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THE WORLD'S LEADING RADIO JOURNAL

Popular Wireless & Television Times

WIRELESS AND THE THREATENED WAR
By
LORD STRABOLGI

EVERY WEDNESDAY PRICE 3D

No. 695.
Vol. XXVIII.
Sept. 28th, 1935

HOW TO BUILD A SELECTIVE D.C. Set

OTHER SPECIAL FEATURES:

FIVE EXCITING HOURS

★ ★

THE "SNAKE" CABLE

★ ★

WIRELESS LINKS FOR REPORTERS

★ ★

THE PARIS RADIO SHOW

Etc., Etc.

POPULAR WIRELESS AND TELEVISION TIMES

MANAGING EDITOR : N. F. EDWARDS. TECHNICAL EDITOR : G. V. DOWDING, Associate I.E.E.

WORM NOISES
MORE LICENCES
LIFEBOAT RADIO
A NEW STATION

RADIO NOTES & NEWS

LUCKY NUMBERS
TELEVISION NEWS
FREE SETS
"SOME VOLUME"

Valve Detector, New Style.

THE voracious worms and beetles who frequent our cathedrals in the hope of chewing up old wooden beams, and making a hearty meal or two daily at the expense of the rarer carvings, must beware of the radio valve. It is now being applied to their destruction, and the success achieved in de-worming has far outdistanced the legendary accomplishments of the Early Bird.

The scientific method of catching the worm is to *listen* for him by means of amplifiers so sensitive that his goings to and fro upon his unlawful occasions sound like the activities of furniture removers in a hurry.

Once the culprits are detected at their beam-feasts it is a comparatively easy matter to gas them, or to treat the wood with a chemical that bites like a million hungry ferrets! And so to bed.

Fires of Progress.

DID you hear about that huge bonfire near Stuer, Jutland, in which hundreds of perfectly workable wireless sets went up in smoke? Not by accident, look you, but with malice aforethought and paraffin poured on.

This remarkable blaze, in which thousands of pounds' worth of components perished, was a policy-move on the part of a big firm, which had been taking back old sets in part payment for new ones. This firm found that if the old sets were serviced and re-circulated to the public, the demand for new sets was strangled. So hundreds of the old-time models were gathered together and set alight—martyrs to big business, but just so much meat and fizzy drink to the small boys of the neighbourhood!

A French Advance.

LET us turn our faces to the south for a moment and wave congratulatory encouragement across the Channel to neighbour France, whose licences have now increased beyond the two million mark. This is good news indeed, for despite the excellent early pioneering of French radio scientists there seemed at one time to be a blight on wireless development in that country, and it is only of recent years that the licence crop has been worth looking at. The late General Ferrie, however, produced a regional plan (which now bears his name), and the high-powered stations that he legislated for are now creating enthusiastic listeners in every area.

Much of the credit for implementing the scheme goes to M. Mendel, Minister of Posts and Telegraphs; while good old Radio Normandie and Co. deserve a salute and hand-clappery for keeping the wireless spark alive in France.

Echo Answers.

A HIGHLY ingenious radio aid to navigation has been invented by M. Ponte, a French electrical engineer.

The principle is that of an ultra-short-wave beam which is radiated from a ship, and reflected back by icebergs, derelicts, and similar obstacles which thus give warning of their presence.

The received "echoes" are amplified and made to operate a photo-electric system, and it is claimed that both distance and direction can be estimated with accuracy.

The wavelength used is about sixteen centimetres. After considerable experimental work the results have proved so gratifying that the apparatus has been installed on the "Normandie."

A STRIKING TESTIMONY

This photograph, sent in by a radio enthusiast residing in Quetta, India, is a striking testimony to the efficiency of modern loud-speaker design. Working under abnormal conditions in having to contend with severe sandstorms, the speaker shown (a W.B. "Stentorian") continues to function satisfactorily a fact which demonstrates to the full the excellent dust-proof characteristics of the instrument.

A Hastings Experiment.

CONGRATULATIONS to Hastings—with which for safety's sake I had better couple the name St. Leonards—upon the lifeboat tests now being carried out with a view to installing radio equipment. Ever since 1066 and all that the men of Hastings have been liable to trouble from the south. The lifeboat has often put out to sea under conditions where communication with the shore would have been more than desirable, and now an attempt is to be made to provide a radio link.

I understand that stations G 5 Q M and G 5 B S are engaging in the tests. Here's jolly good luck to them.

More Depression.

WADING through some unusually stodgy reports upon ionospheric matters the other day I came across the following scientific declaration:

"Whether due to the gravitational tides in the earth's atmosphere, to electrostatic repulsion, to a combination of these or to some unknown cause, there seems to be evidence that when the moon is near culmination and rises as it passes the horizon the Kennelly-Heaviside layer is *depressed*."

No wonder it gets depressed sometimes—all this probing and publicity must have made the Private Lives of the electrons up there unbearable.

Palestine's Programmes.

THE coming November will see the Holy Land taking the air, with a daily five-hours programme from the Jerusalem station. The wavelength will be the same as North Regional's, 449·1 metres, and there will be three or more announcers, since announcements must be multi-lingual.

Two studios have been built, the larger being for music and so forth, while the smaller is primarily for announcements. The five-hourly periods have been divided provisionally as follows:

An hour of relay from the B.B.C.; an hour of European music; an hour of news, weather and local items for the rural areas; an hour for the Jewish community; and an hour of Arabic music and news.

Short-Waves at Peterborough.

I HAVE been asked to notify readers in the Peterborough district that there is a move afoot to start a short-wave club there. Some of the local enthusiasts who hold transmitting licences have come to the conclusion that they ought to share the fun with some new blood, and the neighbourhood is known to bristle with radio possibilities. (Incidentally,

(*Continued on next page.*)

A SET NOBODY DARED TO TURN FULL ON

Kettering has a club going strong. And Peterborough—with a cathedral and all—can't take the dust of Kettering without making an effort.)

Readers who are interested in the project should get in touch with Mr. W. S. Elliott (G6LX), of 222, Eastfield Road, or with Mr. C. Smith, Kenec House, New Road, Whittlesey.

The scheme sounds good to me, and my advice is to get in on the ground floor.

Latest Lottery Luck.

FUNNY Old Mexico—where the picturesquely hatted hombres lean negligently against the saloon and watch the sheriff's posse gallop past and kick up a dust—is a land of luck. If you have a few pesos there to invest there are State lotteries, city lotteries, town lotteries, village lotteries, and lots of little lotteries all ready to give you a run for your money.

The only difficulty is to pick on the winning number. And when a sun-baked citizen of Santa Marta was asked how he managed to pick the prize-winning figures this year he astonished all and sundry by saying "*Radio!*"

While listening to his short-wave set, he had heard some stations sending figures, and he let the chance-heard numbers guide him when selecting from the book.

Red Sea Radio.

A BLOODTHIRSTY request has just reached me from young J. L., of Northampton, who wants to tune in trouble, and craves for news of where he should tune to find Addis Ababa's transmissions. Beyond the fact that this station has been heard on short waves recently I have no particulars at the moment of writing—a fact of which I am almost glad, for I do not share J. L.'s youthful zest for fishing in troublous waters.

It does seem, however, that war-like preparations of the future will always include short-wave radio. A wireless operator, to whom I was talking the other day, told me that the ether was simply buzzing with code messages down Aden way when his ship passed up the Red Sea. He said that the station at Massawa, on the coast of Eritrea, was the big noise. The messages are addressed to the Italian station at Coltano.

French Television.

IF all goes well the next few weeks should see the beginning of a television service from the Eiffel Tower, Paris, on seven metres. The standard of definition will be 180 lines, and the process will be conducted by means of a Barthelemy transmitter. The service is to be admittedly experimental at first, but it has been confidently asserted in Paris that a regular programme is assured in the very near future.

Another Paris development that is worth bearing in mind is the ambitious project to assemble all the scattered offices and studios of the various Paris radio concerns into a central broadcasting house, which is to be the main attraction of the Paris International Exhibition in 1937.

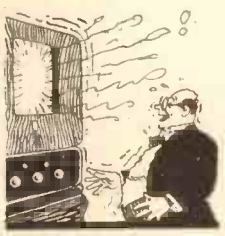
Flotsam and Jetsam.

THE crofters of Caithness, good easy chaps, have maintained their wonted calm with some difficulty of late. (*Did ye no hear the news, McPherson?*) It all started when a Swedish vessel got wrecked recently on an island in the Pentland Firth, and part of the cargo was washed ashore by the tide. General cargo, some of it, packed in large boxes that a wee bit crack with a big stone would open.

Some of the boxes contained apples, some motor tyres, and some, when opened, divulged complete radio sets. Nimble fingers pressed the switches, and lo! the metamorphosis of many a cottar's Saturday night.

World's Biggest Set.

WHY is it that although we hear from time to time of the world's smallest set, there is seldom anything in the news about its opposite number, the world's biggest?



Since the "P.W." Mars receiver, all the claims I remember have come from America, including the one for a millionaire's set which was affectionately known to its familiars as the World Wallöper. Its wealthy owner had no end of fun with this high-powered outfit, but it was a bit of a white elephant because nobody dared to turn the volume control full ON. At half volume it threatened the ear-drums; at three-quarters it shook the house.

One of the New York hotels has a set that drives about two thousand loudspeakers, providing them with six different programmes simultaneously, any one of which can be selected by the switch on every loudspeaker. Is this the limit, or is there a Louder-Still-and-Louder?

Berlin's Lead.

IN their determination to maintain the lead in providing practical television for the public, the Germans are planning to make Berlin the first city in the world to have a television news theatre in operation.

The Reich Film Chamber, co-operating with the news reel companies, aims to open in the Kurfurstendamm, Berlin, a film news theatre which will have the unique distinction of a permanent television projector.

Before the setback caused by the fire at the Berlin Radio Exhibition it was hoped that the apparatus would be installed by the end of this year. Now it is not certain whether the time lost on that occasion can be made up, so special interest will attach to the television news from Berlin in the next couple of months.

In Brief.

CATHOLIC sermons preached at St. Joseph's Church, Hong Kong, will be broadcast regularly from the new short-wave transmitter recently installed at the Hong Kong radio station.

* * *

The B.B.C.'s first official representative for the North American continent is to be Mr. Felix Greene. He will take up his new duties in New York towards the end of the year.

* * *

Germany runs an unusual radio feature on Tuesday evenings from Konigswusterhausen, the object being to assist listeners to investigate family names and pedigrees!

* * *

The number of visitors to Berlin's Radio Exhibition this year is officially given as 480,000. No fewer than 15,000 people passed the turnstiles on the day after the fire which destroyed part of the show.

Those Valves.

THE British Radio Valve Manufacturers' Association has recently made a welcome gesture to John Listener. On behalf of John, I doffs my headgear, pulls my forelock grateful like, and bows accordin'.

The welcome gesture is a concession regarding the guarantee accompanying new valves. Some time ago it was decided that valves sold in complete receivers should be guaranteed for three months. This guarantee has now been extended to include valves sold loose, and will cover failures due to faulty workmanship and material.

It will not, however, cover damage due to misuse, whether this is of an electrical nature (such as excessive voltage) or of the mechanical (knocked-off-the-table-and-hit-the-deck) type. It's now up to you to prove the date of purchase, so get a record and hang on to it.

Home Tragedy.

WE often hear of the beneficence of wireless waves, but I see that a New York lady has recently demonstrated that short waves can be home-breakers. She has succeeded in divorcing her husband, and she told the Supreme Court that there was no other woman in the case, but merely a short-wave set. He bought it eighteen months ago, and completely lost his head over it. Used to sit up with it at all hours, and spent money on it like water. Neglected his wife, became grumpy in the home, and got careless about his business—all of which, we must admit, was very reprehensible. But, oh, boy, *what* a set that must have been!

ARIEL.

WIRELESS and the THREATENED WAR

BY THE Rt. Hon. LORD STRABOLGI

THERE are wars and rumours of wars once more in the world.

An interesting by-product of the Italian dispute with Abyssinia has been the exposure of a wireless dictatorship. Who actually exercises this, and what are the forces at work, is not yet clear; but it is obvious that some irresponsible body is attempting both to prevent the use of wireless as an aid to peace and, in the event of war, to monopolise what should be an international news service.

The Italians are not to blame, as I shall presently explain, and they have already suffered.

Battles in the Ether.

It has for long been recognised that wireless is going to play an increasingly important part in international affairs. For example, there has been a regular wireless war going on for some time between Germany and Austria. The German propagandists have attempted to influence opinion in Austria against the existing government, and the Austrian propagandists have retorted in kind. It looks very much as if this has been the cause of the present extraordinary situation, for it is from Austria that the two important broadcast talks to which I shall refer have been interfered with.

There was a wireless war also two years ago in progress between Poland and Germany. Then the Polish and German Governments succeeded in patching up a truce, and there is now peace along the aerial frontier of these two important nations.

Interference from Austria.

But to return to the Italian dispute with Abyssinia the series of events has been as follows: Signor Mussolini's daughter is married to an Italian aristocrat, Count Ciano. The count has an official position in the Italian Government as a kind of super-censor and Director of Propaganda. He is at present in Eritrea, one of the Italian colonies bordering on Abyssinia, and the scene of a great concentration of troops and war-like equipment. On September 7th, Count Ciano attempted a broadcast talk from Eritrea. Whatever opinions we may have of Italian policy in North-East Africa, Mussolini's son-in-law was perfectly within his rights in speaking through the microphone from Eritrea on any subject he chose. There is no state of war yet. The relay of this broadcast was interfered with from an Austrian station.

In the absence of any more satisfactory explanation—and we can be sure the Italians will take the matter up—some person or persons in Austria decided that they would interfere with the wireless communications of an Italian colony.

The next event was on September 10th. It was announced that the National Broadcasting Corporation of America had

Are there certain forces at work endeavouring to prevent the use of wireless as an aid to peace? Our distinguished contributor thinks there are, and in this article proceeds to give his views on the matter. It should be clearly understood however that these are purely Lord Strabolgi's own personal views, and that the Editor does not necessarily associate himself with them.

come to an arrangement with an American society known as the Women's International League of Peace and Freedom, which has its headquarters in New York, by which the Empress of Abyssinia should give a talk in favour of peace from the little wireless station at Addis Ababa, the capital of Abyssinia. Addis Ababa has the only wireless station in that so-called backward country working on a wavelength

LORD STRABOLGI.

of 7,620 kc., with a power of 2 kilowatts. It was to have been relayed through London in the ordinary way, and listeners in this and other European countries, and also in the United States of America, would have heard the talk.

The Empress was to have spoken in Amharic, the language of the Abyssinian ruling caste. Her daughter, Princess Leilt Tsahai, speaks English, for she went to college in England and Switzerland. She was to have translated the talk as the Empress gave it. This broadcast was much looked forward to, for it was surely unique in the history of broadcasting, and I myself sat up to listen to it.

The talk was a fiasco.

The B.B.C. Declines.

At first the explanation given was atmospheric interference, but it now appears that there was a more sinister reason for the breakdown. As soon as the Empress began with her "Hallo, America" there was strong interference from the same Austrian station.

But now enters our own B.B.C. upon the scene. At the last moment the B.B.C. refused to co-operate or to assist in relaying the talk. There was some vague explanation about the Foreign Office feeling that this talk should not take place, and the statement was made that the talk was not being given at a propitious moment. These may be the official reasons, but in the absence of a more satisfactory explanation—speaking for myself and, I believe, for most listeners—this was an unwarranted interference with the rights of listeners all over the world.

Where Will It End?

Why should we not hear the Abyssinian case over the wireless? Any night we can hear Mussolini, Hitler, Stalin—not to mention our own politicians—if we choose to tune-in. The public, after all, are the best judges of what is good for them, and they want to hear all the facts and all points of view in this dispute, which may affect Britain and Britain's interests very intimately.

The National Broadcasting Company is a private concern, independent of the American Government, and the B.B.C. is supposed to be a public corporation serving all alike.

But where is this sort of thing going to end? Suppose there is another dispute between France and Germany. Are we not to be allowed to hear what leading statesmen in these two countries have to say? This is a matter of vital importance, because if there is another quarrel between France and Germany we might be dragged in,

(*Continued on page* 72.)

BARRY KENT CALLING

News and Views from the "Big House"

Arthur Bliss for the B.B.C.

