates that. In place of the loudspeaker we put an L.F. choke, and this completes the H.T. battery circuit as before, in so far as the D.C. high-tension current is concerned.

The loudspeaker is joined to a fixed condenser, and these two are connected across the plate of the valve and H.T. negative.

No H.T. current flows through this path because the fixed condenser offers a complete barrier against it. And the audio-frequency impulses do not find the choke an easy path (it is an L.F. choke, remember), although they can still get to the loudspeaker through the fixed condenser.

If there isn't room to fix a filter inside the set, it can be added externally, as our

OUTSIDE THE SET



How a filter may be joined up outside the set, by connecting it to the two speaker terminals.

second diagram shows. It should be built into a small box on which there are four terminals, two for the loudspeaker and two for the loudspeaker terminals of the set.

The wires for joining them up should, of course, be kept very short—a matter of inches.

The fixed condenser must have a capacity of at least 2 mfd.

THEY DON'T LIKE THE SUN!

THE so-called "dry" battery which is used in radio for H.T. and grid-bias purposes is not in actuality "dry."

It is usually a modification of the original Leclanche system in which zinc, carbon, and solution of sal-ammoniac figures.

But instead of this solution being in the form of a fluid it is made up as a paste something of the consistency of the paste used for mounting photographs.



Harsh, interfering sounds may be caused by objects in the room being set into vibration by the waves from the loudspeaker.

SECRET FORMULÆ

The paste is a mixture of sal-ammoniac and certain other materials. The different manufacturers have their own secret formulæ.

The object of secrecy is to prevent rivals learning how to duplicate their processes of manufacture. That may be obvious, but the fact that one of the most treasured secrets is how the paste is made so that it won't easily go "dry," may not be so widely known.

You see, if your H.T. battery really were "dry" it couldn't work. The maker does his bit towards rendering it difficult for the battery to live up to its name, and it is to your benefit to further the good work when the battery passes into your hands.

Keep it in a cool, shady place, well away from fires, hot-water pipes, and other such things.

THOSE JARRING NOTES

HARSH noises heard during the reception of orchestral items are not necessarily due to distortion in the set. They might be present in the actual transmission.

Or it may be that the loudspeaker is causing something to vibrate in the room.

Ornaments on a mantelshelf, china and glass objects in a china cabinet (or even the glass panes of the cabinet itself), and fire-irons have all been known to vibrate and generate their own interfering sound waves.



★
Never place a battery in such a position that the heat of the sun can cause deterioration. Keep it in a cool place.
★

Sometimes such troubles can be overcome merely by shifting a trifle the position of the loudspeaker or set. At other times nothing short of filling the offending article, if it is a vessel, with water, or removing it altogether will cure it.

So don't overlook this possibility when you are worried by apparent distortion and can find nothing in your set which will account for the trouble.

THE FUTURE OF RADIO

By Carden Sheils

Do you ever pause to think about the wonders of modern radio? To consider what future developments may show? If so, you'll enjoy the wonderful possibilities visualised by our contributor in this article.

IT is only to be expected, after fifteen years, that we should begin to take Broadcasting more or less for granted. Even those who can recall the excitement of the early days, and the thrill of getting signals on their first home-made crystal set, are getting to the stage where familiarity starts to breed contempt.

We turn a knob and hear what is happening hundreds, or even thousands of miles away. And we hear it as soon as, or even before those, who may be actually sitting in the distant studio. But we no longer register anything in the way of amazement.

A lot of us complain that there's too much jazz, and others are bored when they get classical music. Some will argue that radio-drama is the only "live" spot in Broadcasting, whilst more say it is the one thing they hate worse than all the rest. But very few will stop this clatter of criticism to reflect a little on the marvel of the radio service, or what they would do without it, if the ether suddenly went "sour" and refused to function.

It may not, perhaps, be reasonable to expect people to dwell for long on the marvels of science, or to pay overmuch tribute to the genius of those who brought modern wireless into being. On the other hand, it is quite easy to become a little too self-satisfied and complacent, especially if it means that we think we have exhausted all the possibilities of radio.

Because we most certainly have not. Not by a long chalk!

For instance, we have just started television—which for the moment is somewhat expensive—but the time will come when we shall have picture programmes in colour, complete with song and music, at a price which will bring them into every home now fitted with a wireless set.

Television In Colours

As a matter of fact, television in natural colours could be produced to-day. The technicians have it all worked out, down, one might say, to "dotting the last 'i' and crossing the last 't'." What is more, they have also gone a long way towards putting the pictures over in "solid" form, so that they will appear to have depth, as well as length and breadth—just as though one looked at them through a stereoscope.

On the same lines, broadcast listeners in the not-too-distant future will be able to enjoy stereophonic music—which possesses a quality that is missing at present, even from the best of wireless sets. Stereophonic reproduction brings out the "direction" of each sound in an orchestra, so that one can tell that the stringed instruments are here, the brass there, and the woods over yonder. When this comes—as it will in time—radio music will definitely be indistinguishable from the real thing.

A rather uncanny aspect of wireless is forced into one's mind, if one reflects that

all the time, day and night, unheard voices from all parts of the world are swirling around and about us. Unless we happen to switch on a radio set, we are quite unaware of their existence, and even if we deliberately set ourselves to hunt them down, we could at best pick up only a small fraction of the total. But they are there, all the same, some drifting in from so far away that they could not be heard on any man-made apparatus.

Now here is a curious point: If there are so many wireless voices about—unheard until we trap them with our valves and bits of wire—how do we know that there are not other, and more mysterious, messages

"tune-in" to Mars. The attempt was laughed at by some of the highbrows, and it was perhaps doomed to failure from the start, for reasons which are better understood now than they were at the time.

But was the attempt, in fact, so very foolish or unimaginative? If there are intelligent beings in any of the planets or in the other celestial bodies still farther out in space, the ether is the only connecting link between them and us. And wireless waves—like light waves—form the only medium by which messages could possibly be carried to and fro.

There is no need to go outside the limits of our own planet to ask another question. Can we be sure that the only "radio" messages which get into the ether are those that start their travels from a wireless transmitting aerial? The latter, as we know, originate in the flow of electrons through a wireless valve.

But when you and I, Reader, agitate the grey mass we call our brain in the act of thinking, scientists tell us that it is vibrating electrons which, in the last analysis, are doing the work. And if electrons oscillating rapidly up and down an aerial wire will produce wireless waves, it does not require a far stretch of the imagination to believe that electrons vibrating in the brain may send out somewhat similar waves.

Of course they are very much shorter, and they probably differ in other ways from the waves produced by a thermionic valve. That is why, up to the present, we have not been able to "trap" them in our wireless sets. All the same, there should be something in common between the two.

Thought-Transference

There are too many convincing instances of thought-transference, second-sight, and dream-influence on record, for them all to be dismissed as pure fantasy. On the evidence, scientists are forced to admit that one mind can act on another, at a distance—though under present conditions the action is admittedly feeble and uncertain. It demands intense or highly emotional thought on the one hand, and a sensitive and sympathetic mind on the other, for anything in the nature of reliable thought-transference to take place.

But just as the broadcast listener now uses a radio set to intercept the wireless voices that are always thronging around him, so one day we may discover how to pick up the unspoken thoughts of those who, though far away, are "in tune" with us.

Then again, even to-day, we are only on the eve of the use of high-frequency currents of radio wavelength in the cure of diseases. Perhaps one day diseases will be classified by their wavelength and marvels of preventive and curative medicine will be performed by turning a knob, and what about death rays?—But let's stop at that.

ROY FOX AND PYE RADIO



The popular Roy Fox listening to one of the new Pye Q A C2 receivers in the showrooms of Miller & Sons, Pye agents at Cambridge.

floating through the ether? After all, we can only tune a wireless set through a limited range of wavelengths, and we have only discovered how to detect certain kinds of signals. Can we be absolutely certain that there are no others?

Years ago, in the early days of broadcasting, an attempt was made by the technical staff of POPULAR WIRELESS to

GETTING THRILLS INTO RADIO DRAMA

A VISIT TO D.C.1, THE NERVE-CENTRE OF THE
DRAMATIC BROADCASTS

THERE are weeping principals, distraught chorus-girls and apoplectic producers if a West-End theatre closes its doors, after a run of only two nights, on a "gigantic dramatic production, staged at immense cost."

Calamity!

To remember that is to realise for, perhaps, the first time that when the famous actors and actresses of stage and screen come to Broadcasting House to star in a radio drama, they know beforehand that the show is destined to play for two nights at most; yet art—and eight million listeners—demand that it be as polished and complete as it is ephemeral; as intelligible and fast-moving as though actions and scenes were not, as they are, entirely dependent for their expression upon the accented phrase, the whispered word, the breathless plea.

The Final Rehearsal

Three dramatic productions are, on an average, broadcast each week. As assuredly as the casts who people them, they have their own personality, character and atmosphere which, through the medium of the spoken word, rely for subtle interpretation upon the skill and technique of the producer.

For the average listener, a visit, if only an imaginary visit, to the nerve-centre of these broadcasts, may be of interest. Come, then, to the seventh floor of Broadcasting House, and make your way upstairs and along short, narrow corridors till you reach a heavy oak door, on the circular window of which you will read "D.C.1"—Dramatic Control, Panel No. 1.

At the moment a typical dramatic production with a cast of twenty is in final rehearsal. The show goes out to-night.

Several Studios Used

Inside D.C.1 Val Gielgud, B.B.C. Director of Features and Drama, is seated facing a bank of apparatus which you might think resembles a surrealist interpretation of a camel. On one side of the hump, which rises in a streamlined kind of way from the centre of a heavy, cellulosed table, are a series of controls. Beneath each fade knob, as these are called, are a series of switches; above, a number of tiny light-windows which, when illuminated, bear the abbreviated sign for each of about a dozen production studios, several floors below. By this time the cast have already met the producer on six or seven occasions. Together, they have read through their script, have had emphasised to them the need for an accent here, a gasp there, and so on, until it has been possible for the producer to group them in a way

best suited to the play, in one, two, three, four, five or more studios.

For various technical reasons it is often impossible to have a complete cast in one studio, and, by means of special circuits, the producer at his desk in D.C.1 can not only hear the output of each of the studios in use, but can, also, at the flick of a switch, speak back to anyone or all of the cast. As a production proceeds, members of

the cast in one studio can hear what is being broadcast from the others.

Some producers prefer to operate the D.C.1 controls during the actual broadcast; others—Val Gielgud is one of them—like to be free to follow the closely marked script while a dexterous assistant operates the knobs and switches, giving cues to each studio, introducing "effects" and so on.

As the rehearsal goes on, Val Gielgud dictates last-minute instructions to a couple of secretaries who sit by his side—the kind of criticisms that a hypercritical listener might make of a word, a sequence, or a sentence, that to the average man or woman would sound perfectly well without alteration.

Correcting the Artists

Now and again, if the producer's instructions have not been precisely followed, you will see him lean forward abruptly and turn down a switch. His action brings to life a microphone on the desk before him, and at the same time silences the loud-speaker which brings him the studio output. Thus, in a second, he is able to address a few words to the erring member of the cast.

