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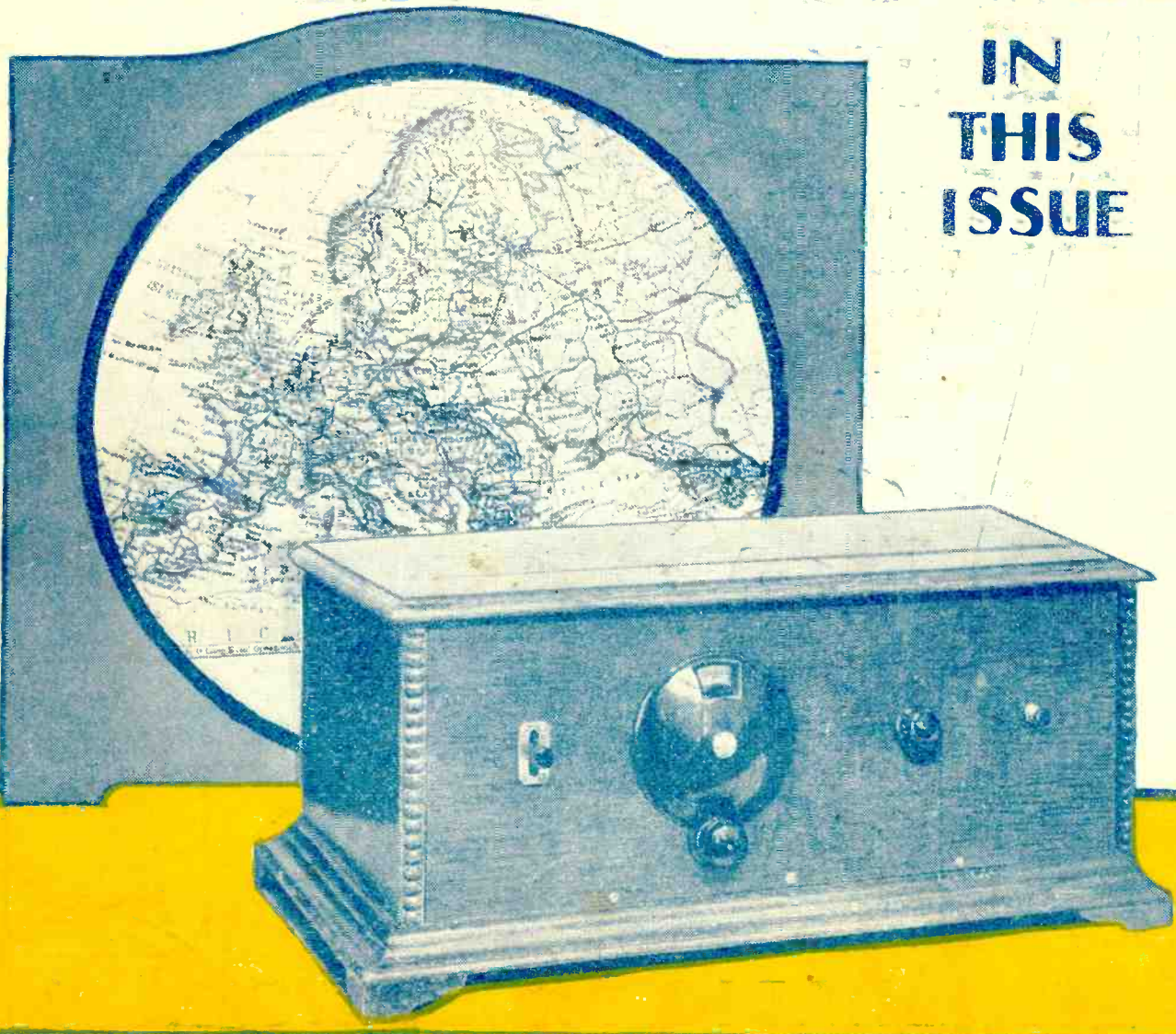
No. 425, Vol. XVII.

INCORPORATING "WIRELESS"

July 26th, 1930.

The "EUROPEAN" THREE

IN
THIS
ISSUE



THE WIZARD OF WIRELESS



The LEWCOS "X" COIL



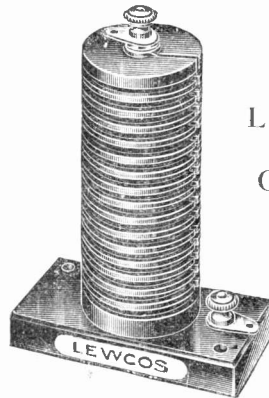
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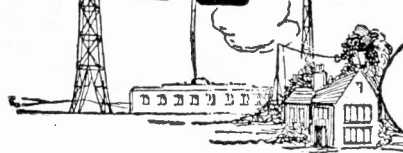
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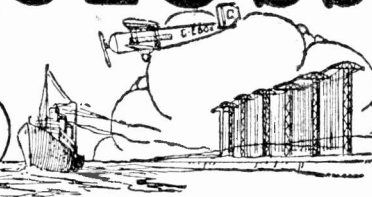


RADIO PRODUCTS

Popular Wireless



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**HARKING BACK—
 MASS PRODUCTION—
 FOR THE BLIND—
 THE LONELIEST JOB?—**

RADIO NOTES & NEWS

**"BELINDA"—
 WIRELESS WARNINGS—
 "P.W." IN PALESTINE—
 SIT UP FOR THIS.**

Now!

NOW is the time when the keen "fan" thinks that the "earth" is much too dry. Now is the time when visiting Americans, sweet pea fanciers and most ordinary folk agree with him. Now the owners of portables boast like blazes, that being the sole compensation for their perspiration. Now is the time when the B.B.C. Talks Department has to fall back upon faith in its destiny: nobody loves the blamed outfit except the printer—and what is the love of a printer? Now loudspeakers blare on lawns, and suburban wives find in the designs new material for competition with "next door." Now—no, not just now, please! Pass me another block of ice, and heaven send the weather change not to cold and rain ere this note gets itself printed.

Harking Back to Winter.

QUITE providentially, at this very moment who should walk in (*I ses*) but Horace the Demon Tipster, engaged at the present time in being our office boy, but destined to fail brilliantly in the City in years to come. He produces a letter, which, (*ses*) has been found alleviated by mischance between the radiator and Mr. Bird's life-saving outfit, which he keeps handy because at any moment may come the cry, "Mr. Rogers has fallen down the vacuum again, sir!" This letter bears a January date! Positively refrigerating to contemplate the Arctic relic, my dear boy. Help yourself to a nib!

Mass Production.

M. C. J. is the target of my apologies and this frivolous persiflage. His was the lost letter which now turns up like Rip van Winkle—very old and whiskery, but perfectly good inside. Many

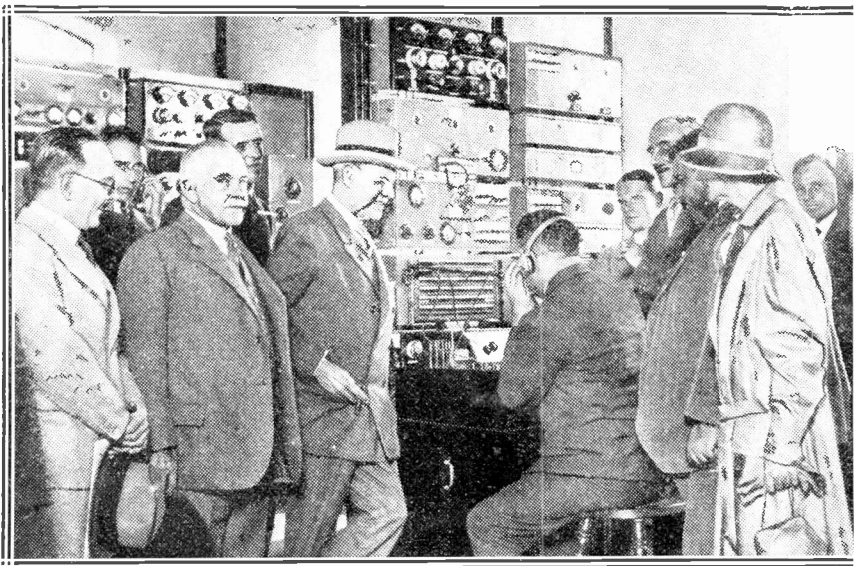
thanks, brother! You want standardised aluminium cabinets! But, imagine standardised furniture! And s. dinners! Or s. clothes! Oh, my friend, shall we not leave a little scope, even in cabinet design, for the quaint, the beautiful and the new?

You leave the "mass producer" to standardise! Go now, on the instant, and make a cabinet crawling with knobs, gargoyles and little cherubs: devise a secret drawer and a trick handle, which when turned letteth loose a cuckoo or a snake. Flee from the yardstick as from the wrath

A Royal Portable.

ALTHOUGH, no doubt, the portable is a goodly thing, it has always aroused in me a faint sense of the comic which some day I'll have to explain at length. Just now, however, I see that such japing would be out of place, for I read that H.M. the King has just bought one of McMichael's models, which is mighty fine business. Whether they sell 'em or have 'em stolen, Mc.M.'s keep their stock of portables well on the move, and either method is a compliment to the makers!

PRESS DELEGATES TALK TO THE "ELETTRA"



Visiting the Dorchester Beam Station, these delegates to the Empire Press Conference called up the "Elettra" at Genoa and had a few minutes' talk with Marquis Marconi.

of Olympus! Standardisation is halfway to petrification! Well, cheerio!

Wireless for the Blind.

THE Radio Manufacturers' Association began their campaign seven months ago and the result so far has been magnificent. Contracts for thousands of sets have been placed, but it is computed that there are still between 15,000 and 20,000 blind persons in Great Britain without receivers. Anyone who would like to help should send money or equipment to the Secretary, Wireless for the Blind Fund, 224, Gt. Portland Street, London, W.1.