FOLLOWING my exclusive announcement in last week's "P.W.," I am now able to say, also exclusively, that the new Music Director of the B.B.C. will be Mr. Arthur Bliss, and that he will take up his new duties early in 1936. Dr. Adrian Boult will continue as staff conductor of the B.B.C. Symphony Orchestra.

* * *

Sir John Reith's Future.

I am authorised on the personal authority of Sir John Reith to say that he will not accept the chairmanship of the B.B.C. in addition to the post of Director-General if, as is rumoured in political circles, the offer is made by the National Government. This is an important declaration by Sir John because it is an open secret that he was not ill-disposed to absorbing both jobs at the time the Corporation was formed, nine years ago.

* * *

Effects.

Listeners are beginning to "spot" effects. For example, several noticed that there was a striking similarity between the "native" effects used in the Gordon of Khartoum programme and the effects of the thriller "Black Vengeance," produced a few weeks ago.

The result is that Mr. Inglis has decided to hold a special effects listening session early in October. All recordings will be reviewed. In preparation for this review Mr. Chignell has been asked to compose music to correspond with the rhythmic sounds of trains. This is needed particularly in connection with fading.

* * *

American Clocks.

At one of the early variety meetings he attended after returning from America Mr. John Watt asked that the new scheme for the decoration of St. George's Hall should include provision of three American clocks with "sweeping hands," to be fitted at appropriate points on the stage. The suggestion has been accepted, which means that, as soon as the clocks are fixed up, the timing of variety programmes will be much improved.

In other words we are about to get a taste of the slick transition of the American radio product. This is all to the good. I shall wait with interest a parallel announcement that real "programme meters" are fitted in all studios under B.B.C. control. It will be only in this way that we shall get rid of the irritating and unnecessary gaps between programmes.

* * *

Canada and the B.B.C.

The Canadian Radio Broadcasting Commission has begun to re-broadcast daily the first half-hour of the B.B.C. Transmission Five programme to the Empire and the world on short waves. This is the first occasion of regular relay by an Empire broadcaster of national status.

There is much interest in Canada, and I hope the B.B.C. realises it is on trial in more senses than one. These relays will have to stand up to active American competition if they are to be retained as features for Canada.

* * *

Mr. Graves Takes Over.

Owing to the urgent international situation and military precautions relating thereto, Col. Alan Dawnay relinquished the controllership of B.B.C. programmes a fortnight ahead of the date planned. Mr. Graves actually took over on Monday,

Miss Mary Hamlin, the famous soprano, whose broadcasts are very popular.

September 16th. The transition was smooth and provided a striking rebuke for those who prophesied serious trouble. The moral is that B.B.C. programmes are now so regularised that they will go on whatever happens to personalities.

* * *

More Money for Programmes.

It is the fashion to circulate rumours about the recommendations of the Ullswater Committee which is still considering the future of broadcasting in Great Britain. I do not know what measure of truth, if any, there is in most of these rumours, but I do know for a fact that it has been definitely decided by the committee, and already accepted by the Post Office and the Treasury, that the B.B.C. is to have a very big increase of revenue specially marked for programmes.

As this was the best news we could expect from the committee and its work, nothing else matters much. Just as soon as the B.B.C. gets hold of the new money, we shall rightly expect results in the form of not only better but more programmes. I for one shall not be satisfied with the silent mornings so popular at Broadcasting House.

* * *

Regional Directors To Meet.

There is to be an unusually important meeting of Regional directors in October. It will be in Belfast, the place less susceptible to head office influence than any other of the B.B.C. centres outside London. The Regions are forming a new "front" for mutual protection. They are not at all sure about their future under the new organisation.

ON THE AIR

Candid comments by our broadcasting critic on recent programmes.

THE poorness of broadcasting during the summer reflects very badly on someone. And with this I will say no more. News Bulletins are, in my opinion, the only exciting things on the air just now. This is not due to the News Department at the B.B.C., but to the fact that things are happening in the world and look like keeping it up for a bit.

The League of Nations, the doings of the League Council, the Committee of Five, the efforts of Sir Samuel Hoare, Mr. Eden, Monsieur Laval, and other eminent statesmen of the world, make exciting news. We wait for the two bulletins each evening. We cannot say the same of any other broadcast fare at the moment.

* * *

Those Football Results.

To add to the interest of the recent bulletins, there have been stories of equally arresting nature. Huey Long gets himself assassinated, and Huey was a captivating personality. A famous jockey, too, meets with an accident on the eve of a big race. The incident shakes the racing community—and who is not of this fraternity?

* * *

Football results are here again to brighten the Saturday evening bulletins. We notice with dismay, however, that we are still made to wait for them till the very end.

* * *

"Friday the 13th," a radio version of the Gaumont-British film, by Lance Sieveking, was the only other big thing of the week, at any rate, before the event. Some listeners don't like Lance Sieveking productions for the amount of noise in them. Personally, I do appreciate his efforts to experiment with effects, though the results don't always please me. "Friday the 13th" was an unusual production. In the telling of the story there was a constantly recurring episode which I can only compare with the refrain of the song: "And the green grass grew all round, all round, and the green grass grew all round."

* * *

Tantalising Repetition.

This repetition was tantalising in the end, especially after it was obvious who the two people were who had lost their lives in the bus. The broadcasting was interesting enough, because in broadcasting we aren't accustomed to the peculiar form that the play took. The worst criticism I have to make of "Friday the

(*Continued on page* 74.)

From Our Readers

DOES THE ETHER EXIST?

Sir,—I was pleased to read your correspondent, R. L. James' letter in POPULAR WIRELESS, dated August 17th, 1935, upon the somewhat abstruse problem of the existence of the ether, and was very interested in the novel experiment carried out by Mr. Stewart, of Kew Observatory, which was described, never having heard of this before.

May I indicate first that my personal opinion is that the conception of the ether as some "mysterious, all-pervading fluid" should be relegated to the scientific mausoleum where repose such abandoned hopes as the "Flat Earth Theory," the "Phlogiston Theory," and the "Fluid Theory" of electricity! Indeed, since the failure of the Michelson-Morley experiment to detect the earth's motion through the ether, physics would appear gradually to have drifted away from such "cut and dried" pictures of natural reality, toward something which becomes increasingly abstract.

From Einstein's Theory of Gravitation, in which the suggestion is made that gravity is not as Newton supposed, a tangible "force" that "pulls"; but rather that it is due to a property of space to "warp" and assume a certain configuration around a huge accumulation of matter like the Sun, I am led to speculate whether it may be possible to attribute to space itself unsuspected properties which would include the faculty of wave propagation. Or perhaps the answer may come from a new definition of a wave.

The idea of an ether permeating atoms and molecules strikes me as becoming more farcical the farther one pursues it, since it seems to presuppose that atoms and molecules are hard, impenetrable "particles," whereas the researches of modern physics indicate that it is more probable that an atom, by reason of its electronic constituents, is itself a "wave-form." Which, of course, brings us back to the irritating though fascinating question: What is a wave, and when?

Finally, just how much of the foregoing "exposition" modern physical research warrants is uncertain, but much is merely conjecture—and, what is worse, *my* conjecture. However, I do feel that almost anything is better than assuming the void to be filled with an intangible and very indigestible "jelly." What do "P.W.'s" constructor-scientists think?

Yours truly,
E. W. J. Wright.

6, *Poulton Road, Fleetwood, Lancs.*

[*This letter wins the guinea prize offered by the Editor in accordance with the details on this page.*]

INTRODUCED BY "P.W."!

Sir,—You mention that, by writing to you, your readers may get to know each other through the medium of POPULAR WIRELESS. I think that my experience will prove this is very true.

At the end of 1931 a paragraph by "Ariel" on the advertising aspect of American radio brought a reply from Mr. W. Werner of San Diego, California, which was published in POPULAR WIRELESS. Being interested in the subject I wrote to Mr. Werner, with the result that he and I have since kept up a regular correspondence on subjects ranging from Mr. J. B. Priestley to mashed potatoes.

I would thank POPULAR WIRELESS for this introduction, for, although I have never seen Mr. Werner, I now know a great deal about him, and his letters have given me an idea of what America and Americans are like, and I only hope that I have given him similar information about England and the English, and that he has derived as much pleasure from my letters as I have from his.

Yours truly,
J. D. F. Tavendale.

34, *St. Agnes Road, Moseley, Birmingham*, 13.

SUCCESS FIRST TIME.

Sir,—It has taken me two years to pluck up courage enough to attempt experiments on the short waves.

The other evening I determined to build a one-valve set and see what happened. After dashing out before the shops closed to purchase a good S.W. choke and a sheet of copper foil I settled down to work on the proposed set. At 9.30 p.m. I had finished, to my mind, a fairly neat-looking job, and after checking up with the circuit I connected up and switched on. What a pleasant surprise was in store for me! I logged the following: E A Q (Madrid) on 30·43 m., C T 1 A A (Lisbon) on 31·25 m., 1 2 R O (Rome) on 25·40 m., and another which I think will be Pontoise (France), F Y A, working on 25·24 m. There were numerous Morse stations which I presume were amateurs, etc., but as I am not as yet acquainted with the dots and dashes, I hope to be able to identify them in due course. The coils I used were of my own making, and I shall now try some thicker gauge wire, as the stuff I used was rather thin.

The reason why I am writing to you is that the circuit which I am working is that published in your very valuable paper of September 15th, 1934, by W. L. S. The first results, from my point of view as a novice, are wonderful, and I hope to add another valve very soon, when I think that the detector stage is as perfect as I can make it.

I have, through your paper and W. L. S., got the short-wave fever, and I shall now only concentrate on these wavebands, as they provide by far the most interesting experiments in wireless. I am only sorry that I did not start two years ago.

Yours truly,
G. P. A. Brandshaw.

The Cottage, Wood Lane, Malin Bridge, Sheffield, 6.

ONE GUINEA FOR A LETTER!

AN INVITATION FROM THE EDITOR TO "P.W." READERS

I WANT readers of "P.W." to help each other. I want them to use the columns of this paper to express their views on all and every aspect of the great hobby of radio; I want them to "swap" experiences; I want them to tell about their triumphs—and their failures—with the various sets they have built. I want, in short, to encourage an exchange of views, opinions, likes and dislikes. . . .

Send me letters for publication, in order that "P.W." can become, more than ever, the best medium for imparting all kinds of knowledge about radio.

YOU must have had, many and many a time, interesting experiences when building or operating your set. Tell other readers about your radio experiences. And, incidentally, get to know each other through the medium of "P.W."

For the best letter out of each batch published I am offering a prize of one guinea. Send your letters to the Editor, "Popular Wireless," Tallis House, Tallis Street, London, E.C.4.

A WRONG CONNECTION.

Sir,—Having read with great interest of the phenomenon which occurred to J. Harris, whose letter was printed in your issue of September 7th, I wish to state that a similar thing happened to me, and after a careful examination I discovered that I had connected the earth lead from the wavechange switch to the wrong side of the on-off switch. Thus, when the set was switched off, I still had enough current leaking through the aerial coil to light a bulb across the filament terminals when the set was set for medium waves.

To this I must add a phenomenon that occurred two days ago. I had been working with earphones, owing to a breakdown with the speaker, and I switched on the set. As I did this my brother told me that he had disconnected the earphones. I called him something nasty, for I could hear that tinny squawk that denoted oscillation in earphones; but upon investigating I found that the sound came from an L.F. choke, which was connected as a tone-filter arrangement. My theory is that the laminations were vibrating with the pull from the coil, but perhaps I am wrong. Anyhow, it gave me a surprise. Here's luck to my favourite journal.

Yours truly,
S. Hetherington.

68, *Holborn Hill, Nechells, Birmingham*, 7.

[*Our correspondent's theory is correct; loose laminations do sometimes cause this puzzling phenomenon.*—ED.]

GOOD RESULTS FROM THE KELSEY ADAPTOR.

Sir,—The first wireless I ever built was a crystal set. It was not a great success, although I managed to get three or four stations. After that I built a two-valver.

With this I was not content. I wanted to get more stations, and so I decided to have "P.W." The first one I got described a one-valve set for economical long-distance reception. This was a complete success. I got all the foreign stations I wanted, and all at good headphone strength.

Having read all the short-wave articles I became immensely interested in them, and what was my delight when, on March 9th, the Everybody's Kelsey Adaptor was described—and for only a guinea! I got all the necessary parts, including the cigar-box, and assembled them. Ever since then I have been able to get remarkable results. It was simple to make and I am sure everybody who tried could succeed.

Yours truly,
A. Hughes-Chamberlain.

Murlingden, Northwood, Middx.

THE "SNAKE" CABLE

By J. C. JEVONS.

Some details of the latest method of handling high-frequencies over long distances by landline, and an explanation of the technical principles involved.

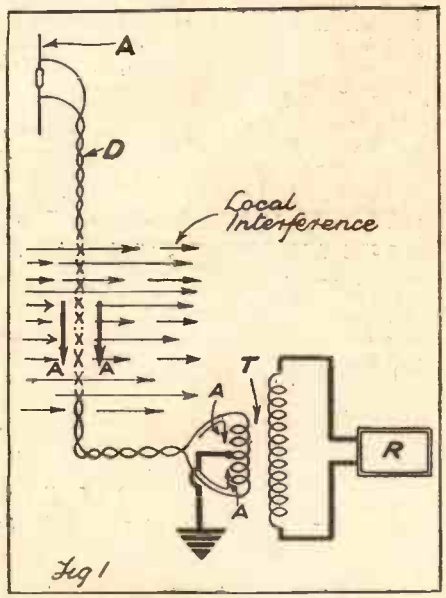
THE decision of the Post Office to install the latest type of "co-axial" transmission-line between London and Birmingham gives a pretty clear indication where the first provincial television centre is likely to be located. The new H.F. conductor is designed to handle a frequency band up to four million cycles, and will carry television pictures as easily as the ordinary trunk line takes the spoken word. It has been christened the "snake" cable, because its outer covering is a flexible tube.

The first long-distance line of the kind is now nearing completion between New York and Philadelphia, and the promptness with which the experiment has been followed over here shows that our P.O. engineers recognise it as an important link in the development of a national broadcast service of high-definition pictures.

Linking Up Stations.

The co-axial type of line has already been thoroughly tried out over short distances, particularly as a high-frequency coupling between an elevated di-pole aerial and a television studio on the ground floor. Its new function will be to link up a central studio—say in London, or wherever an event of national importance is being televised—to the outlying chain of provincial stations, so that a selected item can be distributed simultaneously over the whole country.

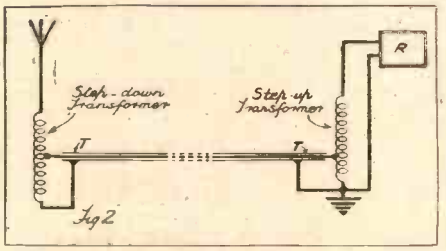
STATIC CANCELLATION



A scheme which cuts out artificial static in radio reception. A similar principle is applied to long distance landlines.

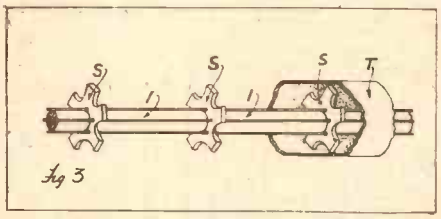
Actually, the new cable is an offspring of the old idea of transmitting several messages simultaneously on different carrier-waves over the same pair of telephone lines. This was the original form of wired wireless, and it has now been developed to handle "wired" television. For instance, when used as a "multiplex" trunk-line, the "snake" cable will carry as many as two hundred different telephone messages at the same time without mutual interference or cross-talk. For this reason alone it is expected to reduce the present cost of long-distance telephone calls.

TECHNICAL DETAILS



This shielded aerial-coupling involves the basic idea of the "snake" cable.

The action of the cable as a carrier of high-frequency currents, such as are used in multiplex telephony—and in television—is very far removed from the behaviour of the ordinary line-circuit used for low-frequency signalling.



The physical construction of the cable is shown in this drawing.

The first telegraph line was a single wire connecting the transmitter with the receiver. When both ends of the line were grounded, it was found that the "return" current travelled back through the earth just as easily as if a second wire had been provided. But for long-distance working, the earth return soon turned out to have definite disadvantages. For certain reasons—some of which are even now not fully understood—different parts of the earth develop different potentials, and so give rise to "natural" earth currents. These vary from place to place and from time to time. During what are known as electric storms they completely "mask" the signals.