And so it goes on, for three, four or five hours, with only brief breaks for refreshment.

Yet it was years ago that Val Gielgud actually first saw, on the stage, the show that he is now putting on the air.

"Thinking back," he says, "it seemed to me that it had particular characteristics which would make it a good broadcast play. It had speed and vitality and a strong differentiation of characterisation.

"So we set about securing the broadcasting rights. That took rather a long time. The play was first put into the programme schedule a year ago. Twice it had



CAUGHT BY THE CAMERA

"Myrt and Marge," famous American radio stars, with George Damerel, their newest addition to the team. Myrt and Marge are heard over the C.B.S.—Columbia network from Monday to Friday (inclusive), at 2.45-3 p.m. E.S.T. (7.45-8 p.m. G.M.T.)

to be postponed because it was impossible to get an adequate cast with the American accent essential to put it over. At last, we were able to get one together, including two actors who were in the original production. For chorus-girls (chosen after several auditions) we got hold of practically every young woman on our books who said that she could speak American!

"Then we had to decide how many studios would be needed. Felix Felton and I are using two. Most of the action is in 6A, and in 6B we have "doubles" of the chorus—trained step-dancers—because our American-speaking girls could not step-dance well.

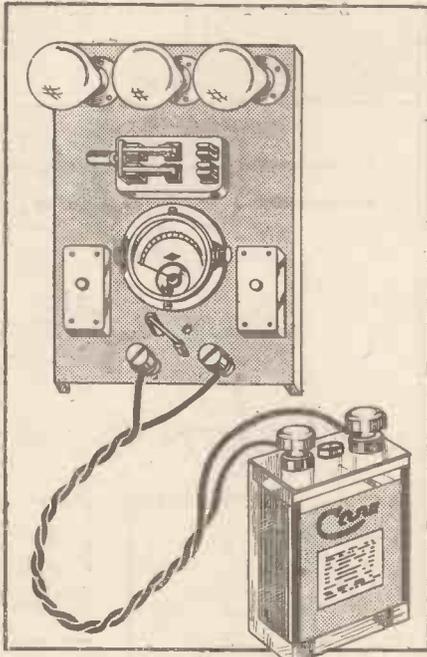
"Actually, there is scarcely any limit to the number of studios that can be used for production; for the average play six, including two 'echo' rooms, and gramophone effects, are used simultaneously."

Val Gielgud tells two good stories of last-minute emergencies.

"During the transmission of a certain play a studio suddenly went dead. We were in the middle of the show and, at a moment's notice, we had to shift a large part of the cast to another studio and replot the cueing and production lay-out from scene to scene. The only way to do it was by a chain of production assistants rushing between D.C.1 and the studio. To listeners, nothing sounded wrong. They should have seen us!

"I once had to start a play without the leading lady. Her car had been caught in a traffic jam. Fortunately, they were rehearsing a number of sketches in another studio, and I borrowed a young woman to read the script until our missing star arrived. You may imagine my relief when the leading lady herself stepped up to the microphone just in time to get her cue."

MAKING A CHARGING-PANEL



How the charging-panel looks when completed. It is built on a piece of blue roof slate.

THE unit about to be described enables an accumulator to be kept in proper condition. By means of a very simple arrangement it allows accumulators to be charged from direct-current lighting or power mains without the addition of any complicated apparatus.

The panel to be used is made from an ordinary blue roof slate. When obtaining this slate from a local builder examine it carefully and choose one which is comparatively free from the various minerals usually found in slate. Choose the smoothest section, and mark out a piece 8 in. by 12 in. with a sharp-pointed instrument such as a scriber. With the aid of a hacksaw it is possible to cut the slate without any fear of cracking or splitting. Do not forget, however, to keep the panel quite flat. Smooth up the edges with the aid of a rough file, and the slate is ready for polishing (the reason will now be seen why a smooth slate should be chosen).

Polishing the Slate

Procure one of the softer types of bricks which are used for facing buildings and carefully rub the surface of the slate; the addition of water assists in this operation.

When the slate appears to be fairly smooth, obtain some pumicestone and finish off the surface. The panel should now be thoroughly washed and carefully dried.

When the exact positions of the various components have been decided the holes to be drilled should be centre-punched and drilled through by means of an ordinary twist drill.

The mounting of the small (Clix) sockets should be carried out first. By moving the centre plug so as to connect up the left-hand socket the ammeter is placed in circuit, and measures the current flowing. When, however, it is placed in the right hand socket the ammeter is shorted. The actual charging

rates possible with this board vary between a fraction of an ampere and approximately three amperes; so that an ordinary ammeter (this need not be of the expensive type) reading up to three amperes will be quite O.K.

After mounting the ammeter, mount the small oblong "cut-outs." These carry the fuses and more about their actual size will be said later. An ordinary D.P.D.T. switch of the type usually employed for earthing the aerial is used to connect the mains to the charging-board. The three lampholders are of the standard "batten" type and should not be placed too close together, or it will be found impossible to place all three lamps on the board at once.

Simple Wiring

The accumulator terminals need not be of elaborate type, although the board looks far more businesslike if large insulated terminals such as those manufactured by Belling & Lee are used. The actual wiring of the set is simplicity itself, and is best carried out with stiff insulated wire such as Glazite. All connections should be soldered, except, of course, where they are joined to the lamp sockets, etc.

When installing our charging-board the panel must be mounted in a position so that it is quite close to the mains socket, but well away from any place where the presence of an accumulator "gassing" might cause damage.

Two flexible leads are brought from the mains and connected through the back of the panel to the centre contacts of the D.P.D.T. switch.

Two small strips of wood screwed to the back of the panel keep the wiring away from the wall. Obtain four small flat plates as used for mounting cupboards to walls, etc., and screw to the edges of the two strips of wood.

Our panel is now ready for connecting to the mains. Place an electric bulb of the same voltage as the mains in one lamp socket and now join a 5-amp. fuse in each of the "cut-outs" (5-amp. fuse wire is obtainable from any electrician's shop). Now short the two accumulator terminals with a piece

of wire. Connect the remaining ends of the flexible lead to a suitable adaptor and join to the mains.

If the switch is closed on the panel the lamp should light, showing that the panel is connected correctly to the mains. Switch off the mains by placing the D.P.D.T. switch in the opposite direction, and remove the shorting wire across the accumulator terminals. Two pieces of copper wire are then joined to the accumulator terminals

Details of a simple unit which enables the listener with D.C. mains to charge his own L.T. and H.T. accumulators

and the ends of these wires placed about one inch apart in a glass of salt water.

If the switch is now placed in the "on" position with a lamp inserted bubbles will be seen to come from the ends of the wires in the glass. One, however, will bubble more than the other; this is the negative main. The terminal on the panel to which this lead is connected should be clearly marked negative. The adaptor and socket making the mains connection should be marked so that these will always be connected in the same way when joining up the charging-board.

This board will enable a 2-volt or a 100-volt accumulator to be charged from a fraction of an ampere up to three amperes. By inserting a suitable lamp or lamps in the socket or sockets provided on the panel

a variety of charging rates is made possible. The table overleaf gives suitable lamps for charging accumulators from two to twelve volts.

We will assume that a 2-volt 30-amp. hour accumulator is to be charged, and our mains are 200 volts. After examining the makers' instructions we will probably find that a normal charging rate of 2.5 amps. is given.

On looking at the table we find that a 200 v., 60 c.p. carbon lamp gives a charging rate of 1 amp. If, therefore, we place two of these lamps in the holders the charging rate is 2 amps.

By shorting the accumulator terminals and closing the switch on the panel the ammeter will verify this. The addition of a third lamp, 200 v., 32 c.p. carbon, placed in the third holder allows a further 5 amp to flow, and our charging rate rises to 2.5 amps.

Remove the Vent Plug

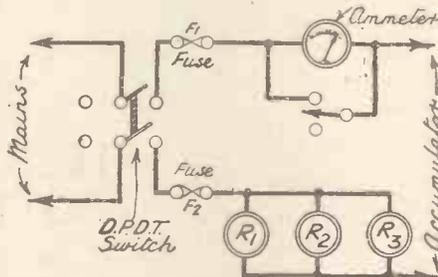
The accumulator should now be connected to the terminals on the panel and the stopper in the top of the cell removed. Care must be taken that the positive on the battery is joined to the positive on the board and the negative to the negative. On closing the switch the lamps will light and the ammeter should register 2.5 amps.

The small shorting lead should now be placed in the right-hand socket so that the ammeter is out of circuit. This shorting arrangement is to prevent the ammeter being continuously in use.

After several hours the accumulator should be examined. With the aid of a hydrometer, which should be an essential

(Continued overleaf.)

A SAFE CIRCUIT



When the switch is in the "off" position the "charging" connections are entirely disconnected from the mains.

LIST OF COMPONENTS

- 1 slate panel, 8 in. x 12 in.
- 3 batten holders.
- 1 D.P.D.T. switch.
- 2 oblong cut-outs.
- 3 sockets.
- 2 plugs.
- 1 3-amp. ammeter.
- 2 insulated terminals.
- Glazite (or similar) for wiring up.

MAKING A CHARGING-PANEL

(Continued from previous page.)

feature of the home-charger's equipment, take the reading of the cell. This should show 1.240-1.250 if the cell is fully charged, but in the case of accumulators designed for car work it will probably be slightly higher—1.290-1.300.

When charging H.T. accumulators the process is far more tedious, as the number of cells has been multiplied many times. The

W = Wattage of bulb required.
E = Voltage of charging mains.
C = Charging rate of accumulator.
N = The number of cells in series.

We will assume that 50 cells are to be charged from 200-volt mains at 0.1 amp.

$$W = \frac{200 \times 200 \times 0.1}{200 - (2.5 \times 50)}$$

i.e. $W = \frac{4000}{75}$

Thus W = 53.

Owing to the fact that it is not possible to obtain a 53-watt 200-volt lamp, it will

CARBON LAMPS.

METAL LAMPS.

Mains Voltage	25-v.	50-v.	100-120-v.	200-230-v.	25-v.	50-v.	100-120-v.	200-230-v.
.25 amp.	—	—	8 c.p. (28-w.)	16 c.p. (56-w.)	—	15-w.	25-w.	50-w.
.5 amp.	—	8 c.p. (28-w.)	16 c.p. (56-w.)	32 c.p. (112-w.)	—	25-w.	50-w.	100-w.
1.0 amp.	6 c.p. (21-w.)	16 c.p. (56-w.)	32 c.p. (112-w.)	60 c.p. (224-w.)	25-w.	60-w.	100-w.	200-w.