Broadcasting Feeling.

I UNDERSTAND that the B.B.C. at Savoy Hill are going to try the effect upon broadcasters of allowing them to dress in their stage clothes. The reason for this is that artists have on many occasions complained that the stiff formality of standing before the microphone, dressed in "store clothes and boiled shirts" drives away inspiration, takes the sparkle from the performance, etc., I take their word for it, but all the same I consider it a feeble confession, savouring of the "temperament," which is a favourite pose of entertainers, artists, poets, and such. If a comedian has sufficient strength of mind he can say his piece well, whether his nose be reddened or not.

The New Gardening.

BY the Great Hoe! this is what I must try on my asters, which have this year entered into a conspiracy against me. A German scientist named Hildebrandt is said to have zipped up the growth of various plants so that only half the usual time was required for them to mature. His tomatoes ripened in three months; radishes matured in two weeks, and so forth. All this was the result of subjecting

(Continued on next page.)

RADIO NOTES AND NEWS.

(Continued from previous page.)

the seeds to very short radio waves (1-50th of an inch) for periods of fifteen minutes. Number of such periods not reported. Very interesting! How much did the radishes finally cost, I wonder!

The Loneliest Job?

WITH the exception of lighthouse-keepers, I should think that radio operators must have to take some of the loneliest jobs on earth. What about Willis Island, for an example? A strip of sand 250 miles east of Cooktown, Australia. On the edge of the Coral Sea and the breeding place of cyclones! There three people stay for six months at a time, advising the mainland by radio of the approach of storms. No ships, except the relief boat, ever come near, and most of the inhabitants of the islands are turtles. Quite suitable for rejected lovers, penniless persons, and students of turtles!

"Sulphating."

THINKING that it might help in the controversy about accumulators, a Hornsey reader is good enough to transcribe an extract from a text book describing the effect of impure zinc in setting up "local action" in a battery, whereby zinc sulphate is formed and hydrogen generated. This, however, probably refers to the Leclanche type, a primary cell, not an accumulator. The elements in a storage battery of the commonest kind are lead compounds and the "sulphate" is that of lead.

"Belinda."

I ALWAYS thought that Philemon was a nice lad, but I don't like the way in which he writes of his "Belinda" at all. I wouldn't give away all the little personal secrets of my Grammy! And he says, "Meet Belinda" and then hustles her off to Italy the very next day. After his unkind remarks about Bel's conversational (one-sided?) abilities, he will be well served if she shuts tight up and sulks throughout the trip. These "femmels," as an old farmer friend calls them, are like that. Now, my Gramelia is— (Snuffed out!—Ed. "P.W.")

Wireless Warnings.

UNLESS one saw it in the annual report of the Admiralty surveys one would not realise that during 1929 no less than 668 radio warnings or notices to mariners were sent out by the Admiralty. By the way, I noticed that the survey people found 67 new rocks last year, the highest number for any year since the war. I wonder how one finds a rock without striking it! But doesn't this sort of report make one wonder how, on earth we ever managed in pre-radio days? Life had its compensations, I suppose, for in any age it is an adaptation to environment, and therefore a balanced affair.

A B.B.C. Beecham's Bill?

WHAT'S this we hear about a possibility of the B.B.C. presenting Sir Thomas Beecham with a "chit" for £5,000 in respect of his share of the loss on last year's symphony concerts? Far be it from me to stick my foot into someone

else's elementary book-keeping! What engages my attention is the fact, if it be such, that the concerts made a huge loss. Why do they, and why should they? Didn't they get "full houses" or are the costs overloaded or the prices too low?

Data from Java.

H. H. (Leamington Spa) is good enough to send us a letter received by him from Bandoeng, Java, addressed to him by the Manager of the International Telephone Office. The following data may be of use. The most important transmitters at Bandoeng are P L E (15.9 metres), P M B (14.55 metres), P L F (16.81 metres), and P L R (27.8 metres). Every Tuesday from 13.40 to 15.40, G.M.T., P L E broadcasts music.

"P.W." in Palestine.

AN enthusiastic reader in Palestine gives his results with Brookmans on 261 metres, using a "straight" three-valver (Det. and 2 L.F.). The signals supplied three pairs of 'phones at strength

SHORT WAVES.

A musician says that for wireless transmission the most soothing instruments are the violin, cello and flute. The intervals that occur when a battery runs down are also very restful.—"Humorist."

"The average American's vocabulary is much more extensive to-day than it was a few years ago," we read.

It is unfair, however, to say that the construction of wireless sets is greatly to blame.

AN UNSOLICITED TESTIMONIAL.

"Although I have no wireless outfit myself, I have a brace of lavishly-equipped neighbours whose enthusiasm and batteries are so strong that I have heard almost every word emitted by 2 L O since March, 1925."—"London Opinion."

"There had been oscillation for over two hours, so in a fit of mad temper I went and chopped down the aerial," said a police-court defendant recently.

This method of cutting out oscillation is not included in those recommended by our Queries Department.

"Oh, but for a little music

That makes the highbrow wilt.

To place the 'phones upon my head

And hear a cheery lilt;

For only one short hour

To hear what we used to hear.

Before recitals and bulletins came

With talk that lasts the whole year."

—"Daily Record and Mail."

IN THAT WIRELESS AGE.

Mr. Robot: "What's wrong with the youngster—teething?"

Mrs. Robot: "No; only a howling valve."

—"Wireless Weekly."

UPLIFT.

A wireless expert remarks that "a good earth is essential." The B.B.C. thinks so, too—hence the Sunday programmes.

RS, and were very free from fading. Very difficult to get a good "earth" there owing to the dryness of the soil, and he has to rely on a well. Seems funny, when you think over history, to hear from a Britisher about "Det. and 2 L.F." in the Holy City, the goal of the Crusaders.

Correspondents Wanted.

MR. BOB CONINGSBY, Van Ness Avenue, Mariboung (W3), Melbourne, Australia, would like to correspond with "P.W." readers interested in short-wave reception. Mr. A. W. Mason finds him to be an interesting and helpful correspondent.

Corks on the Aerial.

IN reference to my comment on the conscientious Cotswold cottager who had strung corks on his aerial, a Rotherham reader suggests, apparently seriously, that the intention probably was the protection of young game birds belonging to the lord of the manor. "If his aerial killed one young partridge, down comes the aerial!" Does that sort of thing really happen? Feudalism must be sat on severely, and if an actual instance were found I should think that "P.W." would be glad to have the fullest possible particulars.

The Latest Columbus.

HAS anybody picked up signals from the frail barque of the Frenchman who recently sailed from Morocco for New York in a boat less than 20 feet long? It is understood that this adventurer's call-sign is X C N P, and that he transmits on 41.5 metres round about 9.30 p.m. and on 36.5 metres an hour later. There's a fine chance for discriminating short-wavers. Has Alf of Middlebro' got this in his log yet? The contemporary from whom I derived this information does not state whether the transmissions are telephonic or morse, but I expect the latter.

Sit Up For This Item!

WHEN in reply to criticisms of the programmes Sir John Reith said—and with reason on his side—that one cannot play trumps every round, "Punch" set the seal of its approval upon the *mot* by adding: "Nevertheless, it is understood that arrangements for broadcasting the Last Trump are already well in hand." Yes, and the B.B.C. will offer to give £100 to a charity for the right to broadcast it!

The Campaign Against Noise.

THIS steadily increases in intensity. Council follows council, with short intervals, in prohibiting loud speaker- and gramophone-playing in the street or at doors and windows in such a manner as to annoy or disturb people. Mr. Abraham Finklestein, of Islington, was recently stung for £1 plus £1 costs for playing a gramophone in his shop. One complainant alleged that he was annoyed in his house 40 yards away. The manager of the shop said that he was using a soft-playing gramophone. Another witness said that he was *inside* the shop at the time and heard no gramophone at all. The quickest way out was to extract £1 from Mr. Finklestein!

What Is One to Do?

INSTANCES like that render me extremely nervous about using my own grammy. I feel that I ought to ask my nearest neighbour before I pass a pensive needle over a bit of Beethoven. "Is the baby asleep? Has your wife a headache? Do I disturb or annoy your bees, cockatoo, tortoise or grandmother?" But, gentlemen, there are other noises! Trains blow off steam nearby till one is deafened. Why can't they do it half a mile up the line? Music lessons ooze out of the school over the way; an infernal *tum tum*. Milk floats and trucks rattle like anything, and new-fangled parents allow babies to yell for hours at a stretch, instead of plugging them with "comforters."

ARIEL.

THE B.B.C. TODAY

BY THE EDITOR



THE most important and significant event in B.B.C. history in the past twelve months was the resignation of Captain Peter Eckersley from the position of Chief Engineer, which he had held since the beginning of broadcasting in this country. Captain Eckersley stood for enterprise, adventure, unremitting activity; he was very much more than Chief Engineer; he was *facile princeps* energiser and stimulator.

Last Year's Big Loss.

He had divided with Sir John Reith the outstanding personal contributions to broadcasting; he was, if anything, more devoted to broadcasting than even Sir John. The withdrawing of his personality from the counsels at Savoy Hill was a serious blow, the results of which are only now becoming apparent.

This does not involve any reflection on Mr. Noel Ashbridge, the new Chief Engineer. On engineering matters Mr. Ashbridge is pre-eminently sound and able, but it was not to Peter Eckersley, engineer, that the B.B.C. was beholden; it was to Peter

* * * * *
 "P.W." again investigates the organisation and policies of the B.B.C. In this first article of a short series the main tendencies and changes are discussed and authentic information of an exclusive nature is given.
 * * * * *

Eckersley, iconoclast and restless rebel against mediocrity and dullness.