The Cause of "Cross-talk."

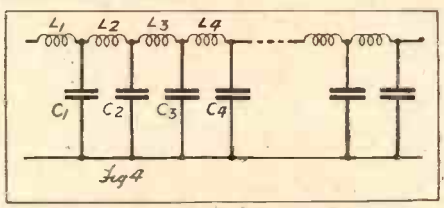
For telephony, too, a double line, or "all-metal" circuit, is absolutely essential. Apart from the interference due to "natural" earth currents, the return signals, if fed back through the earth, tend to spread out in all directions, and so give rise to "cross-talk." According to modern practice the outgoing and return lines are systematically spiralled or "crossed-over" each other, with the object of making any inductive pick-up develop equal voltages in both limbs, so that it is automatically balanced out.

Much the same idea is, in fact, now being used to cut out artificial static in wireless reception. For instance, the elevated short-wave aerial A in Fig. 1 is shown coupled by a two-wire transmission-line or down-lead D through a transformer T to the distant receiving set R. If the down-lead passes through a field of local disturbance (indicated by the horizontal arrows), the induced "interfering" currents will flow through both limbs of the wire in the same direction, namely, that shown by the arrows A. Such currents will oppose each other in the primary winding of the transformer T, and so will be cancelled out.

A Dual-function Down-lead.

On the other hand, signal currents from the aerial flow through the down-lead wires in series, passing down through one and up through the other, so that the full signal voltage is fed through the transformer windings into the set. The down-lead, in fact, acts as a single wire to local interference, which it by-passes to earth and, at the same time, serves as a double transmission line to feed the aerial currents into the set.

The ideal coupling between an elevated aerial and the distant set is approached when one conductor completely encloses the other, as shown in Fig. 2, because when the outer tube T is earthed, it completely screens the inner core. Here we are, in fact, coming very close to the snake-cable, which is shown enlarged in Fig. 3. It consists of an outer tube T carefully spaced and insulated from an inner core. The H.F. characteristic of the line is governed by the relative dimensions of the centre core and of the outer tube, and by the spacing between them, the latter being maintained constant by threading insulator discs, of the shape shown at S, at frequent intervals along the length of the tube.



Electrically, the cable must be considered as a series of inductances shunted by capacities.

The first thing one learns in handling high-frequency currents is that every bit of wire, no matter how short, possesses a very definite inductance. Similarly, an appreciable capacity exists between any two conductors placed in close proximity with each other.

A snake-cable carrying high-frequency currents cannot therefore be regarded as two simple conductors. Electrically it is the equivalent of the network shown in Fig. 4, which is drawn to show that every inch of its length opposes the passage of the current by inductance, whilst at every part there is a shunt capacity waiting to be charged up.

Followed in detail, a high-frequency current flows along the line in what can best be described as a "surge." The current

(*Continued on page* 72.)

No. 2 IN OUR NEW SERIES:

THE "P.W." LIMELIGHT ON THE MARCONIPHONE MODEL 235

The novel and attractive cabinet design is enhanced by the moon-shaped tuning dial.

WHEN one is faced with the pleasurable task of writing about a set that is superlatively good, there are a hundred and one different ways—all of them convincing in their own particular sphere—in which the instrument can be introduced. One can eulogise about the number of stations that it gets; about the quality of reproduction that it gives; about its appearance or its price; and so on.

But really to do justice to a particular design in the minds of those to whom his remarks are primarily intended to appeal, the reviewer must first determine to what extent his readers are influenced by technical generalities. And the only really honest conclusion to which he can come is that the average broadcast listener—as distinct from the great army of home constructors—is interested in one thing, and one thing only—broadcast entertainment.

All those little things which convey so much to those of us who are technically minded are but side issues to the listener who is concerned only with listening. He wants entertainment, and it would seem that, barring considerations of cost, he doesn't really mind by what means he gets it so long as he *does* get it.

Choosing A New Receiver.

And that, of course, is where the difficulty arises. When faced with the task of choosing a new receiver with perhaps little or no technical knowledge to guide him, upon what can the average listener base his choice? It would seem that he can only be interested in appearance, in price, and perhaps, above all, in the reputation of the firm with whose products he is concerned.

Well, he might do worse than pause to consider these aspects—particularly the last one. But in an era when such a large percentage of the community is interested in broadcasting are these considerations alone sufficient? We think not. We believe that what is wanted is an authoritative test report written not in technical language but in everyday terms. A report, in fact, which anybody and everybody can easily understand.

We make no apology for this preamble, for in the observations which follow concerning the Marconiphone Model 235, the careful avoidance of technicalities may give rise to the thought that the set has not been subjected to our usual rigorous testing procedure. Nothing could be farther from the truth, for this set, as with all receivers that are submitted to us for test, has been subjected to the most exhaustive tests possible, and it is upon the results of those tests that our conclusions are based.

Bearing that important fact in mind, the reader will be able to appreciate to the full the significance of our remarks when we say that no set has ever justified the description of radio for the connoisseur at everybody's price more than this new Marconiphone masterpiece.

It is a brilliant piece of work—typical absolutely of the enterprising organisation that is behind it—and likely to carry the prestige associated with the name of Marconiphone to even greater heights.

Wonderful Value For Money.

The Marconiphone Model 235 is a three-valve all-electric design for operation on A.C. mains. But its performance is such that without this knowledge one might have considerable difficulty in believing that it was only a three-valver.

But we do not wish to overstate the case any more than it is our desire to underrate it. At the almost impossibly low price of 8½ guineas the set cannot fail to impress all who hear it, without any garnishing by us. But at least we feel justified in stating that it is one of the best, if not *the* best 8½ guineas' worth that we have yet come across.

In so far as its station-getting capabilities are concerned it would not be correct or even fair to compare its performance with that of a good modern superhet which would inevitably be much more expensive. But then again it isn't everyone who wants a set that will get every station in Europe when, having regard to the congested state of Europe's ether, so many of them are not worth listening to.

All that seems to be required by most ordinary listeners is a set that will provide above all first-class quality of reproduction of the local stations, with just sufficient alternatives always to ensure a reliable change of programme. In other words, a receiver that is capable of giving "local station quality" on perhaps twenty or so stations.

An Extremely Good Range.

Such a set is the Marconiphone Model 235, although it must in fairness be said that its station-getting abilities do not end there by any means. Used under averagely good conditions, there are few stations in Europe that it will not bring in provided it is used properly.

But it is our considered opinion that the average listener is not concerned with that aspect of the set's performance, and is much more likely to be impressed with the fact that the set can be relied upon always to provide a change from the locals.

That is an important consideration but, even so, in our estimation it takes second place to the question of quality of reproduction. We regard quality almost as the "enjoyment factor" of a set, and in this connection we are unstinting in our praise of the Marconiphone Model 235.

The fidelity of reproduction that it gives is undoubtedly one of the most impressive features of the whole design.

"The Real Thing."

The quality is really excellent—in fact, a most striking exemplification of the Marconiphone slogan "the Real Thing." It is indeed the real thing when you are listening to this set, and the almost complete absence of background noise is a joy. From the quality point of view, we very definitely give the "235" top marks.

A NEAT CHASSIS

TECHNICAL—SPECIFICATION

GENERAL DESCRIPTION.—Three-valve (excluding rectifier) all-electric table model receiver for operation on A.C. mains.

CIRCUIT ARRANGEMENT.—Screened grid H.F., detector, and power pentode output. Output is controlled by sensitivity adjustment which varies bias applied to H.F. valve (Marconi V.M.S.4B.). H.F. coils are "bank-wound" Litz windings ensuring a high degree of selectivity. Detector (Marconi M.H.41), which is completely screened, is resistance-capacity coupled to last stage, which is a 3-watt output pentode (Marconi N.41).

CONTROLS.—Four in number (excluding mains on-off switch), comprising main tuning, (top centre) reaction (left), wave-change switch (bottom centre), and volume (right). Volume control has a click position at the middle of its travel which sets the sensitivity of the arrangement to its optimum value for average conditions.

SPECIAL FEATURES.—High quality of reproduction; calibration of tuning dial both in wavelengths and station names, and distinctive modern appearance of cabinet. (This is finished in black leatherette with chromium fittings and controls.)

CASH PRICE AND HIRE-PURCHASE TERMS.—8½ guineas, or 18/6 deposit and 12 monthly payments of 15/-.

MAKERS.—The Marconiphone Co., Ltd., Radio House, Tottenham Court Road, London, W.1.

NOTE.—This set can also be obtained in an attractive console type cabinet for 12½ guineas. The console version is known as the Model 240.

WIRELESS LINKS FOR REPORTERS

How compact short-wave apparatus is being increasingly used for commentaries on items to be broadcast.

How the radio reporter works. The transmitter is entirely complete so that the engineer and commentator are free to go anywhere.

IT has always been the endeavour of the various European and American broadcasting organisations to make the so-called microphone reporter as independent from cables and land lines as possible. Obviously the ideal reporter would be the man who walks about with a buttonhole microphone and a tiny coat-pocket transmitter. Present development has not quite reached this stage yet, but big strides are being made. In America, for example, a small transmitter is strapped to the reporter's back. In Germany similar equipment has been developed along independent lines, and is in constant use.

Completely Self-contained.

The German equipment, which is manufactured by Telefunken, consists of two types. The one is a 0·4 watt station with a range of about three-quarters of a mile over even ground, and the second a 10 watt transmitter with a range of from three to seven miles. The 0·4 watt equipment is entirely portable and if needs be the reporter can carry it all himself.

The 10 watt transmitter is intended for use in aeroplanes, in railway trains, or in boats and ships where a more powerful station is required to bridge a larger gap. A suitable receiving station is the natural complement to each of the transmitters.

In Germany the receiver is very often placed in one of the broadcasters' mobile recording vans, and records are made close to the scene of the O.B. They can then be rushed to the broadcasting house by special messenger for transmission a few hours later.

This is a brief description of the units: *The 0·4 watt station* has two fixed wavelengths, 49·0 and 50·2 metres. The transmitter is crystal controlled and has two stages. It employs a short vertical umbrella-type aerial, and is fed from batteries housed in a separate case. The receiver is a 6-valve superhet. The range is about three-quarters of a mile.

The 10 watt equipment has a range of from three to seven miles, and can operate on any wave between 85 and 115 metres. The transmitter has a master oscillator and the wavelength can be altered continuously. It receives its current from a small converter-set fed from a motor-car or motor-boat 12-volt accumulator battery. The aerial is a single wire of from eight to twenty-two yards in length.

The receiver is a six-valve superhet using a short one-wire aerial. It is fed from batteries contained in the same case.

A Two-way Outfit.

Telefunken also have produced a combined short-wave transmitter and receiving-set for two-way point to point telephony (not broadcasting) communication on the same wavelength. The waves used are between 60 and 100 metres. The current for these stations is supplied from a hand-driven dynamo set which makes it entirely independent of batteries. The equipment can be used for telephony communication between the reporter and the base, especially as the range is eight to ten miles. But, of course, a larger staff of men is then required, and the whole outfit becomes cumbersome.

A. A. G.

A GRACIE FIELDS SURPRISE

THE cinema organ has not received a very great deal of attention from the recording companies in spite of the popularity of that pulsating instrument. Why more has not been done I cannot say, but evidently one company has decided to remedy the deficiency: Synchrophone Ltd. Admittedly their records, the Octacros, are made for the use of cinemas, but they are available to the general public, and they have just turned out a batch of organ records of popular numbers which I can recommend. They have been made by Frank Newman on a Christie organ at the Plaza, Rugby.

Here are some of the numbers of the discs that I recommend for your attention: 1169, 1171, 1172, 1173, 1174, 1177, 1178, 1179, 1180, 1182. And the items include *Musical Comedy Favourites, Memories of Grand Opera, George Gershwin Selection, Bird Songs at Eventide,* and *Love's Last Word is Spoken.* Enough to keep you going for a long time and a most welcome change from the usual dance band and light orchestral recordings of these types of numbers.

Well, after a spate of cinema recordings here is one of Gracie Fields' records—a surprise even for the hardened critic. Gracie has been a regular H.M.V. artist for so long that we were apt to take her regular appearance in the lists as a matter of course. But now Regal Zonophone have released four records of her famous hits, ranging from *Sally* to *One Night of Love,* which she sings as only Gracie can.

The four records make a superb selection ranging through the various styles of which our leading comedienne is capable. And the total cost is four shillings. What a bargain for all you Gracie fans! Here are some of the numbers and the details of the discs. *Love is Everywhere* (MR1793); *Shall I be an Old Man's Darling?*—this is one of Gracie Fields' best comedy records, I think—(MR1794); *Sally* (MR1791); *One Night of Love*; with *You and the Night and the Music* (MR1792).

* * *

Or perhaps you want one or two good piano records of light music? Then what about Regal Zonophone *Big Film Medley,* by Jack Wilson? It includes selections from "Roberta" (did any film ever contain so many hits?), "Sweet Adeline," "Gold Diggers of 1935" and "Sweet Music." The number is MR1775.

Another good piano record is by the Tiger Ragamuffins, those two expert ivory ticklers of Harry Roy. It is a *Waltz Medley,* and though I did not enjoy it quite so well as I have done their other recordings, it is undoubtedly a good bit of work. A Parlophone record, of course, F208.

* * *

Pat Hyde is on Parlophone again this month with her Swing Music. I told you what I thought about Pat some weeks ago, and if you got the record I then discussed you will no doubt want this one. The number is F215 and the items on it are *Louisiana Fairy Tale* and *Music Puts Me in the Strangest Mood.* Tuneful and excellently orchestrated, to say nothing of the vocal efforts of the popular Irish artist. You will like the saxophone and trumpet combination on the former number if you like the crooning type of slow foxtrot.

* * *

One of the outstanding features of the Decca list that I have just received is the inclusion of records of some very fine "standard" music. For instance, we have Gluck's "*Alceste*" *Overture,* Mozart's *Piano Concerto in A,* Beethoven's *Kreutzer Sonata for Violin and Piano,* and Brahms is represented by his *Variations on a Theme of Haydn.*

I can specially recommend the Beethoven records for sheer enjoyment. They occupy CA8207-10 inclusive, and the artists are Kulenkampff and Kempff.

* * *

The film stars are taking to the records in ever increasing numbers, and Decca and Brunswick have recently further expanded their already formidable list. Irene Bordoni, Irene Dunne and Anna Neagle are to be found in the latest releases. And from other spheres of art Decca and Brunswick have annexed Reginald Foort, the famous cinema organist, Reginald Foresythe and his orchestra, and Kathleen Long and the Boyd Neel Orchestra.

SOME FILM STAR RECORDINGS

Enthusiasts of the famous *Serenade to a Wealthy Widow,* with which Foresythe made his name, will welcome two of his latest pieces of modern rhythm; *Landscape* and *Homage to Louis Armstrong.* They are not everybody's meat, and your rhythmic tastes have to be pretty well developed to stand this record. But *Landscape* has been acclaimed by those "who should know" (whatever that may mean), so there you are. For those who are not

(*Continued on page 74.*)

ON THE SHORT WAVES

AERIAL NOTES.
W.L.S. tells readers some valuable facts about aerials and advocates the use of a long one where possible.

IT is a great pity that somebody once upon a time discovered that short-wave signals could be received, after a fashion, on "any little bit of wire." His astounding discovery may never have been taken seriously by the technicians; but, as a result of it, the short-wave receiving aerial has never has a square deal amongst the fraternity of listeners.

Beyond coming up against a beastly dead spot in the tuning and saying "Oh, that's the aerial!" the average short-wave man never seems to give his aerial system a thought. I wonder whether even now he realises one of the main difficulties? This is, briefly, that he has to cover such a huge range of wavelengths with his receiver that his aerial assumes all sorts of different aspects as he tunes up and down the spectrum.

Even if your set doesn't exhibit dead-spots or the other extreme—a tendency to oscillate violently on certain settings—the chances are that you receive much better signals on certain parts of the spectrum than on others. It is undoubtedly your aerial that is responsible, too.

The Ordinary Single-Wire Type.

Suppose we consider an ordinary single-wire aerial about 60 feet long—an arrangement that must be in use in hundreds of cases. Its length, expressed in metres, is something rather fewer than 20, but we will think of it as 20 metres to simplify matters. In the old days we should have said that this aerial had a "natural wavelength" of 40 metres; nowadays we talk of it as a "half-wave" arrangement at that wavelength.