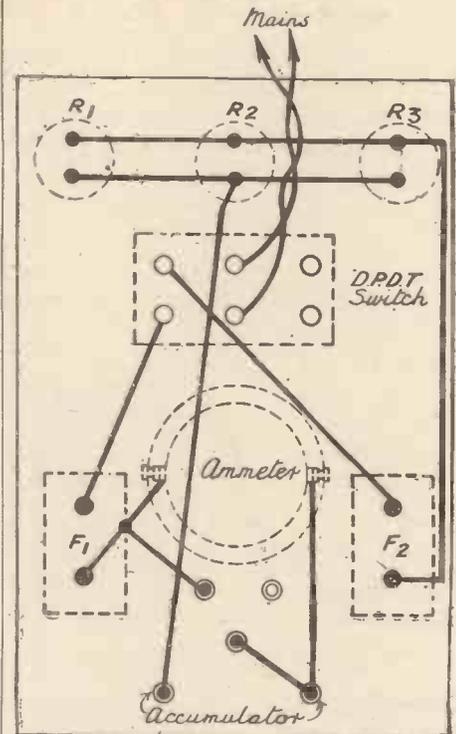
Note.—The figures in brackets, i.e. 56-w., indicate the equivalent wattage of the lamp as against the candle-power given.

charging rate of such an accumulator is very low, usually between .1 and .5 of an amp. The actual value of the lamp required to limit the charging current is easily obtained from the following formula.

$$W = \frac{E^2 C}{(E - 2\frac{1}{2}N)}$$

be necessary to use two lamps (a 20 and a 30-watt) in parallel. The charging rate will then be approximately one-tenth of an amp. When charging this type of accumulator 1-amp. or 0.5-amp. fuses should be employed in place of the 5-amp. fuses already in the cut-outs.

HOW TO WIRE UP



Wiring Diagram

All the connections of the panel are made on the back as per this figure.

A Survey of Sound Reproduction

A VERY interesting matter which comes to me from the British Radio Annual is discussed in a summary of a lecture recently delivered before members of the British Radio Institution by Dr. L. E. Hughes on "The Reproduction of Sound via Radio."

The paper forms a review of the various factors which affect the production and transmission of sound by radio, and is intended to enable those who may be engaged on special problems to take a wider view and to see their own particular sections of the science in better relation to others.

In working out a practical system the author suggests that the correct procedure should be as follows:

(1) To determine the range of frequencies and the phase relations which would be necessary for the exact reproduction of the original sound.

(2) To build as perfect a system as possible and to measure its performance.

(3) By aural comparison, to see how much deviation from the above ideal could be "tolerated."

The Accommodating Ear

You may think that the building of a perfect system is not essential because, as is well known, the human ear does not detect imperfections unless some more perfect reproduction happens to be available for comparison. It is very remarkable indeed what an ability the ear has for "making up" for imperfections in received sound. In fact, it is very probable that many of the sounds received are very far from proper reproductions of the original, so far that, judged by scientific standards,

TECHNICAL JOTTINGS

Varied items of interest to all
By Dr. J. H. T. Roberts, F.Inst.P.

they might be expected to be quite unintelligible, and yet the ear is able to understand them with comparative ease. In passing, the eye has a similar faculty, but not to anything like the same extent as the ear. I dare say you have noticed that in, say, an artist's line sketch, even though this may be very crude and many of the details actually missing, the eye, especially when viewing the sketch at a little distance, will "see" the missing parts and get quite a good and intelligible impression.

Reverberation

The author of the above paper devotes a certain amount of discussion to the important question of echo or reverberation—reverberation being roughly defined as a collection of mixed echoes, usually in all kinds of phase relations, owing to reflections from different objects at different distances.

A conclusion which is drawn from the investigations considered in this paper is that, although we flatter ourselves that sound reproduction has reached a considerable degree of perfection, it still has a long way to go. I do not know whether you will agree with this, and I don't know whether I altogether agree with it myself.

It may be true judged, as I say, by exact scientific standards, but if we have reached the stage where the ear is easily able to make up for any defects then it would seem that further refinements would hardly be noticed.

Using an H.F. Pentode

When using a high-frequency pentode valve, it is important to connect a by-pass condenser between the cathode of the valve and the connection to the screening grid. If you do not use a condenser in this position there is a likelihood that the volume will be low. I had a case just recently of a set with a single stage of high-frequency amplification, for which an H.F. pentode valve was used, but there was no condenser between the screening grid and cathode. The set worked after a fashion, but the results seemed rather poor until a by-pass condenser was included in the position indicated above. The introduction of this condenser produced a very marked improvement in the volume. The condenser in this case, by the way, had a capacity of 1 microfarad, but you will find that a capacity of half this value, or sometimes even less still, will be quite sufficient.

Local Interference

Many people are troubled with strong pick-up from the local station which prevents them from tuning-in weak or distant stations. There is nothing more annoying than to have a strong local station butting in on to everything you try to pick up, and sometimes it is very hard to cure this trouble, although fortunately there are various dodges that you can try.

(Please turn to page 95.)

TELEVISION TOPICS—Collected by A. S. Clark

“TELEFRAMES”

Items of general interest

WE hope no television enthusiasts who visit the Ideal Home Exhibition at Olympia will miss the Marconi-telephone television exhibits.

Among the items of interest on this stand is an Emitron camera, rigged up to give an idea of how transmission is carried out at Alexandra Palace. And there is a small cinematograph theatre in which the television film entitled, “Television Comes to Town,” is to be seen.

This is a B.B.C. film which shows the development work at Alexandra Palace starting from the structural alterations and ending with the completed studios and transmitting equipment.

The television looker and experimenter alike will find a hundred and one things to interest him in the Marconi-telephone exhibit.

PLACARD ANNOUNCEMENTS

A most unexpected criticism originated the other day from a person after seeing his first television demonstration. “Why ever,” he asked, “did they put up a placard with the words ‘End of Variety’ instead of having an announcement by one of those of whom we have heard so much, and who were apparently engaged for just such a job?”

Well, it is surprising, and as he remarked further, it is too reminiscent of the silent-film days. Quite possibly the reason had some connection with the limited space and the possibility that a rapid change of scenery was taking place in front of the Emitrons.

In any case, it does not aid intimacy and snappiness. As a matter of fact, there seems too much striving after effects peculiar to television simply for effects’ sake.

For instance, the poor piece of film showing trains rushing about which appeared between each item of a recent variety show tended distinctly to become boring. But here again it may have been used as a “before-the-curtain act” while changes were made for the next item.

ACCEPTED AS “FAIT ACCOMPLI”

An overheard conversation in a train recently, between a man and woman who had not met for some time ran something like this:

“Have you seen television?” he asked.

“Yes.”

“What did you think of it?”

“Oh, not bad, but aren’t the pictures tiny! Have you seen it?”

“Yes,” he replied, “for a few moments in a demonstration booth.”

“Were there many there?”

“No, not many,” came the off-hand reply.

The recounter of this little conversation thought that such an off-hand manner on the part of the general public did not augur well for the popularity of television.

A weekly feature which will keep the reader au fait with all the latest news and developments in television science. It will appeal alike to the newcomer to television and the advanced experimenter.

NEW ZOO SERIES

Already a large number of children look forward eagerly to television’s “Zoo Day,” which occurs once a fortnight, when Mr. Seth Smith brings a new party of his little friends from Regent’s Park. In the new series which opens on April 9th, it is hoped that some of the larger animals will be persuaded to face the television camera, for, with the approach of warmer weather, it may soon be possible to stage outdoor parties with animals which are too big to be accommodated comfortably in the studio.

It is hoped also to bring children into the picture with the animals.

But does it not rather show that the public has already accepted television as an everyday event and not a scientific novelty?

And, anyway, television must have appeared important to these two for them to discuss it in preference to other things after a period of not seeing one another.

CORONATION HELP

Many visitors to this country will be unable to get seats for the Coronation, and many of them are paying fabulous prices for accommodation. In some cases visitors, between them, would pay the equivalent price of a television receiver as an extra if those providing their accommodation would have it installed. That is one way in which the Coronation is already increasing the demand for television sets.

Another way is that those letting rooms to visitors are making an extra lump sum of money. It is bound to occur to a number of these to spend some of it on a television receiver.

ADJUSTING CONTRAST AND BRILLIANCY

We recently referred in these topics to the knack of getting the right balance between contrast and brilliancy controls on a television receiver. One of the biggest practical difficulties in this connection is that when one goes up to the set to operate the controls one comes too close to the screen to be able to appreciate properly the effect of adjustments.

It is really necessary to be guided by someone sitting a normal distance off when making these adjustments, or to take a step or two back after each small movement to note the result.

One way out of the difficulty would be to have a mirror so placed that the screen could be watched in it while altering the controls. We may even get remote-control panels one day to overcome this difficulty.

STEP-BY-STEP

When building up a television receiver, it is wise to check over each stage as it is completed. Don’t attempt to complete the whole thing before switching on and then expect results first shot.

Get the scanning circuits right before adding any signals, and start off with a simple vision receiver, even ignoring the D.C. component as a start if this helps.

THE SOUND AMPLIFIERS



This photograph, taken in the control-room at the Alexandra Palace, shows the amplifiers used for the sound-tracks. On the right are the switches for the various amplifiers.

TELEVISION TOPICS—Continued

TYPES OF INTERMEDIATES

MOST of those interested in the technicalities of radio know that special types of intermediate coupling are necessary in a vision receiver, in order that the high-frequencies concerned may be handled. But it seems a mystery to many how this is achieved.

Actually there is nothing magical about the intermediates of a vision receiver. In fact, the types employed are very similar to those used in normal broadcast sets. They are simply arranged to pass a wide frequency band.

Another point about them is that their fundamental frequency is much higher than those normally used in broadcast receivers. Sixty metres is quite a common frequency.

The extending of the band-width is usually achieved by the addition of resistance in some way or the other to the tuned circuits.

Introducing Resistance

A very popular type of vision intermediate is the band-pass one consisting of two coupled coils. The resistance is often introduced into the oscillatory circuit by the simple expedient of winding them with resistance wire. Sometimes, however, it is introduced by connecting resistances in parallel with the primary and secondary windings.

Straight tuned-anode coupling is also often employed. Here the increased band-width is not aided by the bandpass effect. Once again, the width increase is achieved by winding the coils either with resistance wire or by shunting them with a resistance, as in the case of the bandpass intermediates just mentioned.

Resistance coupling has also been employed for vision I.F. stages. Here the presence of capacity tends to limit the width, due to the higher frequencies being by-passed. This can be overcome by the including of an impedance in series with the resistance.

TELEFUNKEN CAMERA



Like many other scientific wonders, this Telefunken direct-television camera looks very simple from the outside. It can be used equally well with 180- and 375-line pictures.

This acts in the same way as a high-note lift in a resistance-coupled L.F. circuit. As the frequency increases, so the impedance of the choke used becomes greater, and a fall-off in amplification, due to capacity, is prevented and a suitable band-width obtained.

It is impossible to select one type of I.F. circuit as being best. It will vary with the design, which must be considered as a whole.

240 HOURS OF TELEVISION

ALMOST 900 television programme items covering a period of 240 hours have already been transmitted by the B.B.C. since the official service was opened last November.

A wide range of subjects has been covered and viewers are again to be asked to pass judgment on the programmes, so that the Alexandra Palace staff may be further guided in the selection and distribution of subjects.

Apart from the increasing sales of home sets, public interest in this latest radio development is evidenced by the vast numbers of people who are daily attending demonstrations.