From the time Captain Eckersley ceased to attend B.B.C. Control Board meetings, and Programme Committee meetings, all those tendencies against which he valiantly and successfully struggled till then began to appear. There was decreasing attention paid to "peaks"; novelties diminished; experiments declined; showmanship waned; and the dead-level came into its own at last.

When I last reviewed the affairs of the B.B.C. I expressed the hope that the Corporation would bring Captain Eckersley back at all costs, and before the end of 1929. But my hope has been frustrated, to the considerable disadvantage of broadcasting.

In the past year I daresay the B.B.C. has become more efficient; there have been fewer and fewer mistakes and lapses. The announcers approximate more and more to the common anonymous standard; music is better balanced and controlled; plays run more smoothly; noise effects are more uniformly realistic, and so on.

The Points of View.

But the old time spirit of high adventure is sadly lacking. Some say it is because the B.B.C. is getting more like a Government Department and less like it was in the days of the Company. There is possibly something in this explanation, but I believe the main cause has been the departure of Captain Eckersley.

Let us consider the tendency as applied to some other parts of the work. Take the talks, for instance. Miss Matheson, the Talks Director, had a firm friend and supporter in Captain Eckersley.

A year ago now was being planned the first Point of View series, including Wells and Bernard Shaw. This was excellently contrived, full of interest, and of real "peak" material. Late in the autumn, after the

resignation of Captain Eckersley had become effective, a new series of "Points of View" was considered and launched.

This time the policy was strikingly different. Instead of going for the original and challenging thinkers of the younger generation (which probably would have been Miss Matheson's line if unhampered), the B.B.C. got a group of solid respectable pillars of established society who, with the exception of Sir Oliver Lodge, had no message comparable with those of the first series.

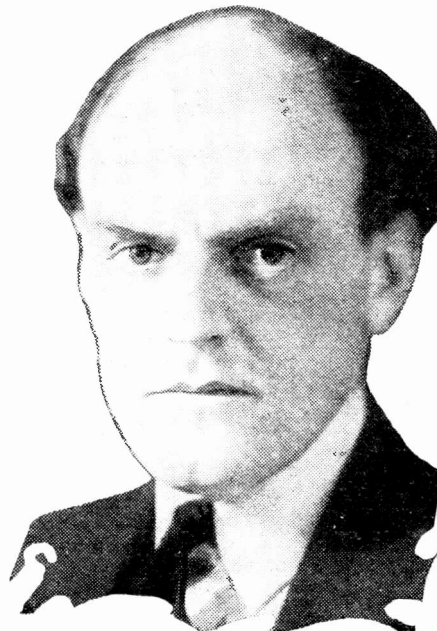
Too Many Cooks?

The policy of the second series was obviously different. What of the procedure? I believe I am right in saying that practically the whole of the arrangements were taken out of the hands of the Talks Director and put into Committee including Governors, Director General, Director of Programmes, and Assistant Director of Programmes. These being translated were: Lord Clarendon, Lord Gainsford, Dr.

(Continued on next page.)



Captain P. P. Eckersley—"Iconoclast and restless rebel against mediocrity and dullness."



"Even Sir John Reith consults his board far more than he should."

THE B.B.C. TODAY.

(Continued from previous page.)

Rendall, Mrs. Philip Snowden, Sir Gordon Nairne, Sir John Reith, Mr. R. H. Eckersley, and Mr. Cecil Graves.

It was a foregone conclusion that the combined efforts of all these excellent people would err on the side of caution and "safety." And so the event proved. The Points of View have now degenerated into the ordinary talks rut; the glamour of the first series has been eclipsed.

If one series of "Points of View" were the only thing affected by the new tendency, it would not be so bad. But the infection has spread both in policy and procedure.

Quick and bold decisions based on personal knowledge and true instinct are no longer the order of the day.

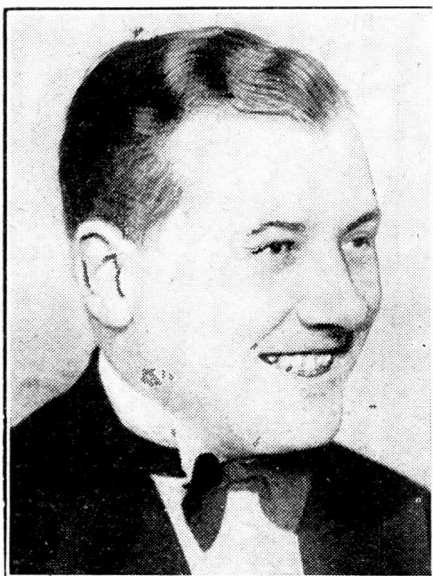
Music the Bright Spot.

Not that Mr. Graves is deficient in qualities of decision or judgment. His hands likewise are tied. He, like Miss Matheson, appears to be caught in the machine. And so it runs right up the hierarchy. Even Sir John Reith consults his Board far more than he should. Is this a symptom of the creeping paralysis of state bureaucracy? I sincerely hope not, but I am not sure.

Meanwhile there is no move to brighten Sundays by providing the alternative programmes during religious transmissions, for which the whole country has been waiting for years. On the contrary, the impression I get is that there is a stiffening of attitude on religious subjects; there is less toleration of views, more insistence on orthodoxy, longer and more frequent religious services, which are certainly no brighter than they were.

I have said the B.B.C. is paradoxically more efficient and less satisfactory. It has lost the genius of Peter Eckersley and so far

A RADIO FAVOURITE



Jack Payne has achieved a notable success with his B.B.C. Dance Orchestra.

there is no sign of adequate replacement. On the other hand the really bright spot is music.

Here, anyway, efficiency has made for improvement. The coming to broadcasting of Adrian Boult is of first-class importance. He has already done a good deal and the next few months will see much more. The National Orchestra is at last nearing completion.

With Adrian Boult behind it, this new aggregation will seriously rival the New York Symphony conducted by the great

THE WORLD'S BEST



Captain O'Donnell whose B.B.C. Military Band is "the best in the world."

Toscannini himself. There is also less of the deciduous modern music, so distasteful to the bulk of listeners.

Walton O'Donnell's military band is far and away the best in the world. In Stanford Robinson the B.B.C. have a pre-eminent choral-master. And so this bright side of the picture unfolds itself.

But I am not done grouching yet. The past year has seen an alarming and dangerous growth of the movement for centralisation. Of course a considerable demobilisation and retrenchment in the Provinces was inevitable as a result of the regional scheme.

The Whittling Process.

Yet the firm maintenance of programme-building centres at Birmingham, Manchester, Edinburgh, Belfast and Cardiff was always represented to be part and parcel of the regional plan.

But the whittling process seems to have proved very ineffective at Savoy Hill. Once the host of relay stations were safely out of the way, the temptation to cut down the regional centres was irresistible. First it was Scotland; the orchestra at Glasgow and all the staff in Scotland except a bare nucleus. Then it was the turn of the Birmingham orchestra, than which no other feature in recent years has done more to add to licence revenue.

But there was such a row about the Birmingham cut that the B.B.C. is marking time in connection with the abolition of the Northern Wireless Orchestra at Manchester. I hope they do more than mark

time about it. This whole centralisation policy needs overhauling. There should be a readjustment of perspective; Here is a chance for the fresh mind of the new chairman, himself a Provincial in origin.

Let Mr. Whitley, Mrs. Snowden, and Sir John Reith go round the Provinces together and get to grips with the situation; let them realise the dangers, and then revise policy accordingly.

Strengthen the Provinces.

It is not safe to go on with the parrot-ery of the box-office argument, translated in licence-increase statistics. The only course acceptable to public opinion and consistent with pledges and policy is to sustain and strengthen the regional centres, orchestras and all.

If there is a scarcity of money, then let the Broadcasting Palace in Portland Place suffer or wait. What matters is what gets into the homes of the million. Real alternatives can be given only by different minds working from different centres, with only a synchronising control.

Halt centralisation, get back to the Peter Eckersley spirit of high endeavour, reform Sunday programmes, and give alternatives on 99 per cent of radiating time, dissolve committees; do these simple, reasonable things and the B.B.C. will take a new lease of life.

Room for Improvement.

It is still easily the best broadcasting service in the world; but I want to see it very much better than it is. Hence the frank commentary on what I regard as the faults that have come to light in the past year or so. How long will it be, I wonder, before Sir John Reith and Mrs. Philip Snowden combine their great talents and ability in the common cause?

SOME HELPFUL HINTS.

One of the great advantages of a loud-speaker filter-output circuit is the fact that it confines the H.T. voltage to the set itself, and thus any long loud-speaker leads to other rooms are not at high voltage, and there is no chance of shock or leakage.

If your 'phones are left permanently connected to your set they should be kept in a perfectly dry place free from dampness which is certain to affect them adversely.