At 40 metres the effect of the aerial will simply be that of a parallel resistance across the tuned circuit to which it is attached. If the aerial is very tightly coupled to the grid circuit of the detector, 40 metres will be about the only point at which satisfactory operation will result.

Generally speaking, however, when coupling is fairly loose, as it always should be under modern conditions, an aerial 20 metres long will behave quite well in the regions of 40, 20 and 10 metres, where it is acting as a half-wave, full-wave and "double-wave" aerial respectively. The points at which trouble will start are those at which it becomes a three-quarter-wave, five-quarter-wave, etc.

In other words, several of the odd wavelengths in between the multiples and submultiples of the length of wire will be marred by dead-spots, instability, etc. My own aerial is about 21 metres long, and I find that the worst spots on the spectrum of my receiver (if I dispense with H.F. and couple the aerial too tightly) occur at about 33 metres and 13–14 metres.

The aerial has, of course, been designed for use in the amateur bands, and 42, 21 and 10 metres are therefore very good on the system.

The average short-wave listener wants to get good reception, not only on these bands, but on 49, 31, 25, 19 and 16 metres as well, so that he's well and truly up against it unless he uses a separately tuned aerial circuit all the time.

I can't suggest a remedy because it's plainly impossible to put up one length of wire that will behave well at all these wavelengths. One reader, strangely enough, has put up quite a short di-pole arrangement, as shown in Fig. 1, and he finds that by tuning the feeders he can obtain good performances from it on practically any wavelength.

A SCHEME USING TUNED FEEDERS

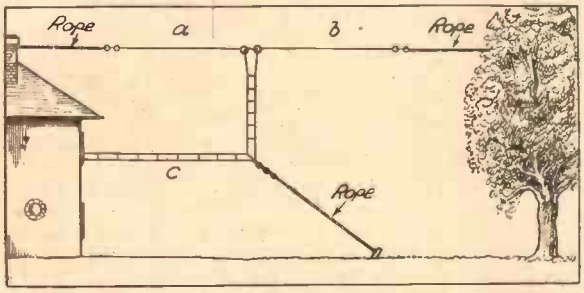


Fig. 1.—With this aerial a reader finds that, by tuning the feeders, he can get good results on all wavebands.

No Dead-Spots.

This is all wrong in theory, as it obviously can't be operating as a proper di-pole at more than one or possibly two frequencies. But he does claim absolute freedom from dead-spots, and he doesn't notice that his set is more sensitive on some bands than others.

Another reader reports marvellous results with the rather extraordinary aerial shown in Fig. 2. It is a kind of sideways "T" aerial, but the top of the "T" has a slant on it. He tells me that he has tried sliding this part about at all angles, and has finally settled down to the arrangement shown, with the top of the "T" inclined at about 60 degrees to the horizontal.

How on earth the thing works I don't know! The top of the "T" is 30 feet (i.e., "A" and "B" are 15 feet each) and the feeder "C" is about 35 feet. Will somebody try this out and tell me how it works, or, better still, *why* it works?

THIS SIDEWAYS "T" AERIAL WORKS WELL

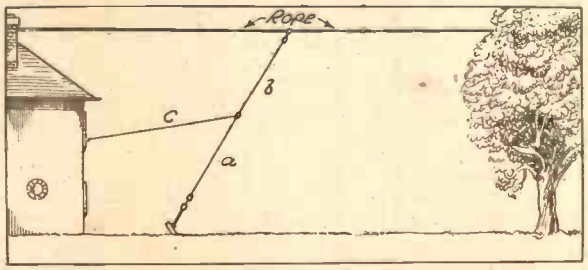


Fig. 2.—Another strange aerial used by a reader, which, against all theory, provides excellent reception.

Use Loose Coupling.

Coming back to the question of the straight wire and the most suitable length, it is a good general rule to get up as long an aerial as you can without running foul of trees, gutters, chimney-stacks, etc., and then to compensate for its length and its high capacity by using very loose coupling to the receiver.

A shorter aerial, naturally, will require very tight coupling if good signal-strength is expected from a small set (as it always is), and not only will the mere fact of the tight coupling increase the tendency towards dead spots, but the fact that the aerial is short will mean that there are more chances of dead spots within the tuning range.

The whole problem may be summed up by saying that any aerial of fixed length will exhibit large changes of impedance as the frequency of the tuned circuit to which it is coupled is varied.

The use of an indoor aerial, generally speaking, is very undesirable. It will be short (which means low signal-strength unless tight coupling is used) and it will be screened (which means low signal-strength, anyway). I am sure that half the bad cases of dead spots, hand-capacity, instability, etc., that come my way are caused by the use of a poor indoor aerial with very tight coupling.

ON THE SHORT WAVES.—*Page 2.*

Points from the POST-BAG

W. G. M. (Southampton) breaks a long silence with an interesting letter on conditions and experiences. He comments on the tremendous increase in the amount of telephony on the amateur bands these days, and says, "I never have a spell at the dials without logging the U.S.A. these days—in fact, just lately the 20-metre band is simply cluttered up with them."

He remarks that my prediction, some time ago, of the probable trend of conditions in accordance with the eleven-year cycle, has proved remarkably correct. He has my "prophecy" curve pinned up on the wall of his den, and watches points as they arrive.

Other interesting points in W. G. M.'s letter, in brief, are: Europeans coming in quite nicely on the 10-metre band; Australians heard occasionally late at night on 20 metres; and V P 5 I M (Jamaica) wants reports from England on his 20-metre telephony.

A Question of Conditions.

J. B. (Bolton) says nice things about the "B.C.L." Two, but thinks it must go wrong in the daytime. At night everything is grand. Well, J. B., daylight conditions have not been frightfully good lately, but the daylight hours, of course, mean listening on the shorter wavelengths, and it is possible that the set is deficient in some way when you get down there.

Receiving Radio Luxembourg on the short waves, however, is certainly a new one on me, and I don't know what's happening unless you're getting a kind of super-Luxembourg effect from some other station!

C. P. (Glamorgan) is puzzled because he sent a report to Rome and it was returned to him unopened, marked "Refused." It looks as though Rome's recent request for verifications has resulted in the reception of more than they can deal with.

W. S. L. (Hatfield) is interested in radio as applied to the field of aviation. He has studied the Morse code and now wants a simple set on which he can receive all sorts of Morse to improve his speed and keep in practice.

I suggest, W. S. L., that you turn back to the July 6th issue and build the "Simplex" Two. That will receive at good strength (too good sometimes!) all the short-wave Morse that's going, and you can either obtain the parts separately or buy a complete kit.

The Best Method.

I certainly think that a short-wave set is the most suitable means of becoming really "hot" at Morse. In the amateur bands alone you have all speeds and all kinds of sending to choose from. Don't forget that the real "pro." must be able to copy the most excruciatingly bad sending as well as the fast, perfect stuff!

G. W. G. (Ipswich) reports conditions very much better than of late, and seems to be having quite an exciting time. He is now using a triple-range wavechange coil, and insists that it is as efficient as separate plug-ins. He has been careful to keep all wires as short as possible.

He inquires, apparently innocently, why it is that one may keep a vacuum-cleaner or some piece of apparatus which causes serious H.F. disturbances without a transmitting licence, and yet has to have a licence for a very low-powered transmitter which doesn't cause the smallest fraction of the interference.

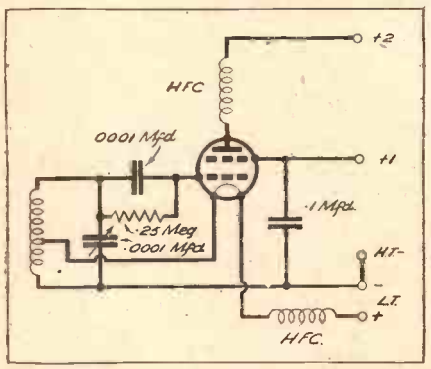
Good Reception from Sydney.

It is rather hard, certainly. How about fitting a Morse key in series with the vacuum-cleaner one day? I bet the G.P.O. would insist on a transmitting licence for it then!

H. J. B. (Manchester) is another one who has returned to the fold after a long time. He finds Sydney (V K 2 M E) best of *all* the D X stations, including the Americans, and gets Radio Normandie (harmonic, of course) at beautiful strength just below 40 metres.

If your noises on 20 metres are getting really bad, H. J. B., I should certainly advise you to use a screened down-lead or some similar system of noise-reducing aerial. I think you will find that it helps a little, at any rate.

A SIMPLE OSCILLATOR



Stability is a feature of this "electron-coupled" oscillator. Note the filament-lead H.F. choke, which is an important component.

K. G. (Garrowby) asks for a circuit of an "electron-coupled" oscillator. Here it is, K. G., on this page. It is a very stable circuit, but you mustn't take liberties with the filament choke, which should consist of about 50 turns of No. 18 or 20 wire. You may need to increase the battery voltage until you get a genuine 2 volts across the filament. If you use a mains valve the difficulty will not arise. If you try it don't forget to write and let me know how you get on with it.

SHORT-WAVE NEWS

THE B.B.C. has often been criticised by overseas listeners for refusing to issue verifications, as such—that is, cards or letters indicating that the listener concerned really *has* picked up the transmission to which their report refers.

It has now pointed out officially the reason for this. In a letter to the radio editors of overseas journals, Mr. Malcolm Frost calls attention to the fact that in many parts of the world newspapers and radio clubs are offering prizes to listeners who report the greatest number of stations.

Since the B.B.C. programmes are circulated in advance, a letter from a listener, stating that he heard such and such a programme at a certain time is, to put it bluntly, no proof whatever that he *did*. In the case of other stations it may be, but not with the B.B.C.

Empire Station Schedules.

Result—no "veri's" from G S A, G S B, etc., although all letters are dealt with and answered separately.

From the end of September onwards the Empire station schedules will be as follows: 7.15–9.20 a.m., G S D and G S B; 11 a.m.–1.45 p.m., G S G and G S F; 2 p.m.–5 p.m., two out of G S G, G S F, G S E, G S B; 5.15 p.m.–9 p.m., three out of G S I, G S D, G S L, G S B; 9.15 p.m.–10.45 p.m., two out of G S C, G S B, G S A; 11 p.m.–1 a.m., two out of G S C, G S B, G S L; 3 a.m.–4 a.m., two out of G S D, G S C, G S L.

This all sounds very complicated, but there are three transmitters and over a dozen call-signs and wavelengths available, so it cannot be avoided. The wavelengths may be found in any published list, so I needn't waste space by listing them.

Elaborate steps are being taken by the New Zealand Broadcasting Board to permit the local re-broadcasting of the commentaries this winter on the Rugby matches between the "All Blacks" and England, Scotland, Ireland and Wales.

It is even proposed to establish an additional receiving point in Australia as a precautionary measure, in case receiving conditions are not favourable in New Zealand. I mention this because it is pleasant to hear that New Zealand is so keen. It may even blossom out with a high-powered short-wave station one of these days.

Recent activities of the Anglo-American Radio and Television Society, which reached me too late for earlier publication, included a visit to Brookmans Park and the second private dance and social. Dancing to music from America was a feature—it is becoming quite a habit with these folk.

The A.-A.R. & T.S. Dance Orchestra recently broadcast from Radio Normandie and can probably claim to be the first Radio Society orchestra, let alone the first to broadcast. Other societies, please note!

Celebrating its Sixth Birthday.

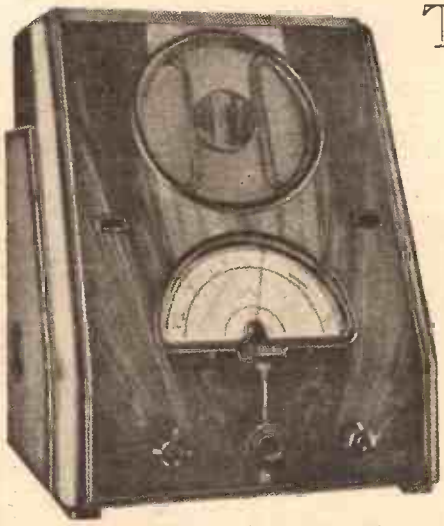
The International Short-Wave Club celebrates its sixth birthday in October, and several short-wave stations all over the world are co-operating by broadcasting special programmes in connection with a special Birthday Contest which has been organised. I hope to be able to give full details before the actual dates draw too near. With all these stations on the air for the express benefit of short-wave listeners, October ought to be a pretty interesting month.

Full particulars are available from Mr. A. E. Bear, 10, St. Mary's Place, Rotherhithe, S.E.16.

W. L. S.

THE PARIS RADIO SHOW

Elaborately decorated stands and waxwork figures of radio personalities were features of the Twelfth International Radio Exhibition in Paris, which is described on this page.



A typical French receiver. It is the Ergos nine-valve all-wave mains receiver.

By Our Special Correspondent.

AFTER visiting Radiolympia and the Berlin Wireless Show I have now spent two days at the Grand Palais, where Paris has been holding its Twelfth International Radio Exhibition.

Two days was a day and a half too much, for it was possible to see everything worth seeing of the Paris Show in a few hours. Don't let me give a wrong impression, however, for although I saw it all so quickly, Paris had actually a greater number of stands than we had at Olympia. The difference was that there were fewer additional exhibits—such as the Post Office, etc.—and no Broadcasting Theatre. Moreover, it was planned so that one could easily walk around and examine each stand without fear of missing anything.

An Artistic Sales Room.

Radiolympia's great virtue was, in my opinion, that it was essentially an exhibition designed to show off Britain's radio sets to the maximum advantage. Berlin, on the other hand, was a vast showhouse with the radio sets there as if by accident, while the Grand Palais was just an artistic sales room with typically French decorations done, in many cases, by artists of renown.

The pains which the 225 exhibitors took over their decorations astonished me. I saw some of them at work the day before the exhibition opened, and it was obvious to me that they thought far more of the appearance of their stands than of the sets they wanted to sell!

Just as the Broadcasting Theatre was the great attraction at Olympia and the Television Hall, in Berlin, so Paris had its waxworks feature. This was a sort of Broadcasting Tussaud's depicting famous broadcasting stars and radio producers at the microphone or at work in their offices. Paris found this an interesting novelty and the French newspapers delighted in publishing photographs of workmen carrying the famous Mistinguett on their shoulders or perching the Sir John Reith of French broadcasting on the back of his chair.

State Broadcasting Exhibit.

Another special feature was the hall devoted to the State broadcasting network, giving plans and diagrams to show how the listener receives his programmes, scale models of the various stations and a series of interesting charts. These charts showed, among other things, that France has 2,009,777 registered listeners and can thus claim to have the third largest listening audience in Europe, Britain having the largest and Germany the second largest. At the same time France has 25 broadcasting stations with a total power of 1,240 kw. compared with Germany's 907 kw. and Britain's 600 kw. (Russia, incidentally, employs a total of more than 1,600 kw. for her radio stations.)

Turning now to the individual exhibits it seems that French sets are very much the same as our own, but not always so well built. They are dearer, too. A 4-valve universal mains super-heterodyne, which would cost 12 gns. in England, costs £23 in France.

The exhibition, by the way, was open to manufacturers of all countries, and I noticed quite a few British, German and American sets there. In fact, I thought the apparatus of these three countries superior to those of French manufacture.

Nevertheless, the French sets definitely scored on cabinet work, some very artistic designs being available on even the cheaper types of sets.

Pathé made very effective use of polished copper on their cabinets and I found this a pleasant change from the now familiar chromium plating.

A few years ago there was a fashion at Olympia for designing sets to appear as anything but what they really were. I remember there used to be sets in book-cases, in cocktail cabinets and even in beds.

This year Paris has all these and more also. I saw sets hidden in clocks, in lamp standards, in bowls of flowers, and actually one inside a bust of Julius Caesar!

All these worked well and—for those who like such camouflage—seemed attractive propositions. A particularly interesting instrument was the "Chronovox," which consisted of a set inside an electric clock which showed the date and month as well as the time. In the event of the electric light mains failing, there was an emergency battery inside which could keep everything going for 48 hours.

Sets made by L.M.T. had a novel loudspeaker device (which I believe has been used in U.S.A.) to flatten out the frequency-response curve. Four round holes, about 1½ inches in diameter, are made in the baffle-board and filled at the back by four cardboard or composition tubes several inches long. It is claimed that some of the accentuated notes "short circuit," as it were, through these tubes which can be adjusted to allow various frequencies to escape.