Up to a few days ago over 65,000 visitors had viewed programmes in the show-rooms of the G.E.C. and their dealers alone since the B.B.C. service began. At Magnet House, Kingsway, where free daily shows are given, more than 5,000 persons have attended. Very keen interest is shown by women visitors, but it is noteworthy that although the demonstrations occur during business hours 90 per cent. of the visitors are men.

Of the 892 items transmitted up to last week 326 have been devoted to variety, drama, ballet and other stage entertainment, covering 103 hours or 43 per cent. of the total. Next in time with 61 hours or 25 per cent. were 191 talks on general, topical and special subjects including show exhibits and personalities. There were 302 film items over 52 hours, or 22 per cent. of the total time. These film transmissions have been slightly reduced in the last two months. Fifty-one items covering 15 hours (6 per cent.) have been given to women's special interests, while the remaining 22 items were devoted to art topics.

TELEVISION FOR BEGINNERS

G. Stevens tells you about more points concerning the vision receiver.

IN the straight set which we discussed some time ago, you will remember that there were one or two stages of radio-frequency amplification, followed by a detector and then one or two stages of video-frequency before the signal was applied to the tube. With a superhet the gain per valve stage can be increased—it may be about three or four times that of the "straight" stage because of the lower frequency employed and the reduction in losses due to stray capacities. This means usually that we can dispense with the video stages and feed the output of the detector straight on to the tube if we have sufficient signal strength.

Expert Knowledge Essential

Of course, we could do the same with a straight set, but this would involve a large number of radio frequency stages which would be difficult to arrange without expert knowledge.

Incidentally, one of the E.M.I. receivers uses six stages of radio frequency amplification and then feeds the tube directly from the detector.

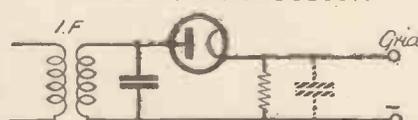
The detector itself is nearly always a diode, because it is the most convenient and it enables the "D.C. component" to be applied to the tube automatically. This, by the way, is another snag about the use of video frequency amplifying stages.

You see, if an R.C. coupled amplifier is used in the circuit the signal handed on from valve to valve is the video signal, i.e. high frequency A.C., because the condenser coupling does not pass D.C. Now, as explained before, to alter the brightness of the picture as a whole we must have a voltage applied to the tube grid which is proportional to the mean current in the output circuit. This can only be obtained by passing the output from the video amplifier through a diode and connecting

the tube in its output circuit. In other words, to get our D.C. component we must rectify the video frequency output again. With a superhet we have the advantage of increased gain and a reduction in the number of stages required, so that we can put the diode immediately after the last I.F. valve and connect its output to the tube.

The simplest connections of a diode are shown in the figure in which the tube grid is connected across the load resistance.

TUBE CONNECTIONS



Showing how the output from a diode rectifier is joined up to the cathode-ray tube.

This resistance has to be of a low value (unlike the average diode load, which may be .25 meg.) because it is by-passed by the capacity of the grid of the tube and the higher frequencies would be reduced due to the shunting effect of the capacity. An average sort of figure is 5,000 ohms, but

sometimes this is as low as 1,000 ohms.

A Point to Remember

There is another point which is met in cathode-ray tube working which does not worry us in ordinary receivers, and it is this: Sometimes the tube is operated with the high voltage end earthed (3rd anode earthed). In this case the chassis, which is also earthed, is "live" to the grid of the tube which is some 3,000 volts below earth. This means that if we connected up a diode, as the figure shows, we should have to insulate it carefully from the chassis and use a separate transformer for supplying the heater. The I.F. transformer will also have to be carefully insulated. For this reason there are a number of receivers which are

operated in the orthodox way with the cathode of the tube earthed and the H.T. of the tube supply highly insulated. Both schemes have their points, but for the home constructor it is probably safer to run with the anode of the tube earthed. Then you know where you are with the live parts!

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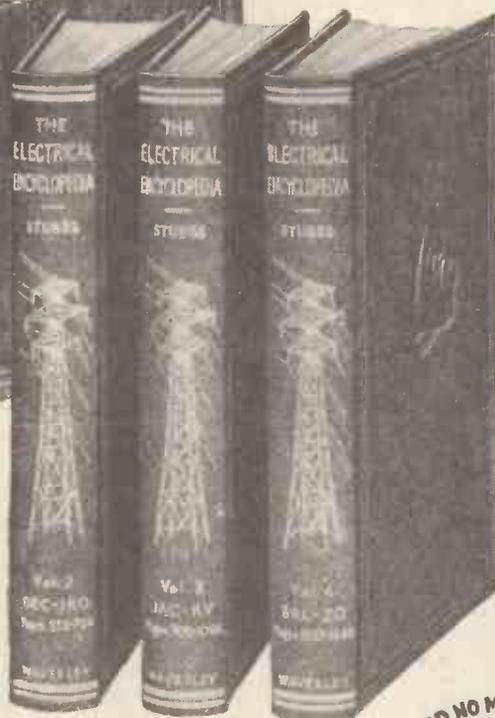
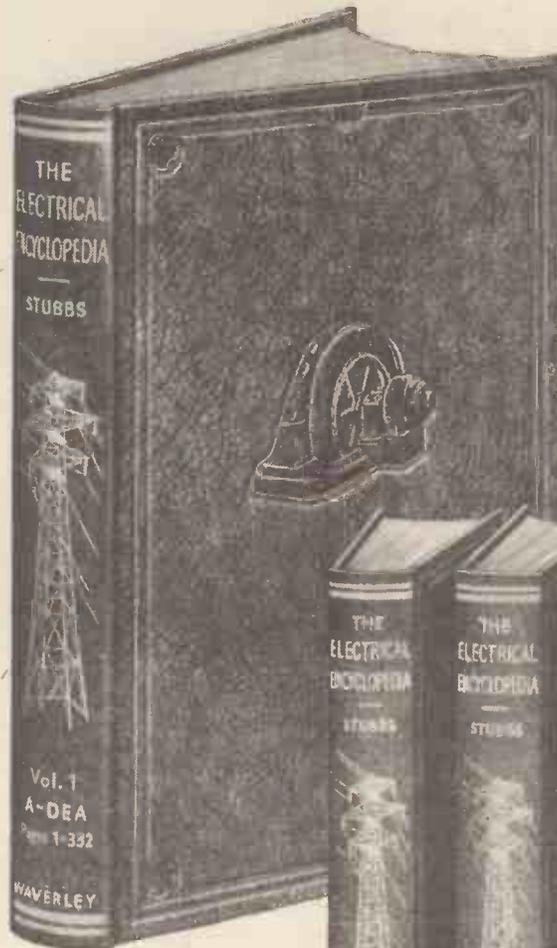
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NEWS AND VIEWS ON THE TELEVISION PROGRAMMES,
BY OUR SPECIAL RADIO-SCREEN CORRESPONDENT,

L. MARSLAND GANDER

THERE has been an interesting development in programme technique recently, a blending in one production of both film and studio transmission. This is something that cannot be done in any other form of entertainment, and it should be cultivated by the television staff.

The first example was provided by Mr. D. H. Munro, a painstaking producer, in a series of scenes from the supper-time revue "Paris-Londres" from the Grosvenor House Restaurant. Actually, it was something more than film and studio combined, for recordings were also introduced. In fact, I think that Mr. Munro can claim to have introduced a unique type of entertainment.

Novel Announcing Method

An entirely novel method of announcing was also adopted. Elizabeth Cowell was seen demonstrating a television receiver to a friend. Then the "screen on the screen" enlarged and upon it appeared the first caption. From time to time viewers were brought back to this dummy television screen, and details of each item appeared on it. Also, "off stage" the recorded voice of Elizabeth Cowell made additional announcements which were occasionally necessary.

After the preliminary view of Miss Cowell as a televiewer, film was welded into the production, showing a series of pictures of an air-liner flying between Paris and London, apparently bringing the Percy Athos Follies who stepped out of the cabin straight into the studio. So neatly was the transition from film to actuality effected that the illusion on my screen was perfect. I must compliment all concerned. Last week I expressed some doubts regarding the future of film in television. But here is an obvious and successful application which I hope will be developed.

And, by the way, if film can be introduced in this slick, imperceptible manner, why must we have the intervals which usually interrupt the continuity of the programme before and after a separate film item?

An Outstanding Turn

Mr. Cecil Madden adopted a somewhat similar principle in his production "International Cabaret" a few days later. In this case the items were linked with film shots of an express train. Then back in the studio we saw a railway signal with the arm horizontal; the signal dropped, disclosing behind it the caption.

Sherkot, the silent comic, was once again highly amusing in this bill, but I like none of his other efforts so well as his goal-keeping to orchestral accompaniment. I cannot see this pantomime too often; it is a classic among burlesques. His bantam walk is a masterpiece.

The Knife-Throwing Denvers were also televised for a second time. Unfortunately, on the small-sized screen the act is not so terrifying as it is legitimately on the music-hall stage. Dexterous camera work is necessary to show off the hair-raising thrills

of knife-throwing round a human target. However, when it comes to the spectacle of throwing choppers blindfold at one's wife, concealed behind a sheet, perhaps television is merciful in its imperfections.

Joan Miller, the telephone girl of "Picture Page," gave her impersonation of a Canadian hotel telephonist. I have great admiration for Miss Miller, but think it a pity that television must have so many repeat items. This particular one, in my opinion, does not wear well.

I am sorry that Mr. Philip Thornton's series on the orchestra and its instruments has come to a close. Though specialised, his talks were not highbrow. This series is another which has led me to revise earlier opinions. I found the talks increasingly interesting as they proceeded.

A highly significant development was the announcement of the B.B.C. that two television programmes, those to be given on April 6 and April 15, were also to be included in the sound programmes on medium wavelengths.

Serving Two Publics

There seems no need to keep the television and the normal sound programmes always

in water-tight compartments. Expense will be saved if one programme of a suitable kind can be made to serve two publics. The catch is, of course, in the word "suitable." The first programme to be given to both publics comprises Irene Prador, who will sing songs in German, French and English; popular Frances Day; and Lydia Sokolova, the ballerina. The last choice is a rather strange one for a "blind" audience, but listeners will be able to hear the excellent Television Orchestra.

The second programme is by Henry Hall's B.B.C. Dance Orchestra, obviously an ideal transmission for the dual purpose.

The B.B.C. is negotiating for the use of a lawn tennis court in the vicinity of Alexandra Palace, and hope to relay to viewers matches between all the best-known players, amateur and professional.



MR. CECIL MADDEN, producer of "International Cabaret," referred to by our contributor this week.

These will be probably the first outside sporting events televised this year. It will not be necessary to wait until the television vans are delivered, nor will they be used for this purpose in any event.

The television cable hitherto restricted to a length of 600 feet is to be extended for these tennis relays. In fact, the court is actually outside the Palace grounds.

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QUESTIONS AND ANSWERS

By K. D. ROGERS

CURING "RATTLE" IN A PORTABLE

W. H. C. (Bristol).—My portable "rattles" rather badly on the low notes, and also on top notes when the volume is turned up. I cannot use the full volume because of distortion. The set is three years old and the speaker is a moving-iron type. Will a moving-coil speaker help matters?