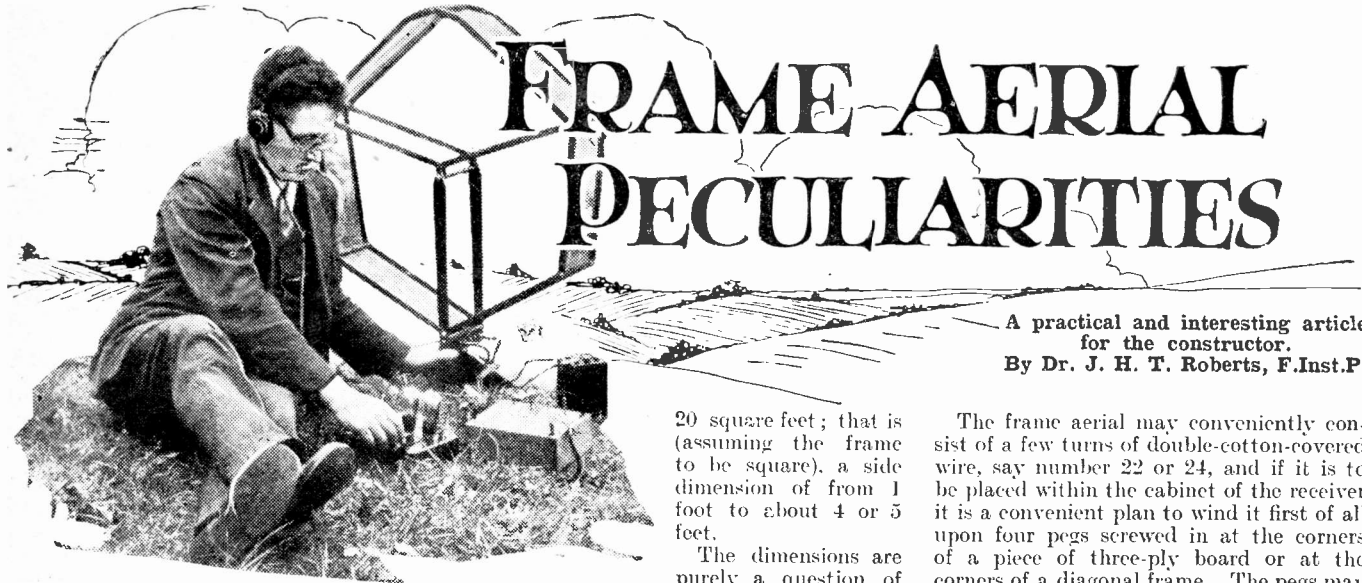
If you use high-tension of 150 volts or more an on-off switch in your H.T. lead may prove to be a good investment.

When a set is switched off the by-pass condensers, etc., are not subjected to the full pressure of the H.T.B. if the H.T. negative lead is fitted with a break switch.

In an emergency a good substitute for a drill is a bradawl of the same size, but pressure must be exercised carefully.

When two circuits are connected together by capacity coupling the smaller the capacity in question the looser will be the coupling.

When the aerial is not in use it should be connected direct to earth outside the house by means of an earthing switch.



FRAME AERIAL PECULIARITIES

A practical and interesting article for the constructor.
By Dr. J. H. T. Roberts, F.Inst.P.

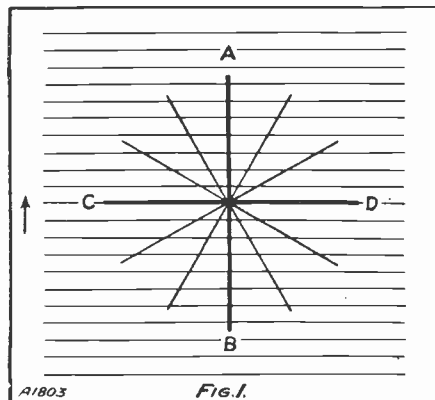
THE current produced in a frame aerial depends on the difference between the effect of the wave upon one vertical side of the frame and that upon the other vertical side of the frame at the same moment. It will be clear from this that if the frame is placed "broadside on" to the waves, the effect on the two vertical sides of the frame at any instant will be the same, that is, the *difference* will be zero, and therefore there will not be any electro-motive force induced in the frame.

Directional Effects.

On the other hand, if the frame is "edge on" to the direction of travel of the waves, the time-interval between the striking of one vertical side and the striking of the opposite vertical side will be at maximum, and the current induced in the aerial by the wireless waves will be at maximum.

This explains the simple and well-known fact that reception on a frame aerial is at a minimum (never actually zero) when the

DIRECTIONAL EFFECT



The horizontal lines represent the radio energy.

frame is broadside-on to the direction of the waves and at a maximum when the frame is edge-on to the waves.

The frame aerial consists, as you know, of a few turns of wire wound upon a frame having an area which may be anything from, say, one square foot to perhaps

20 square feet; that is (assuming the frame to be square), a side dimension of from 1 foot to about 4 or 5 feet.

The dimensions are purely a question of convenience. In the case where the frame aerial is enclosed within the cabinet or lid of a portable set, it is usually of very small size, not more than 12 to 18 in. sides.

In Fig. 1 the horizontal lines represent magnetic lines of force due to the waves which are travelling in the direction of the arrow or parallel to the line AB. You will see that in the position AB the number of magnetic lines linking with the frame is at a maximum, that is, when the frame is edge-on to the direction of the waves.

If the frame is rotated through 90 degrees to the position CD, no magnetic lines are linked and no electro-motive force is induced into the frame.

If we measure the signal-strength produced in the frame when it is in various positions we can plot the diagram shown in Fig. 2, in which the signal strength is proportional to the length of the line drawn (parallel to the frame) from the centre or "origin" and cutting the curve. An important point emerges from this diagram.

You will notice that if you shift the frame through a small angle from the position CD, the length of the chord rapidly increases. If, however, you start from the position AB, and shift through a similar angle, the length of the chord varies very little.

This means that slight shift of the frame aerial when in the region of the *maximum* signal strength produces very little difference, that is, the exact maximum position is not well defined.

Minimum Position Well Defined.

On the other hand, a very slight shift from the *minimum* position causes a pronounced increase in signal strength, and therefore the minimum position is much more sharply defined than the maximum position. For this reason, when the frame aerial is being used for direction-finding purposes, it is customary to take readings of the position of minimum signal-strength.

As a matter of fact, in practice the sharpness of the minimum position is also interfered with owing to certain accidental causes. One of these causes is the fact that the frame aerial, even in the minimum position, acts also to a slight extent as an ordinary line-aerial, and still picks up signals, although very weakly. Also if the windings are not correctly balanced the minimum strength will be raised.

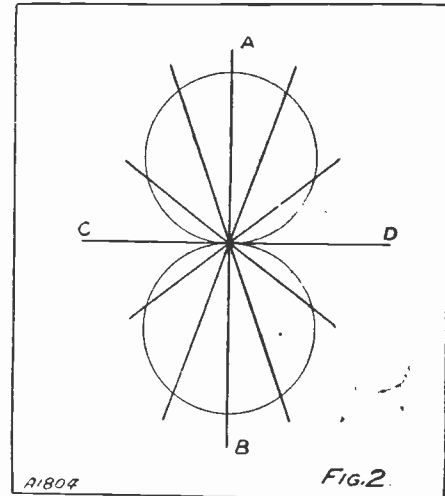
The frame aerial may conveniently consist of a few turns of double-cotton-covered wire, say number 22 or 24, and if it is to be placed within the cabinet of the receiver it is a convenient plan to wind it first of all upon four pegs screwed in at the corners of a piece of three-ply board or at the corners of a diagonal frame. The pegs may consist of ordinary wood-screws carrying ebonite sleeves, and holding these firmly against the wood so that they will not rotate

Advantages of the Frame.

A series of sawcuts may be made in the ebonite, spaced at about one-eighth of an inch apart, the successive turns of wire being laid into the sawcuts. Some constructors put the pegs into the cabinet itself and then wind the turns of the frame aerial in that position, but I think it is much more convenient to wind on a separate frame which can be inserted into or removed from the cabinet.

The frame aerial has the great advantage that no outside aerial is required, nor is an earth connection necessary. Moreover, a receiver with a frame aerial is much more

CRITICAL POSITIONS



Shifting the frame from the C-D position has a more rapid effect than from A-B.

portable than one which has connections to an outside aerial and to earth. At the same time, against these advantages must be set the fact that the frame aerial has only a small fraction of the sensitivity of a good outside aerial with an earth system.

By rotating the receiver as a whole (including the frame), the best position for the reception of any particular station can be found, and this is a distinct aid to cutting out unwanted stations.

LATEST BROADCASTING NEWS.

EISTEDDFOD
BROADCASTS

NATIONAL ORCHESTRA OF
WALES—GROUP LISTENING IN
SCOTLAND—HERE AND THERE
—LANCS. V. YORKS. AT
MANCHESTER.

IT goes almost without saying that several relays from the Royal National Eisteddfod, which opens at Llanelly on Monday, August 4th, are to be included in the broadcast programmes.

Perhaps the most important is the speech by the Rt. Hon. David Lloyd George, M.P., which will be followed by a commentary on the ceremony of the Chairing of the Bard. These relays will be heard by National as well as West Regional listeners.

On Tuesday evening, August 5th, Mr. Caradog Pritchard, the Crown Bard, is to give a talk on "The Eisteddfod, Past and Present." Mr. Pritchard is well-known to listeners for his readings from his own works.

National Orchestra of Wales.

This year's Festival will be memorable in the annals of broadcasting inasmuch as the National Orchestra of Wales has been engaged to play during the week. Listeners, both in the West and to the National transmitters, will hear them on Wednesday evening, August 6th, in a concert, during which items will also be contributed by Francis Russell (tenor), Arthur Fear (baritone), and the Eisteddfod Choir of nearly six hundred voices. Part of the orchestral programme will consist of Sir Hubert Parry's cantata, "The Pied Piper of Hamelin," which will be conducted by Mr. Edgar Thomas.

Group Listening in Scotland.

An important experiment, financed by a grant of £300 from the Carnegie-Trust, to discover what scope exists for the extension of group listening in Scotland on the lines developed in England will take place between September and the end of 1931.

The money will be used for the purchase of receiving sets, which will be loaned to listening groups in the counties of Dumfriesshire and Lanark, which have been selected because they are representative of town, industrial and rural life.

The organising committee has been formed by representatives of bodies interested in adult education under the chairmanship of Professor Rait of the Glasgow University.

Enthusiasts for broadcast education are confident that the experiment will lead to the formation of numerous groups, so that within a short time those responsible for this side of broadcast work in England will have to look to their laurels.

Here and There.