Advances in Car Radio.

Car radio has received a tremendous impetus in France owing to the fact that it is fitted in practically every Paris taxicab. Equipment for cars is considerably dearer than in England, however; the average car radio costing about £20 in England being at least £30 in France.

Many car sets are transportable, that is to say, they can be easily lifted from the car and used indoors as all-mains receivers. Such is the Citroën, which is a compact 6-valve A.C. mains super-heterodyne with special converter attachment for use when it is in the car.

Valves are practically the same price as in England, and all familiar ranges, together with American and German ranges, are available.

Osram, for instance (marketing as "Gecovalve"), have on sale identical types to those they have over here.

Taken as a whole the exhibition did not strike me as being productive of many interesting technical developments. The reason being, probably, that international patent agreements now allow manufacturers all over the world to use the same circuits and inventions under licence.

A DUAL-PURPOSE SET

This compact Citroën receiver can be used on a motor-car or as an ordinary indoor receiver.

FOR HOME CONSTRUCTORS

MESSRS. A. F. BULGIN and Co., Ltd. are well known to home constructors for the way in which they are always bringing out some new item. Maybe it's just a new type of connector, or perhaps a new coil, but whatever it happens to be it usually seems to meet some special requirement in a most satisfactory manner.

And this is no less true of their latest production, which, however, is not a component of any sort. It is a forty-page publication giving full details for building ten tested circuits.

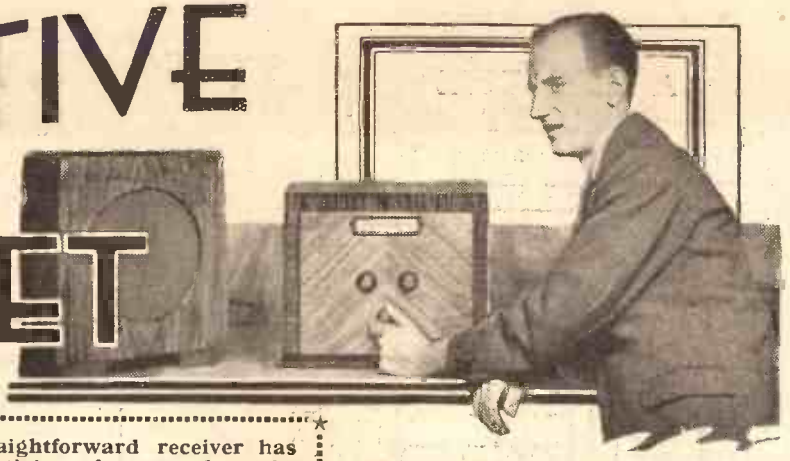
The types of instruments covered constitute a very wide range. They run from a Q.P.P. battery set to a 5-valve Universal mains radiogram, via a mains short-wave converter, and a midget portable receiver.

Two high-power amplifiers are also included, one for D.C. mains and the other for working from A.C. The output from these is 5 and 10 watts respectively, and they are ideal for anyone wishing to make a start in public-address work.

Altogether it is a very creditable production and one which should be in the hands of all constructors. The price is only one shilling.

A. S. C.

How to Build A SELECTIVE D.C. SET



This straightforward receiver has the selectivity of a superhet, the reproduction-quality of an elaborate radiogram, and the safety of a battery receiver. It is attractive in appearance and particularly easy to build. Designed and described by

H. A. R. BAXTER.

THERE must be numerous constructors who have D.C. mains and who are not likely within any reasonable period to go over to A.C. But because of the many changes from D.C. to A.C. which have been and still are being made, sets designed especially for D.C. mains are tending to become rather rare, and have given way largely to universal types.

A universal set will, of course, be perfectly satisfactory on D.C. mains so long as it has been properly designed, but its A.C. elements become "passengers" so far as those who stay on D.C. consistently are concerned.

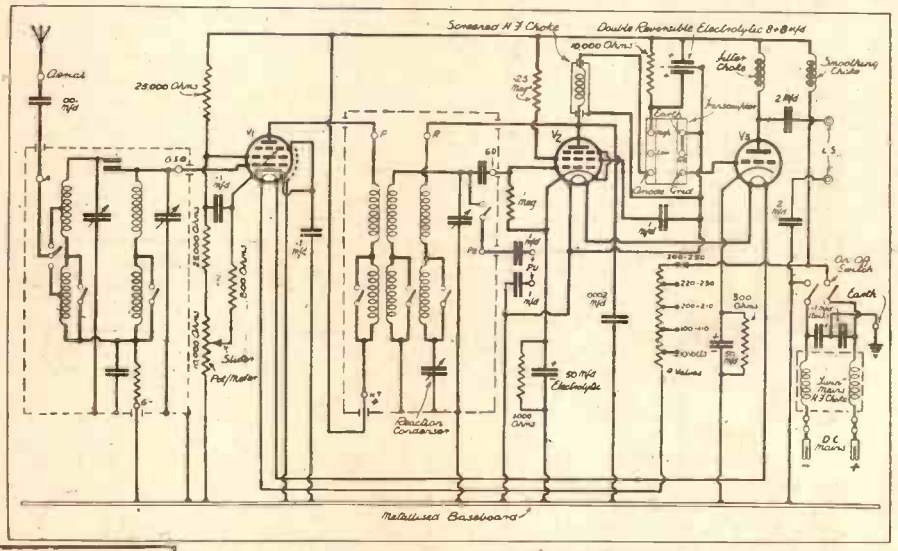
The Problem of "Dirty" Mains.

We therefore believe there will be many D.C. users who will welcome this band-pass D.C. set in view of the fact that it has been specially and solely designed for D.C. mains.

Now, it must be mentioned, though the fact will be only too apparent to some of the readers concerned, that there are many D.C. supplies in this country which are pretty "dirty," to use an expressive if rather crude term.

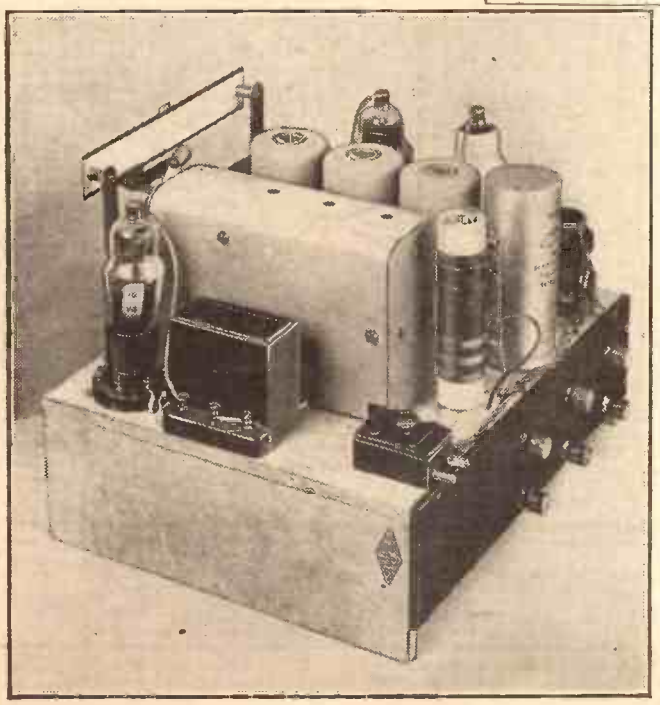
We ourselves have had plenty of first-hand experience of that, and we can recall right into a district only to be rectified and handed out to consumers as scratchy D.C.!

Some D.C. mains are so bad in regard to interference that they have become quite notorious among radio folk. Bearing in mind the great probability that at least a proportion of those readers who decide to build this set will be served with such



Among the valuable features incorporated in the circuit may be mentioned the special mains H.F. filter and the insulation of the aerial from D.C.

FINE APPEARANCE



The neat chassis construction not only gives the receiver a fine "internal" appearance, but renders the assembly extremely easy to carry out.

to mind supplies in eastern and south-eastern areas, one of which at least employs mercury arc rectification, which seem to carry a condensed charge of all the hum and crackles of a county. By the way, talking about mercury arc rectification, it has always appeared to us to be a great pity that A.C., with all its versatility and advantages, should be brought mains, we paid particular attention to the input smoothing and filtering.

It has to be remembered that normally it is the smoothing equipment of a mains set which, in a measure, tends to regulate its cost. That is why the smoothing of some of the cheaper mains sets is inadequate.

Very Efficient Smoothing.

It was quite inevitable that we should have to increase the cost of the components of this D.C. set to some extent if we were to make the smoothing superior to that one-choke variety which is so often used. But in the circumstances we believe you will agree that the price paid for the superior system employed is a very modest one.

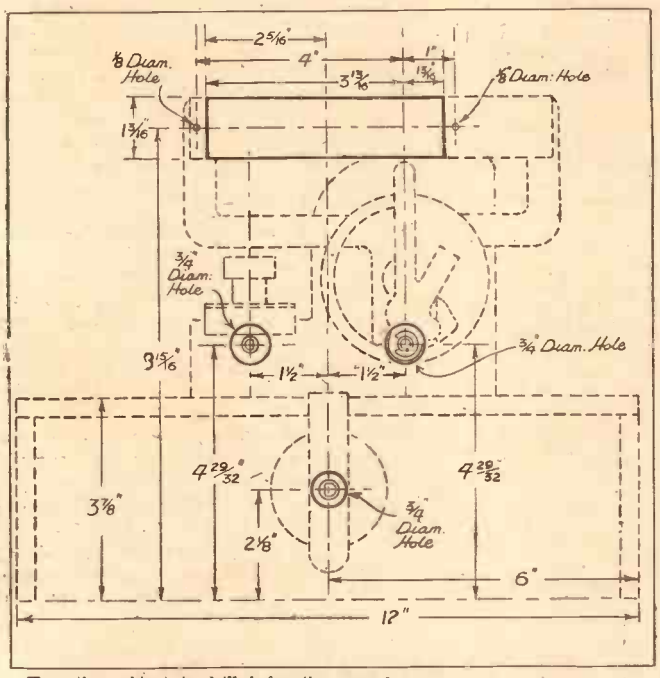
In addition to more or less normal but effective L.F. smoothing, by means of a L.F. smoothing choke aided by an output filter choke and large-capacity condensers, we have incorporated an H.F. input filter. All this should reduce the hum and other demonstrations of irregularities to a negligible quantity on even the worst mains.

(Continued on next page.)

HOW TO BUILD

A SELECTIVE D.C. SET

(Continued from previous page.)



How the cabinet is drilled for the very few controls. The ganged band-pass tuning ensures simple operation and really first-class quality of reproduction.

The D.C. mains serving our research department cannot be called "clean," and that the set works satisfactorily on these might be considered by some to be an adequate test. But we went farther than that. We had the set transported to the home of a reader who has experienced very bad hum on D.C. receivers, one or two of which ought to have behaved better judging by reports of their performances from other quarters.

This present band-pass D.C. set survived the test so well that this constructor has decided himself to install one.

It is adaptable to a range of voltages, and simply by adjusting the position of the one lead to the mains resistance the set can be used with any voltage mains from 200 to 250.

Excellent Selectivity.

Now a few words about its performance from a strictly radio point of view. It incorporates iron-cored coils and a band-pass circuit. The selectivity, despite the fact that there are only three valves in an H.F., Det., L.F. formation, really is amazingly good. It is no exaggeration at all to say that it is equal to that obtainable by the average type of superheterodyne set.

And owing to the fact that the band-passing is soundly engineered the full-response benefits of the system are obtained. That is to say, the quality of the set's output is quite exceptional and really does need to be heard fully to be appreciated.

We are not going to claim that the set will tune-in every station on earth. It has been designed as a stable, high-quality, selective programme provider, and we have ignored the temptation to hot it up for the collecting of distant ether mush at the expense of the above-mentioned virtues.

The construction of the set is immensely facilitated by the inclusion of a high-grade complete band-pass unit. This one component (or unit assembly of components) embodies within the single construction practically all the H.F. tuning and inter-valve coupling of the set.

This not only makes it much simpler for the constructor to build the receiver, for a large part of the component mounting and wiring is already done for him, but it also simplifies the final adjustments and ensures that the coil and condenser matching is efficient in the first place and is not subsequently upset by wiring or layout discrepancies.

Another somewhat unique feature is that the smoothing circuit incorporates reversible electrolytic condensers. Therefore, should the mains plug of the set be inserted in the power point the wrong way round (an all-too-easy thing to do), no harm is done. The electrolytics will not boil up and be destroyed and carry further destruction with them into other areas.

As a matter of fact, you could leave this set plugged into the mains the wrong way round for a whole night, or a whole week-end for that matter, and no injury to it would result, although of course it would not operate until the mains input was reversed.

Simplified Construction.

Although the chassis form of structure has been employed in order to make the set neat and "professional" in appearance, a simplified method has been adopted. The chassis merely comprises the "Metaplex" baseboard with two 10 by 3½-in. pieces of "Metaplex" at the sides for runners, and a 12 by 3-in. terminal strip at the back. This last should be of either ebonite or bakelite.

One of the side runners carries some of the components, as can be seen. In order to mount the reversible electrolytic condenser—this is two condensers in one unit—it will be necessary to cut away some three layers of the "Metaplex" under the baseboard. Mark a circle of 1½ in. in diameter at the appropriate point, and with sharp dividers, or a brace and bit or a sharp knife (though this

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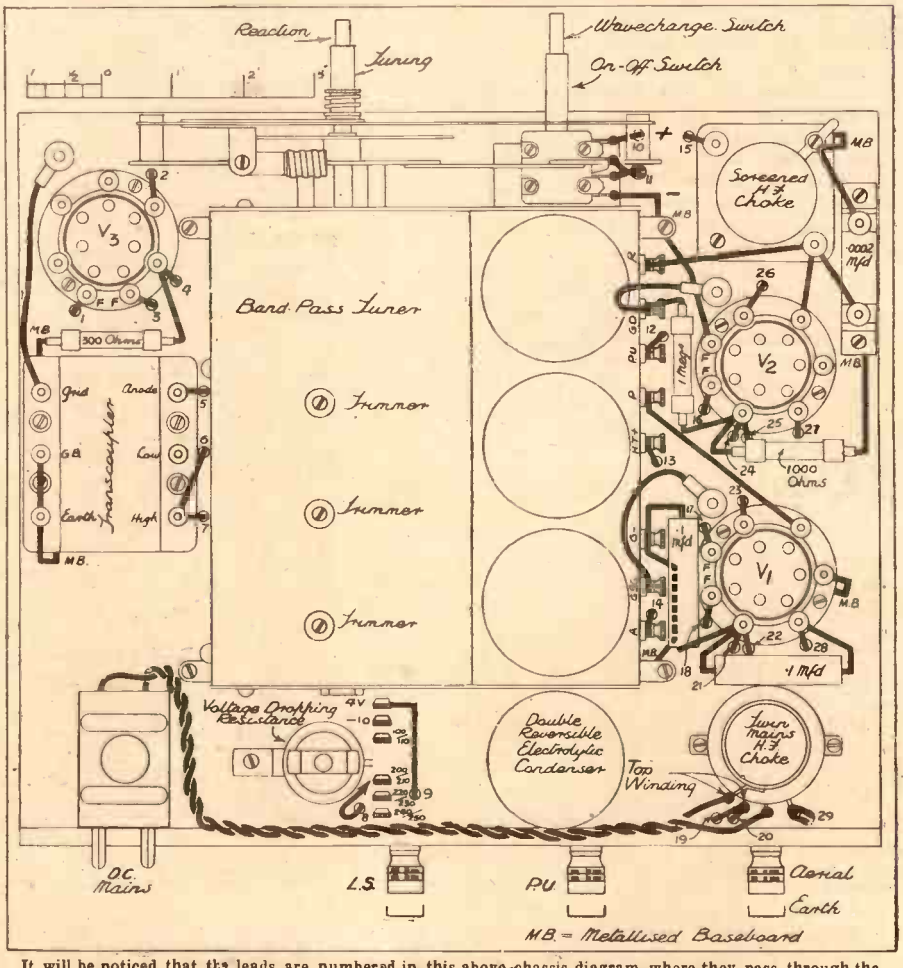
THE ABOVE-CHASSIS WIRING



It will be noticed that the leads are numbered in this above-chassis diagram where they pass through the baseboard, so that they are easily correlated with the under-chassis wiring shown on the next page.