It's all very difficult. It is quite possible that your set will take a moving-coil speaker quite well, if you can get it into the case. But you will have to be sure of other things first. For instance, are the valves all up to their job? Three years is a long time, and I should not be surprised if they are a bit "frayed at the edges" or, in other words, a bit short of electrons.

That may cause the distortion. Did it occur when the set was new, or is it a comparatively modern accomplishment?

Now, there is little doubt that you have kept the L.T. battery up to scratch and also the H.T. But what of the grid bias? Has that got you below the bottom button? If you have forgotten that a bias battery wants renewing as often as an H.T. battery for safety, and at least once every nine months, I am not blaming you. There are thousands like you all over the country, trying to find out why their sets sound vile and not thinking of looking at the bias.

And, tell it not in Gath, there are not a few "dealers" and "set testers" who forget all about that bob's worth of bother. So, before you do anything else, test the grid bias and throw it in the Bristol Channel if it does not cough up at least 90 per cent. of the supposed voltage.

Then see about the valves. Have them tested, and see if the distortion is due to them.

If everything is "hunky-dory," then go ahead and see about the moving-coil speaker. If not, take the set round to some dealer or friend who knows what he is doing and get the set tried on a moving-coil speaker which you know is O.K. Make sure that the speaker is matched for the output valve in your set, however, or you will be led right up the garden.

The idea of trying the set on some known speaker is not only to make absolutely sure about the set itself, but to save you expense if the set does not work properly. You don't want to spend money on a speaker only to find that you cannot use it.

Honestly, though, I don't see why the set should not work perfectly on a moving-coil speaker; but find out first if the set part is O.K., as I have indicated, and if you have doubts take out its speaker and try it on some other set.

Moving-iron speakers do rattle a bit, but I should think from your description of the trouble that not only is some of the distortion due to the speaker, but a lot of it is due to the set.

MODULATION HUM

A heart cry from S. A. (Newcastle). He has a battery set which is used on a mains power pack for H.T. He gets hum which is worse on British stations than foreigners.

Reading between the lines, I expect that the more powerful the station the worse the hum. That is typical of modulation hum. The cure, without upsetting the set, a commercial one, is not certain. But I should advise the use of a mains type H.F. choke in series with the supply to the H.T. unit, and a condenser of .001 between the set side of the choke and earth. In addition, try a good 25-henry L.F. choke in series with H.T. positive to set, and a condenser of 4-mfd. or more between the set side of choke and earth. That may help matters.

READING MORSE

N. D. (Chelmsford) wants to know if there is any book that will give him the call signs, etc. of merchant ships, and details of the procedure of Morse signalling.

The book giving the procedure is published by H.M. Stationery Office and is called the Handbook for Wireless Telegraph Operators, costing ninepence. The list of call signs is not published in this country. You might be able to get a bookseller to order it for you, or you yourself can write for it. It is called

"Alphabetical List of Call Signs of Land, Mobile and Fixed Stations, and is published by the Bureau de l'Union Internationale des Télécommunications at Berne. Write to that address and send equivalent of 7 francs (Swiss). W.L.S. gives some hints on learning morse in this week's "On the Short Waves."

INCREASING POWER

E. N. (Tottenham).—I have a portable universal set which works on radio or gramophone. I want to increase the power on gramophone. Can I just connect the pick-up input terminals to another set and connect this to the second set in order to get pick-up increased amplification?

I very much doubt it. Not that you can do it but that it will be any good when you have done it. It is not quite so easy as that. In the first place you have to find out whether your present set is being loaded fully by the pick-up. In other words if the output valve will carry any additional

amplification. I rather doubt if it will. Most sets are designed so that when the volume control is fully in (maximum volume) the valves are fully loaded throughout the set. It means that any additional amplification would immediately provide overloading and consequent distortion.

In addition to that there is usually a limit to the number of L.F. stages that can be used because of instability, and, though you might get away with the addition of one, I doubt whether you could attach the present set to the tail end of another complete set and get anything but the most terrible howling.

A far better plan in your case would be to work from the other end. That is to construct an output stage which has its own power supply and which can be connected to the output of your present set. It would possibly mean a change of output valve in the present set, but very often it can be done without that.

All that is required is a one-valve amplifier with a resistance input coupling scheme, its own power pack and the output transformer or choke system which enable it to be coupled to and matched with the loudspeaker.

In that way you will not be upsetting the operation of the present set and will avoid overloading. But before you do it you should get advice on the question of the necessary output valve you will have to use.

You will obviously have to employ something that will be able to handle the present output of your set; probably you will find it will have to be a pretty big valve, with some 400 volts H.T. on it—a valve of the 5-watt type. It would not be a bad plan to build a push-pull stage, but you must bear

in mind that the speaker you are now using must be "big" enough to be able to handle the increased power you are going to give it.

I am sorry to put so many qualifications forward, but really the addition of amplification is not so easy as it would at first sight appear. There are plenty of snags to avoid and I would strongly advise you to go further into the matter before you do anything. I should get hold of the circuit diagram of your present set to start with. Send it up to us if you like and we will advise; but it is essential to know what the circuit of the set is, and especially the details of valves and the speaker.

As regards the actual connecting of the additional amplifier this should be possible by means of a plug-in adaptor fitting into the valve sockets of the last valve in your present set, but I cannot say definitely until I see the diagram.

If you do not want to construct the extra stage yourself you will be able to get it done for you by one of the various firms who specialise in building sets and amplifiers to individual requirements.

NOW, DEALERS!

C. H. O. (Belfast) indicts radio dealers. He has tried many. Says they cannot test a valve. Says they have milliammeters, and all that, but can or will only test the filament for continuity, and not test the emission. One man actually said that the emission test "could not be done."

What about it, dealers? I know for a fact that many are better equipped, mentally and with apparatus, than to give that answer. Is Ireland lagging behind? C. H. O. quotes a visit to a Wolverhampton dealer who not only tested the valve for filament breakage, but gave a complete curve of its emission. All free—for the valve was workable!

And now for his query: Is a trickle charger worth the extra cost?

Certainly it is. I would not be without one. Apart from obviating the nuisance of having to take a battery to a charging station, or even to uncouple it and hook it up to a charger, the trickle charger keeps the battery in good trim. But it must be used with common sense. I saw one battery a mass of twisted plates simply because the charger was left on, regardless of whether the set was used or not. The result was that the battery was overcharged to a terrible extent. It got .5 amp. shoved in day and night, workday and holiday, though the set, a three-valver, was used perhaps for an hour every day.

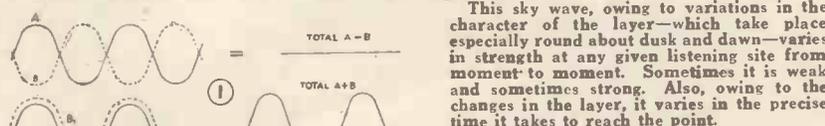
Don't do that sort of thing. It is useless to take, say, .3 amp. out of a set for one hour and to put back .5 amp. for 23 hours. You must balance things up. If the set takes .4 amp. and works 20 hours a week, then give it about 20 hours at .5 amp., or perhaps a little longer with the trickle charger. Don't let the charger go on just because it is there. Have a little common sense about the proportion of "export" and "import."

Used sensibly, the trickle charger is a very valuable and convenient addition to the radio outfit. Used without any "common savvy" at all it is a danger to the battery and a completely unnecessary expense in initial cost and in the running costs, small though they be.

TECHNICALITIES EXPLAINED—No. 46

FADING

When listening to a radio station the best and most constant results are given by the ground wave, which comes direct to the receiving aerial along the surface of the ground. There is another wave called the sky wave, which travels up to the Heaviside Layer and is reflected down to the receiving station. It therefore travels farther than the direct ground wave.



This sky wave, owing to variations in the character of the layer—which take place especially round about dusk and dawn—varies in strength at any given listening site from moment to moment. Sometimes it is weak and sometimes strong. Also, owing to the changes in the layer, it varies in the precise time it takes to reach the point. All this has an effect called fading, because the arrival of the sky wave at the receiving end is additional to that of the constant ground wave. The sky wave (A) may be in step with the ground wave (B) (see 2), or it may be completely out of step. (1). In the latter case, if they are both of equal strength they will cancel out and the station will not be heard. If they are in step (2) very strong signals are usually heard. In between the two extremes the signals increase and decrease as the waves "fight their battle for supremacy" and go in and out of step. The result of Fig. 1 is obviously no signal, while in Fig. 2 the signal is much stronger than it would be with either of the two waves separately.

RANDOM RADIO REFLECTIONS

By Victor King

MR. BRUCE SIEVIER TAKES UP THE PEN AGAIN :: B.B.C. CENSORSHIP HAS ITS POINTS

SONGS YOU HAVE HEARD!

You will remember that I had quite a lot to say about the "Songs You Might Never Have Heard" series a week or two ago, and that I discussed at some length a letter on the same subject from Mr. Bruce Sievier.

I have now heard again from this cheery composer, song writer and impresario of the air. This is what he says—with the exception of a few bits I have left out, as they are of a somewhat confidential nature.

I have also on my own responsibility excised the name of the journal referred to by Mr. Sievier, so that its editor, who I know quite well, shan't think I brought in the original mention of it just to flog a point that might twist back in some way and prick him!

Anyway, Mr. Sievier says:

Dear Victor King,—Thank you for your reply in this week's POPULAR WIRELESS.

I appreciate your opinion—I value criticism that is constructive, even though it be adverse—but to be associated with words like "racket" I naturally object.

However, I see that you yourself happened to be an innocent victim of the "blue pencil" Although agreeing with you that there was an article in—divulging who "The Tin Pan Alley Trio" are—I think their two songs had already got well under way before it did appear.

On the other hand, to show you that I was partly of the same opinion as yourself I would like to put it on record that I rang up the editor of the paper immediately I saw the article and told him that, although I appreciated the fact that it might be "news," it was giving unfair publicity to "the boys' songs" in these early stages.

Mind you, we are surmising that those who read the — are—or form—a large number of the voters in S.Y.M.N.H.H.

Now a song that has consistently held its position is "The Riveter." No publicity of any kind has been given to this number, except to announce that it has been published since the broadcasts started.

Now it so happens that I wrote the lyric of this song, originally for a film called "Rhythm In The Air" (featuring Jack Donoghue). The director of the film and others connected with it turned this idea down!!

The music is by a young composer called Albert Arlen. The song has now been recorded by Peter Dawson and Raymond Newell. I have had a difficult problem to face with this series—a fight between Entertainment and Competition. Naturally, Entertainment had to be uppermost, otherwise the customers switch off and then there is NO competition.

I might have added to the interest had I run the idea in heats—with a grand final. However, I was not to know in the early

days that the public would remain loyal to the same songs in the way they have.

On the other hand, my original contention was that I could find

a "smash hit"—the only way I could prove this was by allowing reiteration should the "customers" ask or vote for it.

I mean, if the voters go for these numbers they obviously wish to hear them again. And as over 25,000 copies of "The Angel" have already been sold *this is a smash hit*. In fact, so big are the sales becoming that it looks like going from our series into *The Music Shop*. It has proved that you can have a smash hit, and because a band leader happens to turn it down, you are sunk.