The August Bank Holiday programme for National listeners will include the next edition of Gordon McConnel's "Suitable Songs"—mainly those of the late Albert Chevalier, King of Cockney comedians. The songs will be sung by Edgar Lane, who

was one of Chevalier's greatest friends, and who, it will be remembered, has already given several recitals of a similar nature from the Birmingham studio.

Frank Westfield's Orchestra, at the Prince of Wales' Playhouse, Lewisham, which has not been heard for more than a year because of the talkie boom, is to be heard regularly on Tuesday afternoons, beginning on July 29th.

It is an open secret that the programmes of "Diversions," arranged at Savoy Hill, did not come up to expectations, with the result that the authorities decided to drop them, at any rate for the time being.

Undeterred by the set-back to their London colleagues, the Studio officials at Birmingham are determined to try their luck even if they fail to provide more than one show. Naturally, details are being kept secret, but it is understood that the Midland

engineers have been making some tests with an aeroplane.

The date chosen for the programme is Friday, July 25th.

More than usual interest is contained in the announcement that the London and National programmes on Thursday and Friday, July 31st and August 1st respectively, will contain a play by Dulcinea Glasby called "Obsession." Miss Glasby, who for many years has been on the staff at Savoy Hill, has prepared many plays for broadcasting.

National listeners will have to wait until Thursday, August 7th, for a relay from the seaside, when the Coldstream Guards will be heard playing at Brighton.

Millions of listeners will look forward to hearing a broadcast of Miss Amy Johnson's arrival at Croydon on Tuesday, August 5th. It is hoped that the broadcast will go out from all stations.

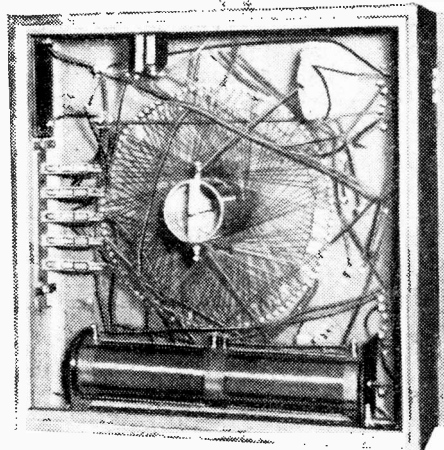
Lancs. v. Yorks. at Manchester.

Provided the weather is fine, listeners throughout the North on August Bank Holiday afternoon will have no grouse against the programme to be provided. It is one of the days devoted to the County Cricket Match between Lancashire and Yorkshire at Old Trafford, Manchester, and several eye-witness accounts of the game will be given by Mr. A. E. Lawton, the former captain of Derbyshire.

Later the same day there is to be a humorous debate on cricket in the Manchester studio between George Cartwright and Levi Shaw, the title of their discussion being "Ashes of Roses."

Subsequently the Northern Wireless Orchestra and the Clitheroe Wesley Male Voice Choir will give a programme of examples of the music of England, Scotland, Ireland and Wales, which has been strung together under the title of the "Royal Standard." This part of the Northern programme will also constitute the programme for National listeners.

AN OLD-TIMER



This interesting photograph shows the back view of an old crystal set made originally to receive the Eiffel Tower broadcasts and time signal. It measured about twenty inches square—the size of a modern portable!

FOR THE LISTENER.

A Specially-contributed Criticism of Current Broadcasting Events.
By "PHILEMON"

This week our popular contributor, who is holiday-making on the Continent, tells how British broadcasting is received there.

A Sensation.

WELL, here we are, Belinda and I at the farm. Belinda's reception was immense.

It is not being reported in the local papers, partly for fear that Mussolini might be jealous, partly because there are no local papers. On previous occasions I myself have been the centre of attraction; but from the moment I said, "This is my Radió. Please meet Belinda!" she has been the centre of attraction.

Nobody in these parts has seen anything like her before. The farm-boy who carried my luggage into the cottage stood staring at her, open-mouthed. I took off her mackintosh—her travelling cloak, I should say. She stood on the table before him,

her polished wood gleaming, and all her little gadgets pricking him with eye-bulging curiosity.

"E bella!" he cried, smiling with his white teeth. "Bellissima!"

The Aerial.

The farm emptied itself around her. The farmer left his reaping-hook, the farm-hand came off the midden, the farm-wife abandoned her washtub, even Lulu, a fat liver-coloured mongrel, left her bone, and they all came around. I took advantage of this enthusiasm to get the aerial put up.

Belinda, of course, carries her aerial inside her, but I thought that an extra

(Continued on page 552.)



CAPT. ECKERSLEY'S QUERY CORNER

A SHOCK FROM A CHARGER—THE NORTH REGIONAL—TROUBLE WITH AN S.G. STAGE—ADJUSTING DETECTOR BIAS.

Under the above title, week by week, Captain P. P. Eckersley, M.I.E.E., late Chief Engineer of the B.B.C., and now our Chief Radio Consultant, comments upon radio queries submitted by "P.W." readers. But don't address your queries to Captain Eckersley—a selection of those received by the Query Department in the ordinary way will be dealt with by him.

A Shock from a Charger.

"CHARGER" (Seven Kings).—"When charging an accumulator from D.C. mains with the positive main earthed, is it possible to obtain a shock from the accumulator by merely touching the negative terminal? The above is assuming that I am standing on an earthed object."

Yes, rather! and you bet! and I have done it! and it's not pleasant! You see if a conductor is either positive or negative compared to earth, and if a person is earthed, and if he touches that positively or negatively charged thing, current is bound to flow from that thing through him to earth, thereby giving him an electric shock.

It doesn't matter if the current flows one way or the other, it's a shock just the same.

* * *

The North Regional.

G. B. A. (Huddersfield).—"I am situated within a few miles of the new Northern regional station, and am thinking of constructing another receiver. Is it safe to assume that conditions within ten miles of this station will be similar to conditions within a similar distance from Brookmans Park?"

Yes, practically speaking.

* * *

Trouble with an S.G. Stage.

J. M. (Muswell Hill).—"I am extremely dissatisfied with my screened grid H.F. valve. The H.F. amplifier gives me good amplification but no selectivity, and if I reduce the number of turns on the primary of my H.F. transformer (which is interchangeable), the selectivity is improved but a loss of amplification results.

"Do you consider an efficient H.F. transformer (Litz

wire, etc.) used with an ordinary neutralised H.F. valve would give me a higher degree of selectivity and an amplification comparable to an S.G. valve, the latter employing a small primary?"

No. The S.G. valve properly treated ought to give both better selectivity and sensitivity than an ordinary H.F. valve. But the screened-grid valve has a very much greater sensitivity as selectivity is sacrificed because sensitivity and selectivity are actually inversely proportional and an increase of sensitivity gives an apparent decrease in selectivity.

But on balance, and designing things properly, both sensitivity and selectivity can be increased in the case of the S.G. valve provided proper precautions are taken. This does not force sensitivity beyond the limits dictated by selectivity. Make your inductances of low resistance and make them to have high impedance.

Adjusting Detector Bias.

B. H. (Southgate).—"I have constructed a four-valve receiver incorporating indirectly-heated A.C. valves and am experiencing some difficulty in arriving at a value of grid bias for the detector, which, while allowing me to obtain good quality of reproduction from Brookmans Park, also enables me to bring in distant stations.

"A positive bias of 1½ to 3 volts allows me to fully tune in the local station, but I have to reduce the bias to zero in order to obtain maximum signal strength from other stations. A negative bias (anode bend rectification) appears to be useless, since it reduces volume considerably from all radio sources.

"I should be grateful for some suggestions. Incidentally, an S.G. A.C. valve precedes the detector."

I do not know the characteristics of the valve you are using.

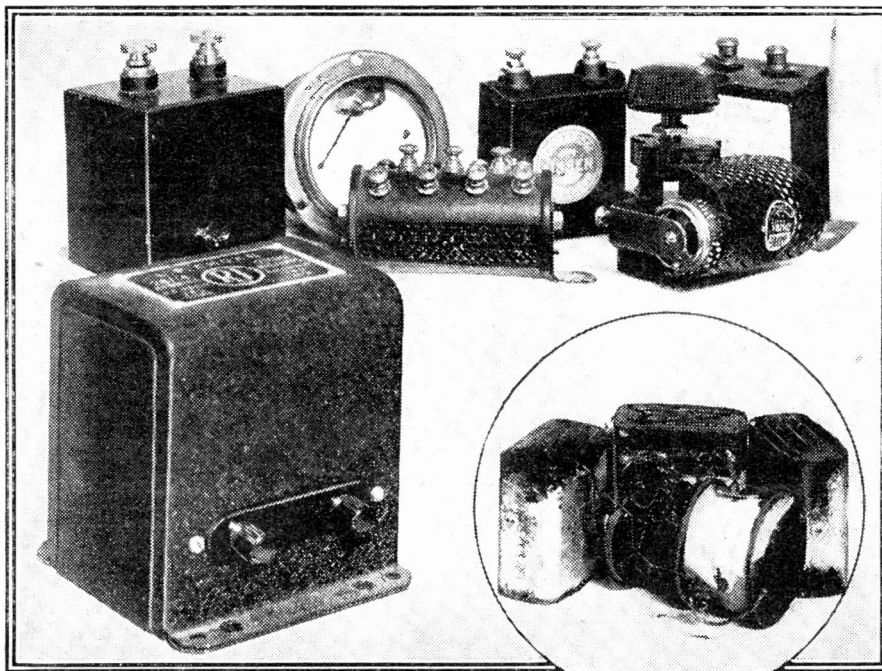
You have two things to consider—quality and quantity. They are not necessarily proportional.

If you get on the straight part of the characteristic you have the nearer approach to distortionless rectification: if, however, you are on other parts of the characteristic you may get better volume but worse quality.

Frankly it is for you to decide. If you get good quality and good volume, why worry? If the volume is good but the quality poor with one adjustment, but vice versa with another you must decide what you want yourself.