HOW TO BUILD

A SELECTIVE D.C. SET

(Continued from previous page.)

will require a little time and patience), remove three layers of the plywood.

In the centre of this inset you must then bore a ¾-in. hole for the large screw end of the component. At this juncture it might be as well to say that the question of cabinet is left to the individual constructor. Some may want to build the set into a console cabinet with a loudspeaker, and others into a simple cabinet without a loudspeaker.

We provide a dimensioned drawing showing how to drill for the wooden or ebonite cabinet front.

The fixing of the components calls for little comment; it is merely a question of mounting them in the positions indicated by means of wood screws. You will find ⅝-in. wood screws of the flat-headed variety the most useful for the purpose.

But as with all mains sets the wiring must be carried out with very great care. It is quite essential to use the well-insulated wire of the "Glazite," pull-back, or other such types for all those leads except those which are shown twisted. For these a sound rubber-covered flexible is desirable.

Use New Wire.

Now don't go and use old stock for this, such as old electric light wire, the rubber of which has all but perished if it hasn't done so entirely. Use new wire and test the toughness of its rubber covering. If it fails to stretch and doesn't resist attempts to tear it off, but easily breaks away, the wire should be rejected.

The wires which are shown twisted are run in this manner for a purpose, and that is to reduce the electric field surrounding them. They are just twisted in the ordinary way just like twin-flex is twisted.

We advise soldering a proportion of the connections in this set. Soldering is quite unnecessary in the cases of normal battery sets, but in a chassis mains set of this nature it is distinctly advisable. But the soldering must be good, or it will be worse than useless.

Dry joints must be avoided at all costs. A dry joint is when the solder does not take equally on to both the terminal and the wire, and the two are held together by a kind of crystalline layer. To avoid these kinds of joints the three fundamental requirements of good soldering must be obeyed.

These are to have the iron hot enough, to have the lead end and terminal well cleaned, and to tin the iron and the job properly before the final connection is made. Needless to say, a good flux such as "Fluxite" ought to be used.

Be careful with those leads which pass through the baseboard. Don't drag them forcibly through so that there is danger of their insulation stripping. And remember all the time that the whole of all the surfaces of the "Metaplex" are, in fact, metal areas joined to earth. There are, therefore, large expanses to which short circuits can be made.

It is advisable to check over every terminal and other connection in order to see that it steers clear of contact with the "Metaplex" and component cans, frames, and other objects which are electrically in contact with it. That is, of course, with the exception of those terminals which are deliberately joined to the "Metaplex" for the purpose of completing circuits.

Adjusting the Trimmers.

The whole of the wiring ought to be checked before the set is first tried. It is obviously important to ensure that the mains resistance is connected up by the appropriate tap-terminal to suit your mains.

Although the trimming of the gang condenser is quite easy if done methodically it will be found that the trimmers are extremely sharp. The set will go in and out of trim over quite a small part of a turn of one of the trimmers.

Set the trimmer farthest from the panel at about a halfway position, and do that too to the one nearest the panel. Now tune-in a station that comes in rather weakly somewhere around the middle of the dial

(Continued on page 74.)

THE PARTS WHICH WILL ENSURE GOOD RESULTS

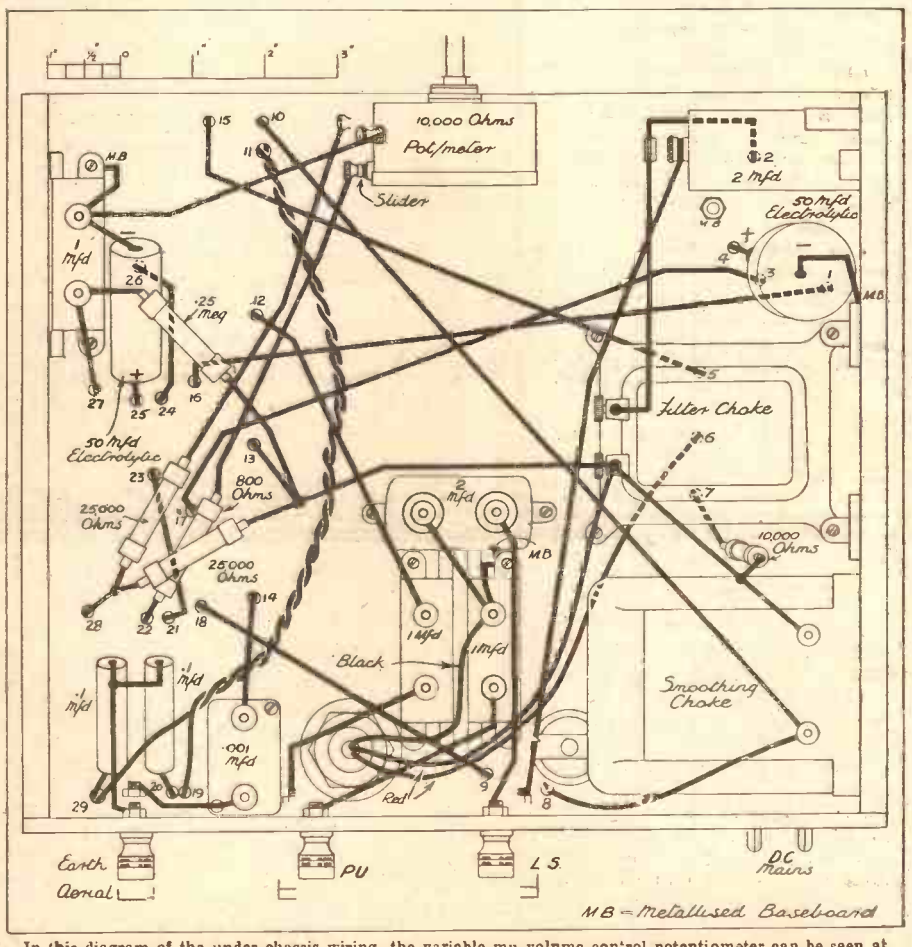
1 J.B. Linacore, type B.P.U., fitted with double-pole shorting-switch.
3 Benjamin seven-pin baseboard-type valve holders.
1 Bulgin Transcoupler, type L.F.10.
1 Graham Farish screened H.F. choke, type H.M.S.
1 Varley 10,000-ohm potentiometer, type C.P.158.
1 Peto-Scott mounting bracket, type 22/1.
1 Dubilier 50-mfd. electrolytic, type 3003.
1 Dubilier reversible 8 + 8 electrolytic, type 9203E.
1 Dubilier ·0002-mfd. fixed condenser, type 620.
4 T.C.C. ·1-mfd. tubular fixed condensers.
3 T.C.C. 1-mfd. fixed condensers, type 50.
1 T.C.C. 2-mfd. fixed condenser, type 50.
1 Dubilier 2-mfd. fixed condenser, type B.B.
1 Dubilier 50-mfd. electrolytic condenser, type 3001.
1 Formo 1-meg. wire-ended resistance.
1 Formo 250,000-ohm wire-ended resistance.
2 Formo 25,000-ohm wire-ended resistances.
1 Formo 1,000-ohm wire-ended resistance.
1 Formo 10,000-ohm wire-ended resistance.
1 Formo 800-ohm wire-ended resistance.
1 Formo 300-ohm wire-ended resistance.
1 T.C.C ·001-mfd. fixed condenser, type S.
1 Varley smoothing choke, type D.P.10.
1 Wearite output choke, type H.T.12.
1 Bulgin mains resistance, type M.R.34.
1 Bulgin combined mains plug and fuses, type F.18.
1 Wearite twin mains H.F. choke, type H.F.11.
1 Peto-Scott ebonite terminal strip, 12 in. × 3 in. × ⅛ in.
6 "Clix" indicating terminals, type B.
1 Peto-Scott "Metaplex" chassis, 12 in. × 10 in. baseboard, with 10 in. × 3½ in. runners.
1 Peto-Scott cabinet.
2 Coils B.R.G. "Quikon" connecting wire.
Screws, bolts, nuts, flex, etc.

VALVES:

	H.F.	Det.	Output.
COSSOR ..	13V.P.A. metallised	13S.P.A.	402P.

LOUDSPEAKER: W.B. "Stentorian."

DETAILS OF THE UNDER-CHASSIS ASSEMBLY



In this diagram of the under-chassis wiring, the variable-mu volume-control potentiometer can be seen at the front edge of the baseboard. A photograph of the chassis from below will be found on page 76.

FIVE EXCITING HOURS

A Special Correspondent takes us into the News Room at Broadcasting House, and gives a fascinating description of the work involved in the preparation of our daily news bulletins.

"THAT is the end of the News," says the announcer—and with those words end the five most exciting hours of a B.B.C. day.

After being privileged to watch the News Department at work building up the day's news bulletins, I have come to the conclusion that this is a more hectic job than any other bit of "presentation" in the B.B.C. studios.

The News Department has four rooms on the fourth floor at Broadcasting House, and in three of them every day until the middle of the afternoon it is all quiet.

In the fourth sits John Coatman, C.I.E., ex-Indian Police Chief, now News Editor at the B.B.C.

His day is a long one. During the morning he works at the business organisation behind B.B.C. news: its cost, its form, its ventures into new types of presentation, its "balance" and policy. And he has to maintain a deep knowledge of, and a lively contact with, world affairs.

It may be that there is a big outside event to-day. Mr. Coatman orders the B.B.C. Flying Squad off, with its recording van, to make sound-pictures of the scenes—perhaps a Royal occasion like the opening of Parliament, or maybe a big sporting occasion.

Preparing the Bulletins.

The Flying Squad is going to be used more than it has been for news gathering. Mr. Coatman told me he is keen to expand in this direction.

In the middle of the afternoon comes the first arrival of Mr. Coatman's staff, a junior assistant, who enters the News Room and touches a switch which sets in motion the elaborate machinery which brings you the news bulletins.

The switch sets the Creed machines tapping . . . tapping . . . typing out the news as it is sent out, minute by minute, by the big Fleet Street news agencies. Until the Regional News Summary is over at 10.10 p.m. the Creeds chatter incessantly.

Now the sub-editors arrive. Kenneth Adams: Home news sub.; R. D. Clark: Foreign news sub.

Mr. Coatman calls a conference.

"What's for the six o'clock News?"

The decisions of the conference can only be tentative, for any minute a sudden message may flash from the Creeds—a big Government decision, a foreign political crisis, a national disaster—and then Messrs. Coatman, Adams and Clark must scrap their plans in order to give such a happening prominence.

When big news "breaks" from some European capital Mr. Clark goes to a special directory where, carefully indexed, he can turn up a B.B.C. representative stationed almost in any foreign city.

A trunk call to the representative warns him to be ready to broadcast a talk that night.

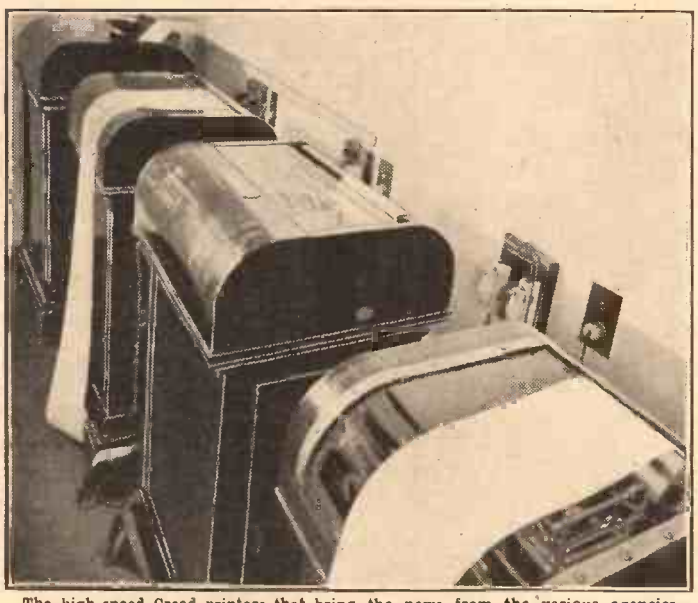
Or if the country concerned is itself broadcasting the event, Clark has the B.B.C. hitched up by land-line to the distant broadcast, and B.B.C. engineers record it for inclusion in the news bulletins. They did this, you will remember, with King Alexander's funeral.

Meanwhile, news editor Coatman has asked Murray, another of his staff, to watch the debate on a new Bill in the Commons. If it "develops" a three-minute talk by an authority may be necessary in the second News.

Murray is Topical Talks Editor. His job is to find the speakers for those short talks which so often illustrate the News bulletins and, having found them, to rehearse the speaker and to stand by when he is actually on the air. How does Murray discover all these speakers?

He has a Talker's Index. Under subject headings, alphabetically arranged, are the names and addresses and telephone numbers of authorities on anything and everything—from "Alligators," to "Baby Welfare," from "Water Rates" to "Zulus"!

NEWS ARRIVING "RED HOT"



The high-speed Creed printers that bring the news from the various agencies right into the News Room at Broadcasting House.

As the news issues from the Creed machines it is sub-edited by Adams and Clark into the short news items which make up the bulletin, and these the junior assistant dictates to a typist. She types them neatly, ready for the announcer to read.

At 5.30 Mr. Coatman O.K.'s the wad of typescript which is the first News.

At 6 o'clock the "first edition" goes on the air.

At 6.30 they start all over again! And as the evening passes, the scene in the News Department becomes busier and busier, like some great accelerating machine, with the Creeds ever in the background, tapping, tapping . . .

At 8.30 the commentators summoned by Mr. Murray arrive, and rehearse and arrange with the News announcer what the "cues" shall be so that there may be no awkward pauses.

A typist is hurriedly typing out an "S O S."

The junior assistant is frantically dictating late news items to another typist.

It is 9.20.

Adams and Clark stand over the chattering machines—just in case anything "big" happens in the next ten minutes.

The announcer waits at Mr. Coatman's desk while the News Editor calmly reads through the bulletin.

9.25. Mr. Coatman hands the announcer the wad of typescript. The announcer clears his throat, walks to the small news-reading cubicle, sits at the microphone, waits for the red light . . .

The "Final Edition."

Clark rushes in. Hurriedly, quietly, he slips another news item into the wad.

In two nearby talks studios, Murray's speakers are waiting. They clear their throats, run a nervous finger around the collar. . . . Murray paces the corridor outside.

9.30. The red light winks. The News begins.

Half-way through the bulletin Adams rushes to the announcer with a "stop press" item.

Mr. Coatman in his office sits back at a loudspeaker and listens to his department's work.

"That's the end of the News," says the announcer. Coatman and Adams, Clark and Murray, the junior and a couple of typists pick up their hats and make for the lift.

It is very quiet in the four rooms of the B.B.C. News Department. The Creeds are silent at last.

NEW EMPIRE TRANSMITTERS

The B.B.C. has placed orders with Marconi's Wireless Telegraph Co., Ltd., and Standard Telephones and Cables, Ltd., for two additional short-wave transmitters for the Empire Broadcasting Service. Each firm will supply one transmitter.

Work will shortly begin on the construction of a new building at Daventry to house the transmitters.

A USEFUL COMPONENT

Details of the latest Dubilier reversible electrolytic condenser.

THE great advantage of the electrolytic condenser over other types is that it has a large capacity for a comparatively small size. For example, two eight-microfarad condensers of ordinary construction using paper for insulation and foil for the plates will occupy three or four times the space of an electrolytic of the 8 plus 8 mfds. type. The latter will give you 16 mfds. in a neat construction something of the shape of a stick of shaving soap.

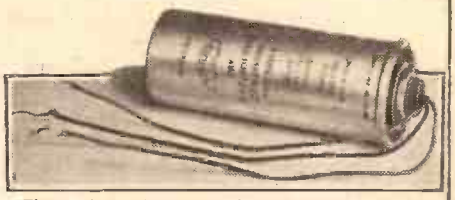
Curiously enough, unlike ordinary condensers, the electrolytic is not a condenser until current is passed through it. This is known as the polarising current and is negligibly small. But clearly the electrolytic cannot be used in many positions in a set for decoupling and so on across points where it cannot derive its very necessary small D.C. current. Yes, it must be D.C. flowing through it in the one direction. That is why electrolytics have their terminals marked positive and negative in some cases.

The Chassis Connection.

But they are not always so marked. Those which are designed for chassis mounting, for example, really do not require marking, for their cans obviously have to be contacted with the chassis, and chassis are normally always in the negative line.