I am glad you liked the series, and I hope, as you say, I shall be allowed to do others.

Thank you, Mr. Sievier, yours shall be the last words. May you have many more brainwaves as good as S.Y.M.N.H.H. And I hope you get them on to the air.

PLAY THE GAME

MORE anti-B.B.C. letters! But *please*, you indefatigable writers, *please* note that in regard to most of the fundamental policies underlying the operations of Sir John Reith and his gang, I am quite unreservedly pro-B.B.C.

The dull Sunday programmes may irritate, but the high moral tone and good taste pervading all the transmissions are something deserving of praise. In my opinion the censorship of comedians' jokes and so on is a very good thing. If you go to a music hall you get what's coming to you—and may like it. I do—mostly. But then I don't take certain of my female or young relations. I leave them at home to listen-in.

And the News. Could be pepped up, but at least it is impartially presented. The only snag is that by gathering together a team of professors and public school men to maintain the level of integrity, culture and dignity that stamps British news casts there has inevitably developed a tendency to fly a bit too high with some of the material that goes on the air.

However, I suppose we can't have it all ways. You can't expect the wearer of an old school tie to appreciate the fact that more people are interested in Soccer than in Ruggah. (I wonder how many football coupons are posted from Broadcasting House every week?)

The other evening I timed the items in the "Sports Bulletin."



HOW DEAF CHILDREN ARE TAUGHT

The teacher at the Royal Residential Schools for the Deaf at Old Trafford talks to the children through a microphone and amplifier, the children themselves being provided with headphones and volume controls for adjusting the strength of the teacher's voice.

There were two and a half minutes of Oxford bumps and Cambridge something else. "Bluenose Three bumped Maudlin Two; Lady Margaret bumped Chester Two (the wench!); Oriel Four bumped St. John's Six" and so on, or words to that effect.

Then there were fifteen seconds of Ruggah news followed by twenty seconds of squash rackets. A bit of ice hockey and a spot of snooker completed the miscalled "Sports Bulletin."

Oxford Bumps and squash rackets! Can't you see ten million listeners in Brixton and Balham, Walthamstow and Warrington sitting breathlessly before their sets drinking in Varsity Bump news and squash rackets!

Blimey!

Play the game, you cads!

Which reminds me. Was on the way to pay a visit to Tallis House the other morning. With a bunch of other folks I made a dash at a No. 11 'bus at Liverpool Street.

"Play the game, you chaps," said the conductor.

En route and while collecting the fares this cheery L.T.-ite maintained a continuous running commentary.

"Bank of England. If you can't pay your fares you can jump out and pick up some money. Here, ladies and gentlemen, we have the Mansion House. No, sir, the original Dick Whittington is not now in residence. (Then, to a conductor in another 'bus drawn up alongside): Good morning, brother slave. Lot of these salmon tins about this morning.—Fleet Street! Come along, you editors. Alight here for newspaperland." And so he went on the whole time, a grin on his plump face and grins on the faces of all the passengers. It was a very pleasant interlude.

That chap is wasted as a 'bus conductor. The B.B.C. ought to get hold of him. He'd make a grand commentator, especially for television, and I mean that, seriously.

ON A.C.?

Those of you who run A.C. sets and are troubled with crackles and splutterings should try sticking in the mains plug the other way round. I cured a bad case in that way the other day.

SELECTIVITY AND REPRODUCTION

Some Interesting Facts

By A. W. YOUNGMAN

It is not often that listeners associate selectivity with fidelity of reproduction, yet it is an established fact that the efficiency or inefficiency of the tuned H.F. stages considerably influences the actual quality obtainable at the loudspeaker, inasmuch as an almost perfectly designed low-frequency amplifier will not necessarily ensure almost perfect quality unless an equal amount of care is exercised in the design of the tuned H.F. circuits.

Whilst fidelity of reproduction is perhaps one of the most desired features in the performance of a modern receiver, present-day ether congestion demands a high degree of selectivity in order to provide interference-free listening, and where the receiver is designed to give even reasonable sensitivity it will be readily appreciated that the selectivity becomes a factor of importance equal to good reproduction.

Frequency Response

To provide for good station separation it is essential that the selective properties of the circuit be capable of tuning to a band-width of approximately 9 kc. Correctly designed tuned H.F. circuits will not permit frequencies outside this limit to pass into the L.F. amplifier, and in consequence an almost perfect barrier effect is offered to the upper register. In this way frequencies above 9,000 cycles are cut off in the interests of selectivity.

Where special care has been taken in the design of the L.F. amplifier to give a much greater frequency response it will be noted that such advantageous qualities are virtually of little use when the approximate highest frequency response placed upon it is 9,000 cycles.

Practically speaking, a 9-kc. cut-off is indeed a satisfactory compromise between tuned H.F. and the L.F. amplifier circuits, and the reproduction normally obtainable is usually quite pleasing to the average ear. To the more fastidious criterion, however, it is considered that the minimum cut-off should be in the neighbourhood of about 14 kc., and that a 9-kc. response is wholly inadequate to emphasise the upper register.

Concerning Output Volume

In cases where the higher frequencies are regarded as essential it would appear at first that the obvious remedy is easily available by simply producing a tuned H.F. circuit with a band-width of approximately 14 kc. and, in fact, this method is quite practicable where the receiver is to be designed for local station working only. Unfortunately, the introduction of an H.F. amplifier to give a moderate degree of sensitivity would prove disastrous to the entertainment value of the receiver by amplifying the side bands of the weaker transmissions to produce interference from unwanted signals.

The importance of the low-frequency amplifier and the particular type of output

valve employed, must, of course, not be overlooked in the quest for good reproduction, and in this respect very many existing receivers are adaptable for considerable improvement. It is an opinion among some listeners that the total number of valves employed in any receiver is directly responsible for the actual volume at the loudspeaker. Whilst this is true up to the point of loading the output valve sufficiently, additional stages beyond this limit cause instability, overloading, and subsequent distortion. Volume so obtained is not always desirable, and, furthermore, a highly efficient L.F. amplifier will not necessarily ensure good quality without the appropriate output valve suitably designed to deal with the load imposed upon it. Similarly, a too large input resulting from high-stage gain, if applied to a small power valve in the output circuit, will produce inevitable distortion due to overloading unless some form of L.F. volume control is incorporated.

Effect of Large Power

Obviously, the larger the output valve employed the better must be the quality obtainable, due to the fact that overloading cannot occur so readily. But here, once again, the association between selectivity and reproduction becomes manifest in the apparent selectivity over the true selectivity. With a moderate degree of sensitivity the former is of little importance unless a large output valve is employed. The greater amplification now obtainable emphasises the smaller interferences, such as side-band splash, etc., and in ultra-sensitive receivers this form of interference which was inaudible until the larger valve was fitted now becomes a menace likely to ruin the best reproduction.

Under the foregoing circumstances the designer is compelled to consider the effect of selectivity upon quality, and as the use of a fairly large output valve is a necessity in a high-fidelity receiver, the need for extremely efficient H.F. tuned circuits, in spite of the sharp cut-off and loss of the upper register, is apparent. The introduction of the iron-cored coil has greatly facilitated the design of such tuned circuits capable of meeting present-day requirements in providing satisfactory station separation.

Compromise Desirable

On the one hand a high degree of selectivity with a large output valve has the disadvantage of behaving as a barrier to the higher frequencies and enhancing side-band splash, whereas on the other hand increasing the band-width to give greater modulation frequency response with a similar output valve reduces the selective properties of the tuned H.F. circuits and so introduces interference from other transmitters.

Generally, frequencies above 9,000 cycles are not always desired, and as side-band splash is only audible when the station tuned is within close proximity on the tuning dial to the station received such interference becomes negligible. To obtain a higher modulation frequency response at the loudspeaker hardly justifies sacrificing the selectivity which is so essential, and in summing up the position the inclusion of extremely efficient tuned H.F. circuits—such as are obtainable with iron-cored coils—and a large output valve is to be recommended in the receiver design.

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LOW VOLUME QUALITY

A practical method of maintaining a true tonal balance at the lower settings of the volume control. This scheme enables listeners to work their receivers quietly without the resulting reproduction sounding unnatural.

By G. H. GALLOWAY, A.M.I.R.E.

EVERYONE knows that, as a rule, reproduction at low volume is not so good as at high. It sounds "unnatural" and, to those with a musical ear, lacking in top and bass. This is expected when listening to a band at a distance, but not when hearing a performance taking place in the studio. Under these conditions the listener is supposed to hear the performance as if he were in the stalls. Where a "distant effect" is intended, the control engineer turns down the gain control from the microphone amplifier. Under no circumstances should the position of the receiver volume control alter the listener's aural position from the performance. That is, whether loud or soft, the orchestra or singer should sound the same position from the listener.

Unnatural When Played Softly

As pointed out above, when the average receiver is played softly it sounds unnatural, giving a long-distance effect and a lack of bass and top. Hence why so many listeners have their receivers playing loudly, even if it is uncomfortable in a small room. With loud volume they get the full musical range of the orchestra as picked up by the microphone and passed through by the control engineer.

This lack of top and bass at low volume is often helped by an insensitive loudspeaker with a stiff movement. Such a speaker requires a pretty hefty input before it is of much use. There is another reason, however, common to all receivers, irrespective of the speaker or frequency response of the set itself. This reason is that below a certain volume the human ear responds better to the middle frequencies than to the top and bottom. Thus, when a set is working quietly the sound waves set up cause the ear to respond better to the middle frequencies than the others irrespective of whether the microphone is close to or a long way off from the performance.

Frequencies Become Masked

Thus, the middle frequencies "mask" the top and bottom, giving an unnatural effect. Turning the volume control up overcomes this defect, since the low and high notes now set up sound waves strong enough for the ear to respond to them as well as it does to the middle notes.

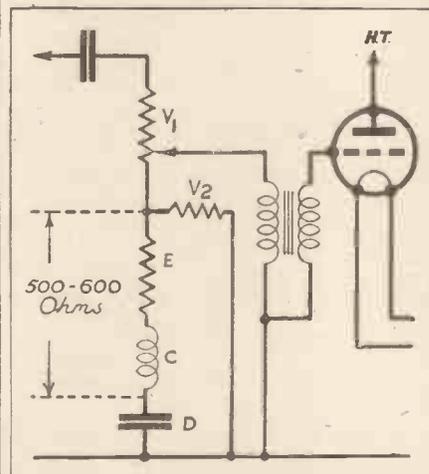
This "human error" can be overcome by means of tone-compensation, which means that, by a simple alteration to the volume control, it is possible to obtain almost the same reproduction at low volume as at high. Not quite, of course, especially if the loudspeaker is rather insensitive, but the results make listening at low volume far more enjoyable, and, further, the circuit used by the writer has no effect on the

reproduction at high volume. There need be no fear that since tone-compensation boosts up the low and high frequencies, it would give too much bass at large volume. This is most certainly not the case.