Since distant stations are normally pretty poor quality, you want to get volume, but in the local station you volume is there, so get the best quality.

TWO MAINS UNITS



The complete "innards" of a small commercial D.C. Mains Unit are shown in the circle. To the same scale are illustrated the parts of the smallest "Safe-power" Unit described by "P.W." The cost of constructing this latter may not be much more than the price of the commercial unit, nevertheless, it is obvious that the constructor must score heavily in, at least, this particular case.

are shown in D.C. "Safe-power" Unit

SHORT-WAVE NOTES.

News about short-wave stations and short-wave reception, including some very useful advice on working short-wavers from H.T. mains eliminators.

By W. L. S.

THE Editor has asked me to say a few words on the subject of mains units and short wavers, as apparently a number of readers seem to be having all sorts of troubles with them.

I have at several times made scrappy remarks on this somewhat wide subject, chiefly consisting of practical tips gleaned from my own experience. I must therefore ask those who know all about the subject and are liable to become bored either to forgive me or to pass on quickly.

I have no hesitation in saying that the source of nearly all the troubles that crop up when a mains unit is used with a short-waver is the detector. It is child's play to make the "note-mags." work from the cheapest eliminator, but when we get to the detector we generally run right into a nest of troubles.

The Source of the Trouble.

Unfortunate though it may seem, the trouble generally comes from the detector and not the mains unit. If the H.F. choke is doubtful, if the by-pass condenser is not above reproach, and particularly if no trouble has been taken at all to provide a really efficient by-pass for H.F. before it gets too far round the detector anode circuit, then it stands to reason that the slightest modulation in the H.T. supply, whether ripple from D.C. mains or 50-cycle stuff from imperfectly-smoothed A.C. mains, will cause plenty of trouble.

Therefore see that your by-passing scheme is efficient. This means not only that its physical position on the baseboard is correct. Remember, above all things, that in the region of 20 metres one good long loop in the wiring may have half the inductance of the tuning coil!

Thus, if you are using an ordinary series-fed circuit you should be able to trace the following short, direct wires: from detector anode to one side of the reaction coil; from the other side to an H.F. choke and also to one side of the reaction condenser (the other side of which goes to L.T.—); from the other side of the choke to one end of the transformer primary; from the other end of the primary straight down through a 2 mfd. condenser to L.T.—, and also through 10,000 or 20,000 ohm resistance to H.T. positive.

Using Extra Smoothing.

If you can find all this there should not be much wrong with the "set" part of the business. Now for the eliminator.

If it is a really good mains unit it should work straight away with one of the appropriate H.T. tappings taken to the detector H.T. terminal mentioned above. If it is of the cheap kind without enough smoothing, take the detector H.T. lead out through an externally-connected 20 or 30 henry choke, and connect the "set" side of this choke straight down to earth through a 2 mfd. or 4 mfd. condenser.

If there is still a trace of hum, don't be

afraid of using 8 mfd. It is cheaper than buying high-tension batteries anyway!

Need for a Good Earth.

I honestly fail to see how anyone can be troubled with hum now, providing he has a moderately good earth on the set. That, too, is a point missed by a number of people who have found that they can work a short-waver quite well off batteries without an earth.

The next trouble that may arise is that the set will continually be slithering in and out of oscillation (at least, we hope it slithers—some of them will go in and out with ear-shattering explosions.) This is, of course, due to slight but persistent

INSULATING THE AERIAL MAST.

To avoid losses in the metal masts of high-power transmitting stations it is often necessary to insulate them in sections in the manner illustrated in this photograph!



variations in the mains voltage, and is, unfortunately, common to a great number of supplies, including mine.

This phenomenon is capable of causing much annoyance, but, luckily, there is a simple remedy. Simply connect a neon lamp across the detector positive and negative H.T.

The ordinary 200-volt night-light that can be bought at any electrician's is suitable. It takes 5 watts (which means about 20 or 25 m.a.) and is very efficacious,

provided that your mains unit is designed to stand an output of that order.

If it is not, a resistance of about 10,000 or 20,000 ohms across that tapping will often put things right. A large condenser across the resistance will also help.

And now I must leave it for readers to make their own particular problems known to me, since I can think of no other troubles that the average man is likely to meet.

A Welsh reader has been kind enough to forward me a schedule from Radio Bandoeng, P.L.E., which runs as follows: Monday, Wednesday, Thursday and Saturday with P.M.B. on 14.55 metres from 1140-1600 G.M.T. Also one or both of the two stations, P.L.F. on 16.8 metres or P.L.R. on 28.2 metres.

On Tuesday and Friday there is one or more of the above and P.L.E. on 15.93 metres. The weekly concert is given by P.L.E. every Tuesday from 1340 to 1540 G.M.T.

Telephony Working.

The Transatlantic 'phone is often the only inmate of the entire 20-metre band these days. Very seldom are distant amateur signals heard at all in the evenings, and the other short-wave broadcasting stations in this region are particularly weak.

This record spell of poor reception extends from the end of March!

Amateur telephony seems to be going strong on 40 metres these days. I have heard some really excellent "fone" from round about London, but particularly from stations further distant and as far North as Aberdeen.

I have hopes that the 80-metre band, now reopened for amateur work, will prove of use for telephony work at week-ends. At all events it should be more useful for "local" work up to about 100 miles than either the 150-metre or the 40-metre waves.

POINTS ABOUT AERIALS.

Indoor aerials are not very good from the pick-up point of view, but the coming of better H.F. valves and the higher-powered stations is resulting in a considerable increase in their use.

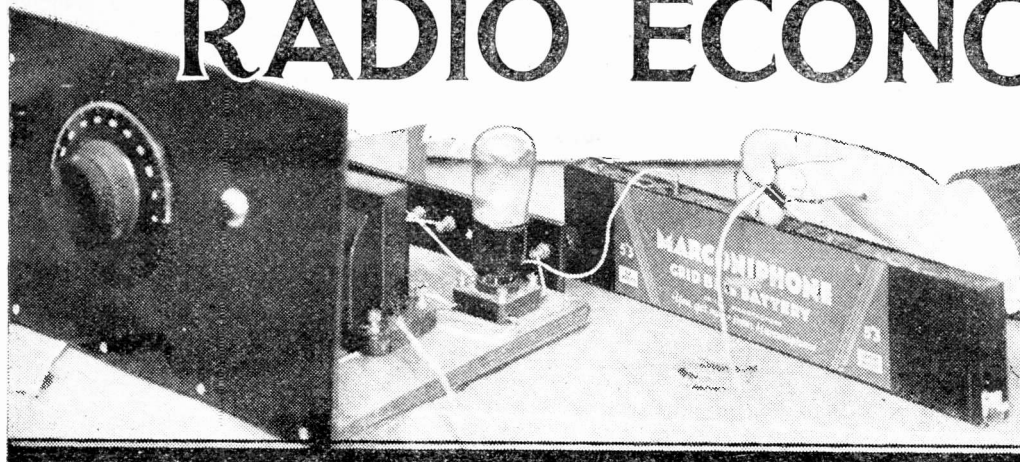
From a high-frequency point of view an aerial is not insulated properly unless it is spaced well away from all adjacent conductors.

If you run an insulated aerial wire close to a metal gutter pipe you are forming a small condenser with the insulation of the wire acting as the dielectric, and your signals are likely to "leak" to earth via this.

A big aerial often causes more trouble by its lack of selectivity than is gained from its large energy pick-up.

RADIO ECONOMIES

by
VICTOR KING



Sound advice on set selection and assembly by one of radio's most outstanding personalities.

I THINK I must have received more letters about one of my recent articles than any other that I have ever written. The article was entitled "How Much Does Radio Cost You?" and many of my correspondents appear to consider that I did not fulfil the promise of that title.

But really, you know, the complete economics of radio is too big a subject to be coverable by one page of "P.W." However, the editor has kindly given me this opportunity of going further into the question.

It has been pointed out that many of the sets described in "P.W." and "M.W." cost some pounds to construct if the recommended components and parts are used, whereas satisfactory versions are possible at fractions of the outlays. I did think that I had adequately covered at least that point, and shown you that it is possible to narrow things down in many instances by an intelligent selection of parts, but it appears that there are many enthusiasts who go to surprising limits.

Dangerous Extremes.

"I have been able to build a so-and-so two-valver for 15s." is the kind of thing that is said. Now that sort of business is all very well, but extremes have their dangers. I think I can go right to the heart of that matter by repeating a very clever sub-title that I spotted in a recent "P.W."

This ran: "the set is no better than its loud speaker," or words to that effect.

The average small loud-speaker is the greatest stumbling block in the progress of home-constructor radio. It is an undeniable fact that all sets are reduced to a very low level of overall efficiency when they are used with mediocre loud-speakers. And unfortunately there are all too few loud-speakers that rise above the *very* mediocre.

If you are for ever going to confine your attentions to a nasty little loud-speaker having no bass, and capable of handling nothing above a thousand in the way of high notes, then you need look no further than the cheapest of everything in the way of component parts.

Another Viewpoint.

What is the use of building a receiver capable of getting frequencies of 75 or 5,000 to its output terminals in fair measure, if a

loud-speaker is tacked on which is quite incapable of dealing with them?

But look at the other side of the picture. What is the advantage in having a first-class loud-speaker that has the power to reproduce quite respectable low frequencies with a quite decent percentage of the upper register, if you never have a set that can deliver a respectable output.

Rather Unfortunate Word.

It seems to me that the constructor too often fails to remember that a radio set is one complete entity and that its accessories, that is, batteries, loud-speaker, etc. are far from being unimportant incidentals.