The polarising current which flows through the component produces an electrolytic action, and a minutely thin film of gas is created between its two "plates," one of which is, of course, the fluid, or in the "dry" type, the paste. The film of gas acts as the dielectric just as mica or paper in the ordinary condenser, and it is because this gas film is so thin that a great capacity is obtained despite the relatively small area of the "plates."

Obviously, a reversal of the polarising current will cause the action to cease. In an A.C. set it is always possible to ensure that this current cannot flow through the condenser in the wrong direction. It doesn't matter a scrap which way round the plug of an A.C. set is inserted in a power point, and the subsequent rectification and production of D.C. is a function of the set itself.



The condenser is made in three models, the prices ranging from 7s. 6d. to 12s. 6d.

In the case of a D.C. set the conditions are different. Here the power socket of the mains supply determines the direction of flow, and if the set-plug is inserted the wrong way round the set cannot work. If there were "dry" electrolytic condensers, then they would be served by a potential of wrong polarity which might produce short circuits through them and damage them beyond repair.

Now it is a simple kind of mistake to make, that of inserting the power plug of a set the wrong way round (that is, of a D.C. set; these remarks do not apply to A.C. outfits), and as such a mistake can produce damage to electrolytics if they are used, it would seem that their advantages are not available to D.C. users.

Three Months' Misuse.

But this, fortunately, is not quite the case. There are reversible electrolytic condensers, and we mean of the "dry" type, too. That great condenser-making concern, the Dubilier Condenser Co., Ltd., lists them. We have heard that the Dubilier Reversible has been able to stand up to almost fantastic misusages. For example, one is said to have been connected up the wrong way round with current flowing through it for a continuous period of three months. And after even that savage treatment it recovered in fifteen minutes!

Our own tests, if less drastic, fully confirm the self-sealing properties of these extremely useful components.

There are three models, the eight mfds. at 7s. 6d.; a combination of a four and an eight at 10s.; and another combination, this time of two eight mfds., at 12s. 6d. Thus they cost a trifle more than the more or less equivalent non-reversibles, but builders of D.C. sets will consider the extra cost very well worth while.

It should be noted, however, that the reversibles are for a D.C. peak working of 275 volts.

RADIOTORIAL

The Editor will be pleased to consider articles and photographs dealing with all radio subjects, but cannot accept responsibility for manuscripts or photos. Every care will be taken to return M S S. not accepted for publication. A stamped, addressed envelope must be sent with every article.

All Editorial communications should be addressed to the Editor, POPULAR WIRELESS, Tallis House, Tallis Street, London, E.C.4.

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

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

QUESTIONS AND ANSWERS

INCORRECT GANGING OF THE S.T.600.

M. S. (York).—"When I tried to get 'P.W.' of January 26th, to follow out exactly what Mr. Scott-Taggart said about incorrect ganging of the 600, I found it was out of print, owing to the big run on this set. Can you tell me what he said about this?"

In his S.T.600 Service Bulletin No. 2, Mr. Scott-Taggart pointed out that it is perfectly easy to test for faulty ganging as a whole. You do this:

Tune to a station as you think, using both main knob and front trimmer, and employing reaction; the aerial coupler knob may be about a quarter of a turn to the right. The station should not be too loud, and you use the volume control to reduce it, but anode reaction must be brought up to keep selectivity high.

Now move the main knob a little to each side; signals should weaken. Leaving the main knob at the best position, move the front trimmer knob a little to the right and then to the left. In each case signals should weaken. If signals remain the same strength as you move the front trimmer to the right, or if they get louder, you were not trimmed. You should, theoretically, get a true maximum tuning point on the front trimmer at whatever point on the dial you do the test, and whether on the medium waves or long waves.

Mr. Scott-Taggart, on page 684 of our January 26th issue, goes on to say:

"However, some of the sets worked exceedingly well when the front trimmer was at zero (full open), i.e., with the knob fully to the right. Probably they were very nearly trimmed, but I was not satisfied. Actually, I am very doubtful whether the ideal conditions can always be realised, and the failure of my test on some part of the dial would not justify uneasiness if the set appears to be working very well.

"The trimming fault when you have the front trimmer knob fully right is that the rear trimmer needs closing more. Turn the star wheel to do this, taking care to see that you turn it the right way to make the trimmer plate approach the frame. Preferably, switch the set off when turning the trimmer star wheel, and turn it a bit at a time. After each bit of a turn re-tune the station, and keep tightening up the rear trimmer until you get signals loudest with the front trimmer *not* at absolute maximum. If the rear trimmer is absolutely tightly closed and the front trimmer still gives loudest signals with the front trimmer fully right, you are certainly 'out of gang.' If this occurs at all points of the dial I should condemn the set. Probably the two coils of the coil assembly or the two halves of the gang condenser are improperly matched. I think I should have the coils tested first.

"The position can, however, be put right in a way by connecting a very small condenser across the anode tuned circuit of the set. There are several points where you can connect the condenser to give the required result. I myself used a ·00005-mfd. J. B. baseboard trimmer (of the kind used in the S.T.500 as a phase reverser preset), and connected it 'in the air' by the aid of two one-inch long wires connected to terminals 9 and 10 on the coil assembly.

"Having failed to get a maximum tuning point on the front trimmer even with the rear trimmer fully closed up, I started with the ·00005-mfd. fully open and then closed it by degrees until I got proper tuning on the front trimmer. The set worked excellently then, but I am afraid a few of the small stations (including Fécamp) at the bottom end of the dial had 'slipped off.' Also the station-name dial was no good."

[NOTE.—Since this was written by Mr. Scott-Taggart, Fécamp has moved higher up the wave-band.]

"A hint for bringing a station under the control of the front trimmer if this has to be full-right, is to decrease the aerial coupler, by turning nearly or wholly to the left. If signals are not too much reduced (you may turn up the volume control) you may now find that you can get a maximum tuning point on the front trimmer.

"Since without aerial reaction the first tuned circuit may be a little flat in tuning it is always possible for the set to be trimmed, or very nearly so with the front trimmer making little audible difference when near its full-right position.

"The sensible test is: Does the set work well?"

COILS FOR THE "B.C.L." TWO.

L. B. (Bridlington).—"The set I want to get going is the 'B.C.L.' Two, described in your paper just over six months ago. But, instead of the 6-pin coil for short waves, I want to use one of the 4-pin B.T.S. coils. How should this be mounted?"

(*Continued on next page.*)

RADIOTORIAL QUESTIONS & ANSWERS

(Continued from previous page.)

You can use an ordinary valve holder to hold the coil, mounting it in the position shown for the 6-pin coil holder, to keep the leads as short as possible. Additionally, you will require a pre-set condenser (·0001-mfd., maximum capacity), mounted between the coil-holding valve holder and the edge of the baseboard.

Mount the coil holder with its anode towards the detector valve holder; then the connections are as follows: Plate terminal to the ·0001-mfd. grid condenser, to fixed plates of tuning condenser, to one terminal of the new pre-set condenser.

Filament terminal nearer panel to fixed vanes of reaction condenser. Other filament terminal to plate terminal of the detector. Grid terminal to metallised baseboard.

Drill a hole in the baseboard near the other terminal of the new pre-set and take a connection through it from that point to the aerial terminal.

POWER DISSIPATED IN RESISTANCES.

W. P. N. (Burntisland).—"The power in watts = amps. multiplied by volts, but it is not usually possible to say right off what voltage is operating across the resistance in question and what is lost in other resistances.

"Can the power in watts be calculated from the current and number of ohms of the resistance, which number is always known?"

Yes, you can use the equation watts dissipated = ohms × amps². This will give the same answer as multiplying the volts (across the resistance) by the amps. (through it).

FITTING A FUSE.

Although most set owners are agreed as to the advisability of having a fuse fitted to their sets, there is a wide diversity of opinion as to the best place in which it should be installed.

A Manchester reader of "P.W."—J. H., of Astbury Street, Radcliffe—tells of an expensive accident he had with the S.T.600 after fitting a fuse as described in these columns recently, in reply to a Brighton reader's question.

In his letter describing the incident, J. H. says:

"I fitted a fuse, as you say on page 676, but the bulb got broken. Not having a spare one on hand, the wire was connected direct to H.T. negative.

"Later, when changing the L.T. battery, the spade terminals were accidentally allowed to fall on to the H.T. accumulators, and the result was that £2 5s. worth of valves were ruined.

"This was the first set I did not put the fuse *inside*. And," he says ruefully, "it will be the last!"

As a result of his accident with the valves, J. H. is strongly of the opinion that the best place for the fuse in any set is just inside the set itself, close to the H.T. — terminal. And although we gladly recount his experience for the benefit of other readers, we must, at the same time, point out that no method can possibly be effective if, when the fuse breaks or blows, it is not replaced. That is where J. H. went wrong.

He admits that, not having a spare bulb on hand, he wired up without a fuse at all; and the moral is that, *whatever sort of fuse is installed*, the fuse holder should only be shorted as a temporary measure when the fuse blows or breaks.

PERSISTENT MOTOR-BOATING ON MAINS SET.

H. F. F. (Portsmouth).—"The circuit is H.F., detector and pentode, and the trouble is persistent motor-boating. This was intolerably loud until I inserted a resistance in the detector's anode supply lead and connected the H.T. + side of the transformer to the earth through a decoupling condenser.

"This treatment made a vast improvement at once, and I have tried all sorts of condenser and resistance values to stop the remaining motor-boating. But although it is nothing like as bad as it was at first it still spoils the set from being used.

"Should I try decoupling the pentode in the same way? It seems to want more decoupling somewhere and, having cured most of the original trouble, I naturally want to put it right altogether."

It would probably be useless to decouple the pentode anode in this way, but you might decouple its screen-grid feed, and also the H.F. valve, in the same way that you did the detector's.

Although you cannot decouple the pentode anode in the same way that you decoupled the detector, you can decouple it by means of a filter circuit of the conventional type. A swamped choke would be desirable to obtain proper matching.

Finally, don't forget that the grid-bias resistances may need by-passing by means of large condensers between their cathode and grid sides. The grids could be decoupled, but this should not be necessary in a small set.

SHOULD THE TRIMMERS BEHAVE ALIKE?

S. H. (Whetstone Park, N.).—"Should the trimmers behave alike? I notice that alterations to the first one make a great difference to reception, but there is nothing like the same effect when altering the second one.

"Does this show anything wrong with the ganging? I get very good results from all over Europe, but naturally if I can get better still, by making any small alteration, I am all for it."

The effect of small alterations to the trimming of various stages may be quite apparent in some instances, much less noticeable in others, and very critical indeed in a third instance. But whether the effect of moving the trimming adjustment is great or small, there is only one thing that matters about it, and that is to set it correctly and then leave it alone.

If your set is pulling in the foreigners well, there is probably not much wrong with the ganging. But you should follow any trimming instructions that were given with the set to the letter, because correct ganging is very important in its effect on the set's performance.

You can tell when the set is correctly ganged by the fact that readjustment of any of the trimmers then reduces the volume. Do not worry as to whether there is a large reduction or a small one, a sudden reduction or a slow one; but get the trimmers in the position where any alteration of the settings reduces the volume of the station you have selected to trim by. (You will need to follow your instructions carefully, but the correct position for all trimmers can certainly be found, and is well worth finding.)

At this stage of the proceedings the trimmers *do* behave alike in one respect, inasmuch as turning any of them in either direction weakens reception. This is all that matters, so set them in the finally-selected positions, and thereafter leave them alone.

WIRELESS AND THE THREATENED WAR

(*Continued from page 55.*)

and we should certainly be entitled to know the facts before we are faced with a possibly ruinous policy of intervention.

And what appears to be happening at present is that there is developing a secret control and censorship of wireless. Wireless can play a great part in bringing about a better understanding between peoples. It can be a great force for peace. Sinister influences can prevent this good influence. They appear to be at work, and they should be exposed.

If the British Government is really responsible, then we ought to know the facts. We are supposed to be strictly impartial in this dispute, and to have taken up an attitude of benevolent neutrality. This is not the occasion to examine this claim of impartiality, either with regard to the embargo on arms or the failure to use the machinery of the League of Nations. What I resent as a listener—one of millions in this country—is the attempted blockade of ideas and information.

Arbitrary Actions.

The British Prime Minister has just announced once more his belief in the freedom of the Press. The same principles apply to broadcasting. There should be complete freedom—and I know in expressing this opinion that I am speaking for the majority—provided that nothing offensive to religious and moral sentiments is broadcast.

In this particular case, here was a woman in the highest position in a far-distant land threatened by a terrible war, the wife of a ruler of a poor country, who was trying to put the case for peace, speaking as a woman to women and to any men who cared to listen. It was scarcely chivalrous, to put it no higher, to interfere in this arbitrary way. The arrangements must have been made some weeks ago, and to refuse facilities at the last moment was also abominably discourteous.

Supposing evil-minded persons in some foreign country had deliberately blocked the broadcast of our own King last Christmas? One can imagine the justifiable indignation that would have been felt.

Supposing in the future we are involved in some dispute in the international field, and those who do not see eye to eye with us propose to block our use of the ether in putting our side of the case or pleading for peace. One has only to consider the matter from our own point of view to see how indefensible these recent actions were both in regard to the Queen of Abyssinia and Mussolini's son-in-law. We listeners are entitled to know the facts.

THE "SNAKE" CABLE

(*Continued from page 58.*)

first passes through the inductance L_1 to charge up the condenser C_1. It then forces its way through the next bit of inductance L_2 to charge up the condenser C_2, and so on, step by step, until it reaches the end of the line.

It is obvious that the "surge" must move forward smoothly and continuously. Otherwise energy will accumulate here and there along the length of the line to form "standing waves," which in turn will tend to radiate energy away from the system. Similarly, there must be no piling-up of energy at the end of the line. The output current should flow smoothly into the load, so as to avoid "end" reflection which, if present, will again lead to the production of standing waves. In other words, the impedance of the load must be carefully matched with that of the line, just as one matches the impedance of a valve to the loudspeaker, or to an intervalve coupling.

Because of the peculiar manner in which the high-frequency currents travel, the impedance of the line is commonly called the "surge" impedance. It is equal to the square root of the inductance divided by the capacity of any given length of line, the value of the inductance being determined by the diameters of the outer tube and the inner core, and that of the capacity by the spacing between them.

THE LINK BETWEEN

By G. T. KELSEY.

IN the interests of my fellow-listeners, as well as myself, I want to start off my notes this week with an appeal for reasonableness on the part of that section of the listening community which apparently delights in loud loudspeakers.

Alas, if my experience may be taken as criterion, the nuisance appears to be on the increase, and I fear that unless something is done about it broadcast entertainment is going to get a very bad name.

I suppose I am feeling a little more bitter than usual about it at the moment, for to be truthful I am writing these notes while on holiday and, of course, it would be just my luck to strike the worst case of loudspeaker nuisance that I have yet come across.

He, and it, are in the very next bungalow to the one I am occupying, and from morn till night I am forcibly "entertained" with a raucous noise which completely baffles description. Of one thing at least I am certain. It certainly isn't radio, although I have no doubt that my neighbour thinks otherwise.

But when I tell you that we have almost to shout in our garden to make ourselves heard, I will leave you to imagine what it must be like in the room in which the "instrument" is let loose. It must be simply nerve-shattering. Sad to relate there is no direct legislation in this part of the world to prohibit such cacophony, and I have, therefore, no alternative but to sit and suffer, if not exactly in silence, at least in pain.

I imagine that there must be hundreds of others in the same dilemma as myself, and this appeal to the guilty parties will not, I feel sure, be out of season.

With a view to overcoming this menace once and for all, I have been playing with an idea at the back of my mind which grows on me the more I think about it. Why, after all, is it necessary to produce sets with outputs so very much in excess of what is required for normal domestic listening?

Why not a limiting device which, while enabling ample volume to be obtained for all normal and reasonable domestic purposes, prevents the flagrant misuse of the instrument? I am certain that this would provide a satisfactory solution, and I see no reason why it should not be possible technically. It is an idea that manufacturers might do well to think about if they are concerned with future markets, for it is in their interests more than anybody's to ensure that broadcast entertainment does not get a bad name through the inconsiderateness of the few.

This Week's Catalogue News.

The first catalogue on the pile this week is one which interests me particularly, for it is to do with short waves. It is probably true to say that no single firm in this country has devoted more time to the great cause of short-wave reception than has Stratton & Co., Ltd., the makers of the famous "Eddystone" parts. And an excellent idea of the amount of painstaking research that they have devoted to the subject may be gauged from the comprehensive range of parts which is shown in their new catalogue.