Tone-compensation, unlike tone correction, only takes place at low volume, its influence becoming proportionately less as the volume from the set is increased. It is used on the L.F. side of the set, and cannot be used with an H.F. volume control. Most sets of to-day use diode detection, the load resistance being utilised as the volume control. Many, however, still use grid-leak detection, the detector being R.C. coupled to the L.F. stage, and the volume control taking the form of a potentiometer resistance.

Either way, tone-compensation is applied

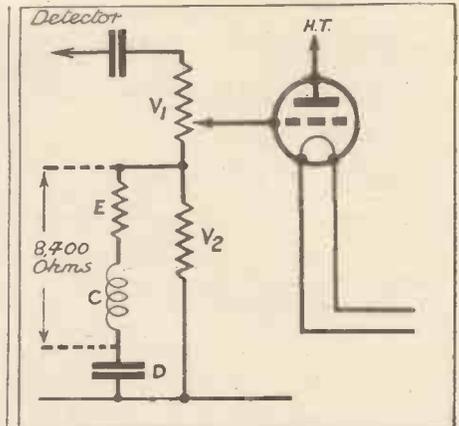
TRANSFORMER COUPLED



With parallel-feed transformer coupling the values are somewhat different. V_1 is a volume control of 25,000-30,000 ohms. V_2 is 6,000 ohms, and E again depends upon the resistance of the choke. C is a .05-henry disc choke, and D has a value of .5 mfd.

to the bottom end of the volume control. Its effect is to reduce the response to the middle frequencies—thus at low volume to give the low and high notes a chance to be heard. As the slider is moved towards louder volume it moves away from the bottom end of the volume control, and the compensating choke and condenser have less influence over the middle frequencies; hence the balance is very well maintained.

When using a 500,000-ohm volume control the following points will be of interest. First, the choke should be a disc choke, and not an iron-cored one. As it is rather tedious to wind (4,400 turns are needed), it is better to get a commercial product. Suitable disc chokes are made by Postlethwaite Bros., Stourbridge, Yorkshire, and the Scientific



The arrangement used for an R.C. stage. V_1 is a 500,000-ohm volume control; V_2 a resistance of 100,000 ohms; and the value of E depends upon the resistance of the choke. C is a .84-henry disc choke, and D a .03-mfd. fixed condenser.

Supply Stores, Newington Causeway. Both are provided with mounting brackets.

The Total Resistance

The resistance of the choke is 275 ohms, therefore to make up the desired resistance to 8,400 ohms, an 8,000-ohm resistance will do. The extra 125 ohms will make no difference to the results. When mounting the choke, take care it is in no magnetic field from the mains transformer if used with a mains set, otherwise a loud hum will be picked up. However, altering the angle and position from the transformer will cut out the hum.

The R.C.-coupling circuit shown is for a 500,000-ohm resistance volume control. When used with a 250,000-ohm control, halve the resistance values and double the condenser value. The diagram will make this clear. The value of the extra resistance E will, of course, depend on the resistance of the choke, but it must be such as to make up to 4,200 ohms.

Tone-compensation can be used with L.F. transformer coupling, but the transformer must be parallel-fed. The other diagram will show the connections, and it will be noted that a low value volume control is used in the interests of quality.

What the Scheme Does

In conclusion, the writer does not claim that tone-compensation will improve the over-all response of the set. What it does do is to give better reproduction at low volume than is possible by ordinary methods. That reproduction, however, is influenced by the capabilities of the set and the sensitivity of the loudspeaker. The better the L.F. response of the set, and the more sensitive the speaker, the more effective will be tone compensation. Obviously, for the most natural results, the reproduction should equal the original in volume, but Henry Hall's band at original strength in the average living-room would be too much! Even as it is, 2-watts undistorted output can be very uncomfortable in the normal room, even if it is more natural.

It is for this reason that the writer prefers ½-watt, coming from a set fitted with tone-compensation. Low and high notes as well as middle are heard equally well, and there is not that uncomfortable feeling that something is wrong, together with the temptation to turn up the volume—and annoy the neighbours!

TECHNICAL JOTTINGS

(Continued from page 86.)

One of the methods which is probably the best is to use a wavetraps. This acts by increasing the selectivity very greatly and so enabling you to cut out any wavelengths which are appreciably different from the one you are trying to receive.

Wavetraps

Before talking about wavetraps, I should mention that there are some methods by which you can improve the selectivity of the set as a whole, by which I mean that the same advantage is obtained not only at one particular wavelength (in this present case the wavelength of the troublesome local station), but at all wavelengths over a fair range. The wavetraps system, however, is more particularly for the purpose of giving you the selectivity which you require at some particular point in the range, usually for a set purpose, such as that which we are now discussing.

Adjacent Wavelengths

There is another point with regard to the wavetraps, which I think it is important to mention before going any farther, and that is if you are by this means cutting out one particular station and you wish to receive another station, the wavelength of which is very closely adjacent to the one you are cutting out, you can hardly expect to receive the desired wavelength at full strength. It all depends, of course, on how close together they are, but the closer they are, obviously the finer the selectivity which will be necessary to cut out the one without cutting down the strength of the other. No wavetraps is perfect, and in actual practice you will find that the wanted wavelength will be cut down to some extent, this cutting-down depending upon the closeness of the two wavelengths and upon the sharpness of the selectivity given by the wavetraps.

"Spreading" Effect

The cutting down of a wavelength adjacent to the one which is being eliminated is due to what is sometimes called the "spreading" effect of the wavetraps. I think this term will explain itself, even to those of my readers who may not be quite familiar with this point. The spreading can, however, be reduced and the effect of the wavetraps confined within narrow limits if you use a type of trap incorporating a tapped coil. In this trap the aerial is connected to one of the tapings, whilst one end of the coil is connected to the aerial terminal of the receiver; in this way, as you will see, the aerial is connected to the aerial terminal of the set through a tapped portion of the coil; a variable condenser is then shunted across the whole of the coil, this condenser having a maximum capacity of perhaps 0.0005 microfarad.

Condenser Adjustment

In using a wavetraps you tune-in to the station you want to get rid of, and then you adjust the above-mentioned condenser until this station disappears (or is reduced to the lowest volume you can manage). Having successfully silenced this fellow, you are then free to tune-in the weaker transmission which the interfering station was previously

overpowering. But I want to mention once more before leaving this point that the difficulties are very greatly increased if the two wavelengths, which you are trying to separate are extremely close together.

Improved Selectivity

Coming on to the question of the improvement of selectivity generally, quite apart from the use of a wavetraps, you will find that the bandpass arrangement is one of the best. You may remember that in principle this consists of a tuned circuit extraneous to the set (by which I mean extraneous to the circuit of the set because, of course, the bandpass tuning arrangement can be incorporated in the cabinet), this being coupled to the tuned circuit by means of a small condenser.

Screening

The coupling between the extra tuned circuit and the original tuned circuit must be limited to the coupling which is brought about by the coupling condenser. This means that in order to prevent unwanted coupling you have to screen the two circuits from one another which can, of course, be done by means of ordinary simple screens.

When using this bandpass arrangement you have to tune both the normal tuned circuit and also the additional one, and the tuning of both circuits will vary with different stations. In view of the advantages gained, however, you will find this little extra trouble well worth while.

No Alterations

Another very important practical point is that no alterations to the present circuit are necessary, and so it is a very simple matter to disconnect this extra bandpass unit if at any time it should not be required. Suppose, for example, that you want to leave the set in a form in which it can be used easily by someone not so initiated in the operation of it as yourself, where simplicity of tuning and operation is more important than overall selectivity, then you can easily disconnect the additional unit.

Ganging

When setting out on the trimming of a ganged condenser it is a good plan to have an insulated tool rather than one of the ordinary kind. If a screwdriver or a pair of pliers is used it should be well insulated and if that is not convenient you can easily make up a tool which will serve the purpose out of a piece of wood. This depends, however, upon the type of trimming knobs to be dealt with, but as a rule you can get out of it with an improvised wooden tool.

The first thing to do when setting about the trimming is to screw in all the knobs as far as they will go and then to unscrew them all about three or four turns—but, whatever it is, the same amount for all. This, of course, is by no means an accurate adjustment, but it will do sufficiently for a first shot, and you can assume that the trimmers are as near as may be equal, at any rate for a start.

Adjusting Trimmers

Now you tune-in a weak station at the lower end of the dial, and for this purpose

(Continued overleaf.)

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NEW TIMES SALES CO.
56 (P.W.25.), Ludgate Hill, London, E.C.4
EST. 1924



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"What's this that I've got!
Is it Mars, or Australia, or what?"
But his pal merely said,
"You've got crackle, instead,
Of the Fluxite your wiring did not!"

See that FLUXITE is always by you—in the house—garage—workshop—wherever speedy soldering is needed. Used for 30 years in government works and by leading engineers and manufacturers. Of Ironmongers—in tins, 4d., 8d., 1/4 and 2/8.

Ask to see the FLUXITE SMALL-SPACE SOLDERING SET—compact but substantial—complete with full instructions, 7/6.

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The FLUXITE GUN
is always ready to put Fluxite on the soldering job instantly. A little pressure places the right quantity on the right spot, and one charging lasts for ages.
Price 1/6.

ALL MECHANICS WILL HAVE

FLUXITE

IT SIMPLIFIES ALL SOLDERING

FLUXITE LTD., DEPT. 324, DRAGON WORKS,
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Electradix Radios' Wonderful Bargains.
 Electradix Home Recording with the all-gear'd FEIGH Electric Recorder. Ball-bearing centre gear box and traverse rod; is the lowest-priced electric home recorder that will fit any gramophone. The set with tracking gear, pick-up and tone-arm with diamond. **37/6**
 Gear only, 21/6.



TELEPHONE SETS for Office, Garage and Field Sports. Table, wall, and waterproof portable from 10/-. Headphones for short-wave radio, 2/5 pair.

CRYSTAL SETS (for crystal-pure reception). Table type "A," 7/6. Double circuit type "B," 10/6.

HEADPHONES, with cords, 2,000 and 4,000 ohms, 4/6. Single high res. earpieces, 2/6. Sullivan 120 ohms, 2/9.

WHY NOT LEARN MORSE? Cheap home learner's set, complete with battery and buzzer, on walnut base, 4/6. Large range of Keys, Buzzers, Sounders and Recorders.

X-RAY TUBES. As illus. previous issues. Brand new W.O. Hospital Surplus, 7" dia. bulb, big tungsten electrodes. Full emission. Cost £5. Sale 10/-. Packing 2/6.

PHOTO CELLS. R.C.A. 12887. Tackle model, 25/-; few Oram C.M.G. 35/-; Selenium Cells, 5/-, 7/6 & 10/-. Raycraft, 21/-; Photronic self-gen. cells, 25/-.

ALL-WAVE CRYSTAL SETS for plug-in coils. 2 tuning condensers, semi-perm. Detector, 5/6. Why bother to make one when cheaper to buy ours?

BELL PUSHES in porcelain and brass. Big stock, all types, from 6d. English Bells, 2/-.

THIS BATTERY SUPERSEDER provides H.T. from your L.T. 2-volt battery, 3 rectified and smoothed, 3 tapings. A boon to those who are not on the mains. Reduced from £3 15s. New and Guaranteed, 37/6.