Maybe the word accessory is unfortunate in that it might tend to indicate that these

If a loud-speaker outfit cannot give better results with more H.T. than that, then there surely must be something wrong with it. It is a false economy indeed to cut down your battery power to such absurd limits. That is, if you have a decent set and a moderately decent loud-speaker to take its output.

You see, all these things are so interdependent; drop the level of the one and the level of the whole outfit correspondingly falls. The practical value of a £100 outfit can be entirely invalidated by the presence of one cheap and nasty little component.

Expensive Components.

As you are all by now no doubt aware, I am no lover of the expensive component or accessory for its mere expensive-ness, but I would not attempt to drive a fifteen guinea moving-coil loud speaker (if I had one) with a fifteen shilling set.

Unfortunately for constructors in general, I have to admit that there is no justification for the high prices of a few of the components and accessories of first-class grade. But gradually prices are coming down, and the discriminating constructor has no difficulty whatever in getting real value for money.

There is very keen competition in the radio trade.

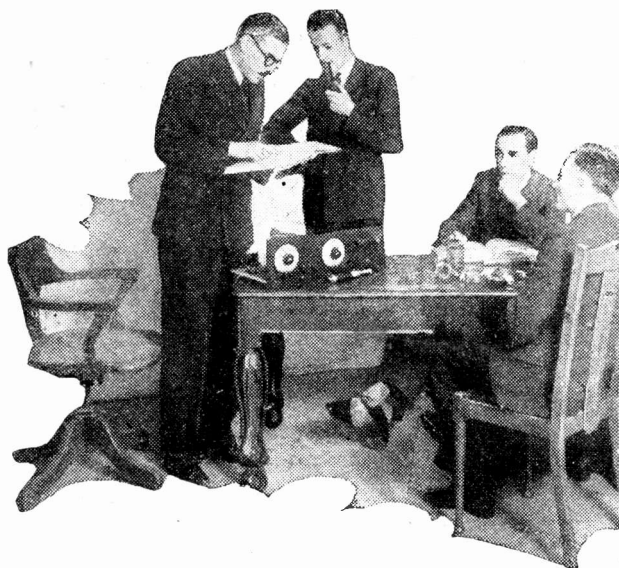
Although there may not be much stuff sold these days that is as hopelessly bad as some of those earlier components and accessories, there is an extremely wide gap between the component or loud-speaker with a passable performance, and the one that is labelled by the expert as first-class.

Sound Advice.

And it depends upon your selection of parts for your set and the selection of its accessories, whether the results of the whole outfit are going to be at the one end or other of the scale.

Real skill is needed to steer a middle course, knowing that your financial resources will not permit you to strike the highest levels.

I should advise you to spend all you can on those radio parts having definite frequency or amplitude characteristics, particularly loud speakers, L.F. chokes and transformers, valves (and H.T.), if you want really high quality results.



Victor King (left) describes one of his own set designs for the benefit of some interested friends.

vital items play "second fiddle" to the set itself.

But you should always think of the whole outfit, batteries, valves, loud-speaker, aerial—everything, every component part, every accessory as playing important rôles in an important whole.

I have mentioned batteries, and what vital things these are! You can get results from your set whatever it is with an H.T. probably as low as 60 volts. But that is not a matter for congratulation; it is not an achievement.

THE CRITICS OF THE B.B.C.

Readers will enjoy this article about criticisms of the B.B.C., especially in view of the new series of well informed and constructive articles which begin in this issue.

By N. F. E.

It is sometimes amusing, though seldom instructive, to go through a pile of newspaper cuttings, and note the space devoted to criticisms of the B.B.C.

Where the criticism is not definitely destructive it is usually carping, and where, in rare cases, it is not carping, it is misinformed.

Now we have had many a word of adverse criticism to make against the B.B.C., and unless a miracle happens and all things suddenly attain to a state of blissful perfection, we shall have many a word of similar criticism to make in the future. But, we hope, with some definite constructive basis.

Criticism which consists in the main of fault-finding is similar in effect to a nagging, grumbling wife: it becomes a habit to be disregarded by the object of the criticism. And there is nothing quite so valueless, so sterile, and so abysmally futile, as criticism which is contemptuously disregarded.

Those Constant Attacks.

A dramatic critic who inspires theatre managers to say "Oh, it doesn't matter a tinker's cuss what so-and-so says about a play," should throw up his job and try something else.

Oscar Wilde once said that it was better to be attacked than to be ignored—but like most of the so-called smart sayings of that King of Posers, there was only a superficial truth in his *bon mot*.

Constant attack—especially when it is obviously destructive and biased—is harmful to those who attack. The attacked needn't worry—much.

And so, when the B.B.C. is picked upon—as it often is—as the object for all the ink-slingers who suffer from indigestion, liver, and what-not, and who seem to find some relief in castigating the B.B.C. in and out of season, the B.B.C. need not worry.

As a matter of fact they don't. They used to—very much. We remember days when one little piece of adverse criticism would set Savoy Hill in an uproar. We ourselves have had some experience of the fluttering in the B.B.C. dove-cote caused by editorials in this journal.

Two Classes of Critics.

But those days, happily, are passed. The B.B.C. is now well able to face criticism, because it realises that intelligent and constructive comment on its affairs is definitely valuable.

Criticisms levelled against the B.B.C. may not always be regarded at Savoy Hill as pearls of wisdom. The advice offered—gratuitously, of course!—may not always be accepted; but there can be no doubt that Savoy Hill does not find it unwelcome. As Sir John Reith would say, "By taking heed of differences of opinion, we gain ground."

Critics of the B.B.C. may be split into two classes—those who criticise the programmes, and those who criticise the

administrative policy.

The programme critics seem reasonably unanimous about the need for more cheerful Sunday programmes, but like their brethren, the dramatic critics of the theatre, they seldom agree when criticising individual programmes. Which shows, of course, the truth of the old adage that what is one man's meat is another's poison, and incidentally lends force to the argument that you can't please everybody.

The Out-and-Outers.

The critics of policy are equally divided. Some are against the "uplift" policy: some maintain there should be a basis of entertainment in everything broadcast—especially in connection with the "educa-

A RADIO PERSONALITY



This is Miss Beatrice Harrison feeding the birds in her beautiful Surrey garden after a successful American tour. She is well known to listeners for her 'cello recitals and in connection with the nightingale broadcasts.

tional" activities of the B.B.C. (With this view we agree.) And there are the out-and-out highbrows, and the out-and-out lowbrows: and then a vague body generally known as middlebrows.

And lastly, the "can't-be-pleased-at-any-price" gang—the critics who simply cannot find an ounce of good in the B.B.C.—from programmes to administrative policy. These of course, can be ignored. They are of no value.

The Brick-Heavers.

They contribute nothing to the progress of broadcasting, and they merely weary the listener who is interested in B.B.C. criticism, by the monotony of their diatribes and the malice of their rhetoric.

Still, they probably get some fun out of writing stuff and nonsense, and we all know that, at times, there is a snug satisfaction to be had in "breaking things."

Your jaundiced critic gets the same feeling as a small boy does when he heaves a brick through a window and runs away.

The only difference being that hard words break no bones, while hard bricks do break windows.

But there it is. It takes all sorts to make a world and perhaps the B.B.C. and the average listener would miss the fulminations and the desperate campaigns of those who regard the B.B.C. as a sort of permanent Aunt Sally.

The only danger is this: some people find this sort of froth convincing because of its very superficiality.

What Really Counts.

But the man who likes a tankard of beer knows, by experience, that the froth at the top, although effective in appearance, doesn't count for much. So then, we hope listeners will not be gulled by the froth of the "out-and-outers" who can find no sign of grace in the activity of Savoy Hill, but will blow them aside and pay heed to the unprejudiced critics who know their subject, and who realise that although there may be much which is (relatively) bad about the B.B.C., so there is much that is (relatively) good.

After all, who wants a perfect B.B.C.? Nothing is perfect on this earth—and probably never will be. And if we could honestly say British Broadcasting were perfect we should have realised something absolute.

And that would be almost supernatural. Certainly it would be super-human: and super-human in the broadcasting sense would probably result in something super-mechanical!

But there's no fear of that so long as intelligent criticism, backed by goodwill and a desire to help forward, is understood and appreciated—not so much for what it is intrinsically worth, but for the motives which underlie it.

RADIO WRINKLES

When soldering, both the iron itself and the working surfaces must be kept perfectly clean.

The old-fashioned idea of a small loud speaker necessarily giving small volume and a large loud speaker giving large volume is still occasionally cropping up, although it has been disproved long ago.

An ordinary on-off switch fitted across the terminals of one loud speaker wired in series with another will enable it to be switched into circuit without affecting the other speaker.

For "family" use one of the permanent types of crystal detector is generally more satisfactory than the "cat's-whisker" which easily gets out of adjustment.

HAVE you ever seen a receiver of the detector and L.F. type with wave-change switching arranged with plug-in coils? Can you remember how many coils there were? Somewhere about five or six, wasn't it? That is what generally happens when an attempt is made to arrange a set including switching for going over from the ordinary band to long waves, and yet retaining the advantages of standard plug-in coils.

Efficient Switching.

The complication and waste of space which results in the case of a set assembled on these lines has been sufficient to cause designers to avoid this otherwise satisfactory method of wave changing. It really is an attractive method, of course, remembering that plug-in coils are not expensive and that a very large number of constructors already possess them, and further, that provided the switch itself is a good one, the efficiency obtainable from any scheme giving a complete change-over from one set of coils to another is usually quite high.

Evidently if the one drawback of complication introduced by so large a

the famous "Magic" Three receiver, which was originally of the interchangeable coil type, in order that it might be used successfully on the short waves.