This catalogue is a most valuable acquisition to

(*Continued on next page.*)

THE LINK BETWEEN

(Continued from previous page.)

all who are interested in short-wave or ultra-short wave reception, and in addition to the useful circuits which it contains, there is some helpful information concerning the Eddystone "Crossfeeder" aerial system for the elimination of man-made static on short waves. Altogether a most useful book (367).

Pocket Radio.

I was struck by the amount of interest that was shown in midget radio at Olympia this year. The Hivac stand, in particular, was besieged with enthusiastic constructors who were anxious to build pocket radio sets around this firm's popular range of midget valves. In fact, the interest was so great that Hivac had to produce a special leaflet giving a list of the firms who are now making pocket radio components.

I propose to include this list under our postcard literature scheme because I believe that there are many "P.W." readers who would be glad to know from where these tiny components can be obtained. The list gives full details of the components available together with prices, and it also includes midget H.T. batteries and accumulators. It is, I feel, indispensable to all who are contemplating the construction of a midget set (368).

For Battery Users.

A particularly useful feature of the Exide and Drydex catalogue this year is the list in which is given the correct Drydex and Exide replacements for practically every type and make of commercial receiver. The list runs to eight pages, and I should imagine that there can hardly be a single set that is not dealt with.

The battery catalogue itself is also very complete, and it is an immense help to those who are faced with the battery problem. Even if you are not in need of new batteries at the moment, I seriously advise you to obtain one of these booklets while the going is good, for it is a most useful reference to have by you (369).

TELEVISION JOTTINGS

By L. H. THOMAS.

ALTHOUGH we still have nothing on which to test out ultra-short-wave receivers under actual working conditions, most people seem to be continuing with quiet development of simpler and more efficient superhet circuits. This type of work can be done fairly easily by the home constructor. It is quite interesting, and nothing like as complicated as that other aspect of television reception—the time-base arrangement.

It is interesting to note that the 5-metre amateur transmitters are changing over quite rapidly to superhet technique, and it really looks as though the super-regenerator is being dropped at last. Most of them have already found quite a simple superhet definitely superior to the "super-regen," and from such a set it is only a fairly small step to a television receiver.

Use of the "Autodyne."

One interesting point that has arisen is that the autodyne may come into its own again as a frequency-changer for superhets working on these very short wavelengths. One particular set of which I am thinking uses an autodyne followed by three (or four) *resistance-coupled* I.F. stages. The overall gain in the I.F. amplifier is considerable, and the band-width over which it operates is colossal.

A receiver of this type is far simpler to build than the average broadcast receiver, and if it *will* give results on television—well, our future looks very rosy indeed.

The aspect of television that is rather apt to frighten away the home-constructor is the whole business of cathode-ray scanning. He sees photographs of time-base units that seem to have spread to colossal dimensions, and becomes unduly scared by the appearance of complexity.

Obviously, the whole technique of scanning is something quite apart from *radio*, and something which the average radio amateur has got to learn from the beginning. I think he will find, however, that the operation of a cathode-ray scanning unit requires very little more understanding than, say, the operation of a modern broadcast receiver with double-diode triodes and delayed A.V.C. and all the other modern complications.

The main components of a time-base unit are, after all, condensers and resistances. Everyone who has carried out the simple neon-tube experiment—charging up a condenser through a resistance, with a neon-tube connected across the condenser—should be able to proceed to a thorough understanding of the completely developed double time-base circuit.

In any case time-base units and exciter units will be available, either ready built or in kit form, at quite reasonable prices, and many readers will prefer to devote their energies to the building of a really nice receiver from which to operate them.

My remarks about the amateur transmitter and television have had a queer sequel. I heard during the week that a prominent manufacturer of disc scanning kits has suddenly had a terrific demand for motors and discs. He would not tell me where they were all going, but he *did* know definitely that they were to be used for transmission and not reception.

HOW TO BUILD A SELECTIVE D.C. SET

(*Continued from page* 67.)

with the wavechange switch over to medium waves.

You will have no difficulty at all in noticing the adjustments for correct trimming as they will be very clearly defined, but move the trimmers slowly and carefully. Most of the operation will be conducted on the two trimmers nearest the panel.

The pick-up terminals are quite isolated from the D.C. circuits, and you need adopt no special precautions in regard to the external pick-up wiring beyond that for quality and stability reasons they should be kept as short as possible. We mention stability, but actually this set is very stable, much more so than the majority of mains sets of similar calibre.

And owing to the incorporation in the set of an effective loudspeaker filter you need have no worry about the loudspeaker leads from a mains-juice point of view. They can be run all over the house if need be, for they do not carry D.C.

The aerial, too, is isolated from D.C. by means of a series condenser. In fact, we have taken care in the design to make the set a safe and sound proposition. And this—your model too—must be, so long as you use the parts in the manner specified in this article and in the diagrams.

ROUND THE RECORDS

(*Continued from page* 60.)

familiar with Forsythe's work I may, perhaps, say that he is a sort of Epstein of music.

* * *

For followers of Ginger Rogers, who liked the film "Roberta," I may mention these Brunswick records. Irene Dunne, *Lovely to Look At* (02048); Guy Lombardo and His Royal Canadians playing the same number with *I Won't Dance* (RL273); *Yesterday* and *Let's Begin*, played by Leo Reisman and His Orchestra (RL277), and the same band playing *The Touch of Your Hand* on RL278.

* * *

Once again we have *St. Louis Blues* dished up to us. Why cannot crooners, dance bands, organists and pianists let that "classic" rest? Admittedly it is a good piece of work. So in a different class is Handel's *Largo*, but that does not mean that we have to have it *ad nauseam*.

I have no quarrel with *St. Louis Blues* as a number, but it needs a rest—and a long one. Anyhow, this month, for those with strong constitutions that will bear up under yet another record of this well-worn tune, we have Brunswick 02044, The Boswell Sisters. *Trav'lin' All Alone* is on the other side.

* * *

Want to make your blood creep? Then try H.M.V. C2771. It is a potted version of the thriller, *Ten Minute Alibi*. Turn the lights out and prepare to shudder. A good effort of compression to get the essence of a full play on two sides of a twelve-inch disc.

And then to cheer you up what about the brass-band Columbia DX703, a good massed band record, or a soothing re-recording by Turner Layton of *Smoke Gets In Your Eyes?* He first made that record last year when the tune was all the rage, but as it comes from "Roberta," which film was but recently introduced into this country, Columbia have re-issued the number together with *Lovely to Look At* by the same artist. A very fine record, DB1574.

K. D. R.

ON THE AIR

(*Continued from page* 56.)

13th" is that some of the characters were too exaggerated. I have a different conception of a bus driver and conductor than that represented by Fred and Alf. Miss Twigg (Bertha Woolcote) irritated me.

* * *

The same criticism applies equally well to some of the effects. The bus of which we heard a good deal sounded more like a privately owned car badly driven. And what was the point of the organ music at the beginning and end of the play? It had a point, of course; but, frankly, it escaped me. For all this, the other effects were excellent.

* * *

The death of Julian Rose means a great loss to listeners who like a good laugh. The B.B.C.'s best entertainers are a good crowd, but their cleverness doesn't necessarily produce laughter. Julian Rose was always out to make you laugh, and the B.B.C. can ill afford to lose artists of this type.

* * *

A new artist (new to me, that is to say), who might be said to step right into the shoes of Julian Rose, is Arthur Marshall. He is not another Jewish friend but, like Julian Rose, he speaks at the amazing rate of over 200 words a minute. As a garrulous headmistress, making her usual end-of-term speech to the girls, he is a scream. I like Arthur Marshall. But one has to listen rather carefully to him. Otherwise a good deal would be missed.

* * *

I find The Rhythm Boys a bit colourless. They favour the dreary tune. A bright number would work wonders in their act. They also like strange harmonies, as was evident in their medley of popular tunes.

* * *

Billy Reid takes the pick of the good tunes that are going, and his accordion band makes a good thing of them. It did occur to me, however, that inclusion in a variety bill ought to be an opportunity for a band to break fresh ground and present something really novel.

* * *

Jeanne de Casalis has another fine "Mrs. Feather" episode. Her telephone talk with Withers the florist is as funny as any she has yet done. It was a good thing she was in this particular bill, for, apart from her and Arthur Marshall, there was nothing else of distinction. Variety bills aren't what they were. There was a time when I looked forward to these Saturday evening bills, but nowadays there is little excitement in anticipation.

C. B.

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WHERE R.C. COUPLING SCORES

Items of interest to every radio enthusiast

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

Transformer coupling and resistance-capacity coupling have taken it in turns during the past few years for their share of favour amongst constructors. At first transformer coupling was all the thing because of the extra stage gain which was available, but later on resistance-capacity coupling came along and almost completely ousted transformer coupling, owing mainly to its technical advantages at that time, bearing in mind that intervalve transformers then were comparatively crude affairs.

The position to-day is that resistance-capacity coupling is not nearly so much in favour as it was: I think this is mainly due to the very great improvements that have been made in coupling transformers, which now show excellent response curves.

The Question of Stage Gain.

A very important point in favour of transformer coupling in any case, as already indicated, is the large stage gain which is obtainable by its use. On the side of resistance-capacity coupling must be mentioned that it has a very wide frequency response, wider than that of the transformer. It is true that the stage gain is comparatively low, but in these days of high-amplification mains valves this is not nearly so important a point as it was a few years back. A further important point in favour of resistance-capacity coupling is that it is very good for the reproduction of transients. This, incidentally, is a very important consideration from the standpoint of faithful reproduction.

Bass and High-Note Response.

As regards transformer method of coupling, this is probably as good as resistance-capacity coupling so far as the response to the bass notes goes, more particularly if the transformer is used in the parallel-feed arrangement. As the note frequency rises, however, we find that above perhaps 5,000 cycles the transformer begins to fall off in performance owing, amongst other things, to the self-capacity of the windings, whereas with resistance-capacity coupling the question of self-capacity is practically negligible. In fact, it is often claimed that with R.C.C. you can get practically even response up to as high as 8,000 or 10,000 cycles.

Transients.

Some of you may not perhaps know what is meant by "transients." This can be best explained perhaps by taking such letters as "p" and "b," the effect of which is only very temporary. They consist, in fact, of a kind of minor explosion made by the lips. More serious examples are sudden sounds such as the clapping of hands, and so on. In all these cases the effect is very temporary or "transient," and some types of circuit will fail almost entirely to reproduce the effect in any recognisable way. It is often urged against transformer

(*Continued on next page.*)

WHERE R.C. COUPLING SCORES

(Continued from previous page.)

coupling that, owing to the sluggishness, or inertia if you like, of the electro-magnetic effects in the transformer, a circuit of this kind is unable to handle transients properly. The transformer, they say, does not "rise to the occasion" sufficiently quickly, and the same thing happens after the effect has ceased. With R.C.C., on the other hand, this effect does not arise to any appreciable extent, with the result that the "attack" is better and percussion notes, such as those of a piano, are rendered more natural—at any rate, so the advocates of resistance-capacity coupling maintain.

Grid-Blocking.

Before leaving this point I should perhaps say that in arranging a resistance-capacity coupling it is important that the value of the grid leak should not be too high and the coupling condenser should not be too large, otherwise you will get blocking of the grid. This effect is produced owing to the large charge on the condenser being unable to get away rapidly enough. On the other hand the leak should not be too small, because if so it will have an adverse effect on the amplification. The low notes will also be weakened if the grid condenser is made too small. For all-round purposes, at any rate as a start, you can try a condenser of 0·1 microfarad and a grid leak of half a megohm. You may find some variation of these values better under your actual conditions, but they form a basis from which to begin experimenting.

The Importance of Using a Good Loudspeaker.

There is just one other point. I have said something about reproduction with transformer coupling beginning to suffer a bit after, perhaps, 5,000 cycles. This depends a great deal upon the particular transformer used. Some of the best transformers at present on the market give much better performance than this. Moreover, a good deal depends also on the type of loudspeaker which you intend to use with the set. It is obvious that, if the loudspeaker has a cut-off at 5,000 cycles or lower, it is useless to have a transformer which gives a much better performance. If you use a really up-to-date and high-class transformer, giving you a good response curve well up into the higher audio frequencies, then it is necessary to use a loudspeaker which can do it justice.

Amazing Development.

We frequently read accounts of the enormous development of the radio trade during the past few years; many of them seem almost fabulous. But I was looking at some of the actual figures, and these are really amazing. For instance, over half a million mains sets, about one-third of a million battery sets and some 70,000 radiograms, making a total of roughly a million sets altogether, is not too bad for one year. The average price of a mains set seems to have gone down now to somewhere about £14, whilst the average price of a battery set appears to be something under £10. The average price of a battery set, by the way, has increased slightly during the past couple of years, owing to the increase in the use of the super-heterodyne circuit, with a correspondingly larger number of valves.

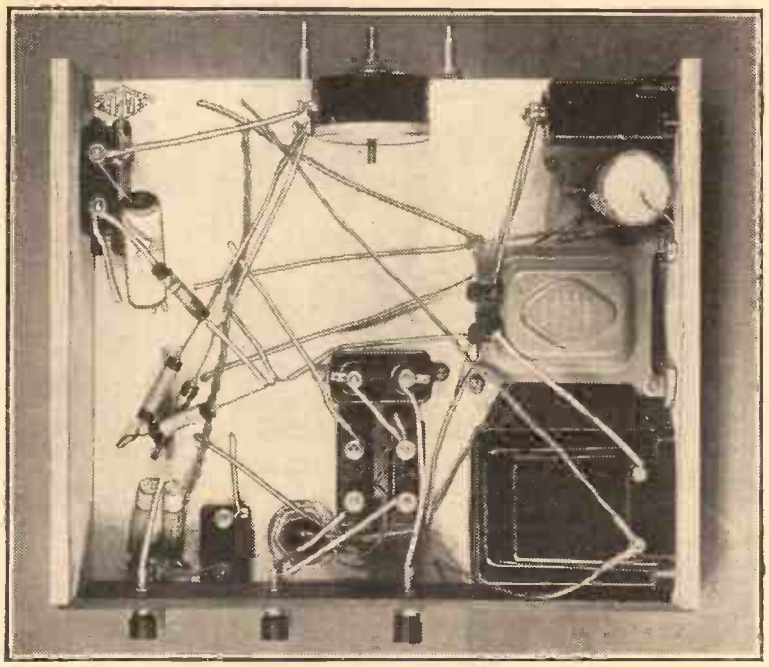
Batteries, Valves and Accessories.

The yearly sale of batteries totals close on £6,000,000, whilst valves and other accessories show about £5,000,000.

As regards the total amount spent in the retail radio trade, it is difficult to give an exact figure, but it is probably in the region of £30,000,000 a year at the present time.

One of the most interesting and important facts which emerges from the various figures compiled is that the average life of a radio set is about four to five years; by this I mean that the rate at which sets are bought, taken in conjunction with the total number of owners of sets, shows that the rate of renewal or replacement will result in all the sets in use in the country being replaced in about five years. Or, if you like to put it another way, about one-fifth to one-fourth of wireless users give themselves a new set every year. Quite apart from the ever-increasing number of listeners, and therefore users of sets, this is a pretty complete answer to the suggestion so often put forward that the radio market has reached saturation.

A SELECTIVE D.C. SET



Here is the under-chassis wiring of the Selective D.C. Set, described on other pages of this issue. This view will be helpful if used in conjunction with the wiring diagram on page 67.

Photo-Cells.

Photo-electric cells which, although not directly used in radio at present, play a fundamental part in television and in talking pictures are now coming to be used for all kinds of other purposes as well. Wherever it is possible to carry out an operation by the production or interruption of a light-beam, there a photo-electric cell can be used as a kind of automatic watchman.

I don't know whether you know, but photo-electric devices of this kind are now used, and have been for some time past, for timing the finish of horse races and motor-car races. A small beam of light is arranged to pass above the finishing line and to fall upon a photo-electric cell. As soon as the winning horse comes along and passes through the beam of light the latter is interrupted and the circuit connected with the photo-electric cell is actuated and records the precise instant at which the beam was interrupted. Inasmuch as the whole thing is electric and automatic it makes for much greater accuracy in the timing of the finish. Another use for photo-electric cells is for automatically switching on street lamps when the natural daylight falls below a certain pre-determined intensity.

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