SPARK COILS.—1 in., 1 in. and 1 in. gap, with condensers, 10/6. Short wave spark transmitters for boat model control, 17/-.

SPEAKERS and MIKES cheap.
 Send for "Radio Electrical," Scientific Illus. List "P" Free.

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TECHNICAL JOTTINGS

(Continued from previous page.)

it is better to choose a station with a wavelength of between 220 and 240 metres; in the process of this tuning the trimmers should be adjusted for maximum signal strength, just as though they were ordinary tuning condensers.

When you have got satisfactory results with this you tune-in another station, a weak one, but at a longer wavelength, say about twice the previous wavelength. Now you again adjust the trimmers and note very carefully whether the adjustment makes any improvement in the reception.

Advantages of the Multi-Mu Valve

With the multi-mu valve which, of course, is a screen-grid valve of special design, you can adjust the valve so that it will not be overloaded, and so avoid distortion so far as the valve itself is concerned, whilst the output can be adjusted so that the detector is capable of handling it. In the multi-mu screen-grid type of valve the magnification, as you no doubt know, depends upon the grid bias and so, by varying the latter, the magnification can be varied correspondingly.

The screen-grid multi-mu must have its grid bias so adjusted that it doesn't over-magnify and so overload the detector, whilst in the next stage the valve following the detector must be arranged so as to handle without distortion whatever is passed on to it by the detector.

Doesn't Interfere with Tuning

If these various conditions are properly carried out, the whole chain of stages from the multi-mu to the output will be free of distortion, or at any rate they will be free of any distortion due to overloading. This form of volume control by means of the grid of the multi-mu valve doesn't interfere with tuning, which is an important point.

Some people control volume by the simple process of de-tuning. This may have been all right in the old days, but with modern super-sensitive and highly-selective sets it won't do, and you will be surely in trouble with neighbouring stations and distortion.

HOW MANY VALVES?

The solution of the Louis C. S. Mansfield problem which appeared on page 68 of last week's issue.

He started with 719 valves. To the first man he sold half of these and gave away half of a valve, so he had 359 left. The next man bought a third of this number and received a third of a valve, so this left him 239. After selling a quarter of this and giving away a quarter of a valve, he still had 179 left. After 'high-pressuring' the last man into buying a fifth of this number and giving him a fifth of a valve over he had 143 over, which enabled him to build thirteen sets with eleven valves in each. Easy wasn't it.

YOUR SET—HOW IT WORKS

(Continued from page 76.)

any roughness, it is passed through a smoothing circuit, which knocks this roughness off, as it were.
 Now a word about the current for the

heaters of the valves: All valves work by virtue of the electrons given off by a coated tube called a cathode. They are only given off when the cathode is heated up to a certain temperature, and therefore some method of heating must be provided. Obviously the most convenient method is to heat a piece of wire which passes through the centre of the cathode, by allowing an electric current to flow through it.

This is what is done in the modern set, and the heater winding on the transformer supplies this current. The electron flow takes place between the cathode and the anode of the valve, but only when a voltage is applied to the anode. This latter voltage is what is called the high tension or H.T. voltage, and comes via the rectifier valve, which is connected to the transformer winding.

Incidentally, the heater winding on the transformer also supplies the current for the small electric bulbs which illuminate the dial on the set.



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

ON May 12th millions of people will listen to the B.B.C. broadcast of the Coronation ceremony from Westminster Abbey and the commentary on the procession.

Public address loudspeakers will be erected all over the British Isles for the benefit of those who are unable to listen-in to their own sets at that time, and to enable this to be done the B.B.C. will waive the copyright clause on its transmissions.

One of the big P.A. jobs will be that of relaying the broadcast to the tremendous crowds which will throng the route of the procession, and one firm alone will need over 25 miles of twin wire to link up its equipment. This gigantic length of wire will be used for connecting up over fifty tons of apparatus—apparatus employing nearly 1,000 valves.

The firm in question is the Marconiphone Company, and on this day it will have on duty as many as fifty public address engineers to look after the apparatus. Standby equipment will be installed, so that in the unlikely event of a breakdown there is an "understudy" ready to be switched in.

Some of the most important work which has been entrusted to the Marconiphone Company by H.M. Office of Works includes The Mall, Parliament Square, Palace Yard, the St. Margaret Stand, Lincoln Enclosure and the Canning Enclosure.

Contracts have also been secured for the Westminster Stand, Westminster Hospital Stand and the St. George's Hospital Stand.
 (Continued on next page.)

THE RADIO BULLETIN

(Continued from previous page.)

R.C.A. EQUIPMENT AT LUXEMBOURG

R.C.A. Photophone, Limited inform us that Radio Luxembourg have recently installed a complete R.C.A. high-fidelity sound-reproducing apparatus which has been specially designed for use in conjunction with the station's broadcasting equipment.

This new apparatus is very similar to that installed in many leading cinemas, and an interesting feature is the provision of an ingenious device enabling films of both 35 mm. and 17.5 mm. to be run.

* * *

PREMIER DUKE'S CAR RADIO

Among the Duke of Norfolk's wedding presents was a Philco car radio outfit, and this has now been installed in his Lagonda car.

The set, which is the model 902T, has been fitted under the bonnet on the engine side of the dash, with an extension speaker under the dash in the front driving compartment.

* * *

SET SERVICING

Speaking of Philco's, the firm informs us that there is to be a more strict regulation of qualifications for membership in the Radio Manufacturers' Service organisation, which was instituted by Philco Radio at the beginning of 1935.

There are now 2,700 technicians who are members of this group, the purpose of which is to provide radio servicemen with useful technical information, establish a set of fair prices for repairs and, generally, to raise the service side of the radio industry into a recognised profession.

Many members of the R.M.S. have been dropped for failure to maintain the high standards demanded.

Membership of the organisation is open to independent service engineers as well as Philco representatives, and a technical training scheme is in operation.

* * *

SHORT-WAVE PIONEERS

Ten years ago short-wave broadcasting was very much in the experimental stage, and we in this country had nothing with a range sufficient to reach our Colonies and Dominions.

It was at this time that the Philips short-wave transmitter in Holland established the first link between Europe and Asia on a wavelength of 30.2 metres.

The success of this transmission resulted in a request from the B.B.C. asking the Philips Company to radiate the Daventry programme via their short-wave station. This was done, the transmission occupying six hours, and so successful was it that radio stations in South Africa, Australia and New Zealand, as well as other parts of the world, picked up the programmes and relayed it to their own local listeners.

Recently, Philips celebrated the tenth anniversary of their first inter-continental broadcast to the Far East with a special transmission from P.C.J. on wavelengths of 16.88 and 19.71 metres. No doubt a number of "P.W." short-wave enthusiasts heard this programme.

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SOUTHERN RADIO'S WIRELESS BARGAINS

All Goods Guaranteed and sent Post Paid.

RECEIVERS.—VIDOR. 3-valve Battery Sets. Model C.N. 212. Complete in attractive Walnut Cabinet with three Mullard Valves, Moving-Coil Speaker, Batteries and Accumulator. New, in sealed cartons, £3 17s. 6d. (List, 6½ gns.)

LUCILLE. 5-valve American Midget Sets. Complete with 5 Valves, Moving-Coil Speaker. Ready for use on any mains 100/250 volts A.C./D.C. Long and Medium Waves, £3 15s. 0d. New in sealed cartons.

RECORD CHANGERS.—Garrard Model R.C.4, plays automatically and changes eight 10-in. or 12-in. Records of any kind. New, in sealed cartons, £6.

GRAMOPHONE MOTORS.—COLLARO Spring Gramophone motors, complete with all accessories, 11/-.

SPEAKERS.—CELESTION Soundex permanent magnet, 10/-; TELSEN permanent magnet, with 10-ratio Transformers to suit any Receiver, 12/6; Telsen Loud-Speaker Units, 2/6. All Brand New and Boxed.

COILS.—Telsen Iron Core, W.349 (Midget size), 4/-; Type W.478 (Twin), 9/- pair. Type W.477 (triple), 16/- per set. Type W.476 (triple Superhet, Selector and Oscillator), 16/- per set. All ganged coils complete on base with switch. Telsen I.F. Transformer Coils. 110 kc., 5/-; Telsen Dual Range Coils, with aerial series condenser incorporated type W.76, 4/-; Telsen Aerial Condensers with shorting switch, 2/-.

All Telsen components Brand New in sealed cartons.

AMERICAN VALVES. A full range of valves for all American receivers, 6/- each.

MISCELLANEOUS BARGAINS.—All brand new in original sealed cartons: Telsen A.C./D.C. Timimeters test anything radio or electrical, 8/6. Telsen 2-range Voltmeters, 3/-; 3-range meters, including milliamps, 4/-; Ace (P.O.) Microphones, with transformer ready for use with any receiver, 4/6; 36 assorted Tru-ohm Resistances. 1 watt, colour-coded and marked, 36 on card, 6/- per card. Bell Transformers, 200/250 volts input, 3, 5, and 8 volts output, 3/6; Morse Signal Units, incorporating buzzer, tapper and flash with international code, complete with batteries and bulbs, 3/9 each. Marconi V.24 and Q type valves (useful for short-wave experiments), 1/6; Lightweight headphones, double pole, 4,000 ohms, each earpiece, 3/- pair.

REGENTONE ELIMINATORS A.C., 200/250 volts, type W.5a, with trickle charger, 37/6.

SOUTHERN RADIO. Branches at 271-275, High Road, Willesden Green, N.W.10; 46, Lisle Street, London, W.C.2. All mail orders to 323, Euston Road, London, N.W.1.

SOUTHERN RADIO, 323, Euston Road, London, N.W.1 (Near Warren St. Tube). Phone: Euston 3775.

HEADPHONES. Brown, G.E.C., B.T.H., Ericsson Brandes, Siemens, etc., 2,000 ohms, 2/6. 4,000, 5/-; Postage 6d. Guaranteed.

SPECIAL. Ericsson, as new, 4,000 ohms, 7/6. Telefunken, adjustable, 7/6.

CRYSTAL SETS. Burne-Jones. Double circuit. Complete. Guaranteed. 8/-; Sensitive permanent detectors, 1/6. Crystal detectors, complete parts 1/-; Crystals, 6d. Post Radio, 153, Caledonian Road, London, N.1.

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(Continued)

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VALVES

LEEDS' SPECIAL OFFER!

3/- EACH. All popular types American Valves, including 6L6, 6K7, 6C5, 6F6, 25A6, 6J7. **LEEDS,** 66, New Briggate, Leeds.

3/- EACH. 6L6, 6K7, 6H6, 25L6, 25A6. All other popular types American Tubes. Radiographic Ltd. 66, Osborne Street, Glasgow. C.1.

MISCELLANEOUS.

A.C.—D.C. New Motors all voltages from 14/9. Lists free. Repair Specialists. **EASCO** Electrical Service, 18, Brixton Road S.W.9.

SITUATIONS VACANT.

POST OFFICE ENGINEERING. Excellent openings for young men aged 18-23. Start £3/13/0 weekly at age 18. No experience required. FREE details of exams from N.I.E. (Dept. 606), Staple Inn Buildings, High Holborn, W.C.1.

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