We have now devised a form of wave-change circuit with plug-in coils which we think our readers will agree fills the bill admirably. A glance at the photographs of the receiver we are presenting this week will show you that it contains only three plug-in coils, and calls for nothing more complicated than an ordinary double-pole change-over switch. What a contrast it presents to many designs using this type of coil! The actual extra complication as compared with an ordinary non-wave-change receiver is really only slight and does not entail any loss of efficiency.

You will appreciate this point better when we tell you that the circuit used for this receiver is fundamentally the same as that in the famous "Magic" Three, and that the present set when on test came well up to the very high standard set by its predecessor. Those who have had experience of the "Magic" Three will understand that this is high praise indeed: this remarkable wave-change receiver possesses to the full the extraordinary power and sensitivity of the "Magic" and handles just as pleasantly.

Selective.

An examination of the circuit diagram will show you the main features of the set, because the switching arrangement is so simple that it is quite easy to follow in this form. First, you will notice that the aerial can be connected to either of two different terminals, one connecting it straight through to the tapings on the tuning coil via the switch, and the other bringing in a series condenser of the adjustable type, which enables you to obtain higher degrees of selectivity.

Now take a look at the switch S_2 , and you will see that it gives you a complete change-over from the coil L_1 to the coil L_2 . These are both "X" coils and serve for both aerial coupling and tuning purposes. Coil L_1 is the short-wave one, while L_2 is for long waves and you will observe that the switch gives you what is in effect a complete change-over from one band to the other, with no possi-

bility of dead end or other losses. At this point you will begin to see where the simplicity of our scheme comes in. By using "X" coils in this way we have been able to achieve our end with only two units

instead of the more customary four which are required when a separate aerial primary winding is employed on each wave band. The second great simplification results from the fact that we have found it possible

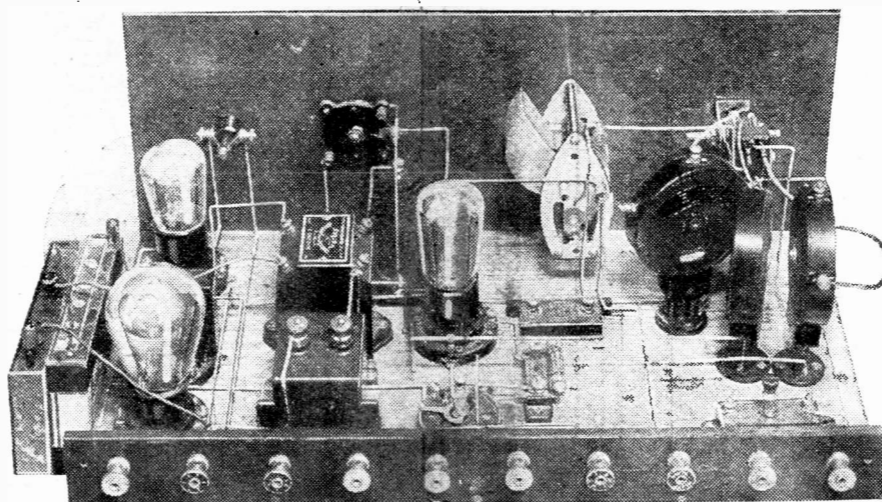
The "EUROPEAN" THREE



This remarkable set gives you the convenience of wave-change switching in combination with all the efficiency of a single-range instrument, with amazing power and sensitivity.

Designed and Described by the "P.W." RESEARCH DEPARTMENT.

READY TO RANGE THE CONTINENT

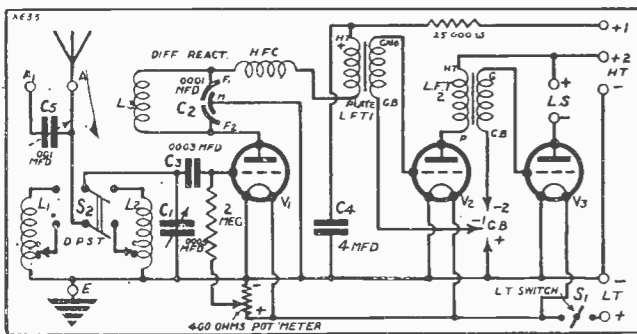


Here you can see how the open nature of the lay-out, and the care with which it was planned, combine to give particularly simple wiring.

HERE ARE THE COMPONENTS THAT YOU WILL NEED.

- 1 Panel, 18 x 7 ins. (Paxolin or Lissen, Trolite, Goltone, etc.).
- 1 Cabinet to fit, with baseboard 9 or 10 ins. deep. (Camco or Osborne, Pickett, Kay, etc.).
- 1 .0005-mfd. variable condenser (Lissen or Lotus, J. B., Ready Radio, Dubilier, Ormond, etc.).
- 1 Vernier dial if condenser not of slow-motion type (Lissen or Igranic, J.B., Lotus, etc.).
- 1 .0001, .00013, or .00015-mfd. differential reaction condenser (Ready Radio or Lotus, Lissen, Ormond, Dubilier, Formo, Bulgin, Wearite, Polar, etc.).
- 1 Lever type double-pole change-over switch (Wearite, etc.).
- 1 L.T. switch (Red Diamond or Benjamin, Lotus, Igranic, Lissen, Bulgin, Wearite, Ready Radio, Junit, Ormond, etc.).
- 3 Single coil holders (Red Diamond or Lotus, Lissen, Igranic, Ready Radio, Wearite, etc.).
- 1 .001-mfd. (max.) compression type adjustable condenser (Formo type G or R.I., Lissen, Lawcos, etc.).
- 1 .0003-mfd. fixed condenser (Lissen or T.C.C., Dubilier, Ediswan, Igranic, Ferranti, Mullard, etc.).
- 1 4-mfd. condenser (T.C.C. or Lissen, Hydra, Dubilier, Mullard, etc.).
- 1 2-meg. grid leak and holder (Dubilier or Igranic, Lissen, Ediswan, Mullard, etc.).
- 1 H.F. choke (Lewcos or R.I., Ready Radio, Lissen, Varley, Dubilier, Lotus, Watmel, Wearite, Magnum, Bulgin, Ormond, etc.).
- 2 Low ratio L.F. transformers (Varley and Lotus, or Lissen, R.I., Igranic, Ferranti, Telsen, Lewcos, Mullard, etc.).
- 1 25,000 or 30,000-ohm resistance and holder (Ready Radio, or Ferranti, Lissen, etc.).
- 1 400 or 200-ohm potentiometer (Lissen or Igranic, Wearite, etc.).
- 3 Sprung valve holders (W.B., Lotus, etc.).
- 10 Terminals (Elex or Igranic, Belling & Lee, etc.).
- 1 Terminal strip, 18 x 2 ins.

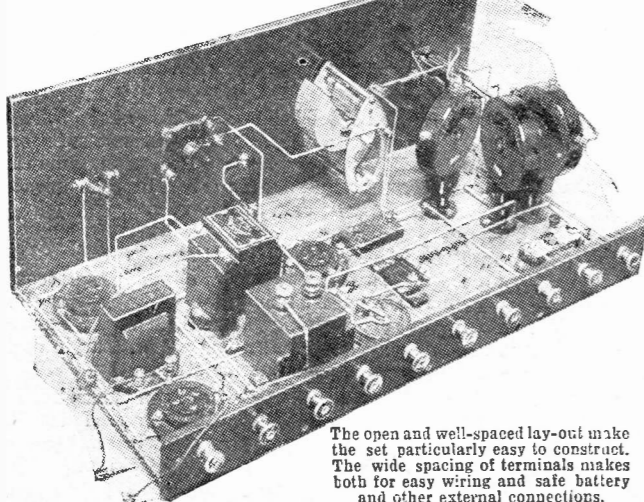
SIMPLIFIED SWITCHING AND A STRAIGHT-FORWARD CIRCUIT



Have you ever seen such a simple wave-change circuit as this? Remember that it uses plug-in coils and absolutely standard parts.

number of separate coils could be removed, we should have then a very excellent method of wave changing. We have been led recently to look into this question, with a view to seeing whether we could not reduce the total number of coils required and so effect the necessary simplification. It all started because certain readers wanted to introduce wave-change switching into

POWER AND PURITY



The open and well-spaced lay-out make the set particularly easy to construct. The wide spacing of terminals makes both for easy wiring and safe battery and other external connections.

to dispense altogether with any sort of wave-change switching in the reaction circuit. Instead, we have so arranged matters that a single reaction coil serves our purpose on both the medium and long wave bands, this coil being the one marked L_3 .

Coil Economy.

How this is done is really very simple, for it is only a matter of suitably placing the three coils in relation to one another. Briefly the scheme is this. The reaction coil is of the usual type for long-wave work, in other words, a No. 100 or 150, and it is placed quite close to the long-wave "X" coil. If it were also close to the low-wave "X" coil naturally the reaction effects on the ordinary wave band would be far too violent, so the low-wave "X" coil is put out at something of an angle, the distance being adjusted by test in a matter of a few moments until satisfactory results are obtained. We will tell you how to carry out this adjustment when we have finished the constructional side of the set, and then you will see how easy it is.

The reaction circuit is of the improved differential type which we used in the "Magic" Three, and which is now so well-known for the special sensitivity which it confers and its very valuable property of absence of any effect upon the tuning adjustment. A further device which helps you to get the very last ounce from your detector valve when working on distant stations is the potentiometer which controls the grid voltage, another point with which we will deal more in detail when we come to the operating instructions.

Ensuring Stability.

The remainder of the set consists of the now familiar extra-powerful two L.F. stages, which do so much to give it its tremendous volume and range. In the detector stage you will see the customary anti-motor-boating filter consisting of the 25,000 ohm resistance and the 4-mfd. condenser marked C_1 . By the way, a 2-mfd. unit will also serve the purpose here quite well, but in view of the ever-increasing use of mains H.T. units we have thought it advisable to increase the capacity somewhat as a further precaution.

The larger this condenser the more completely is motor-boating

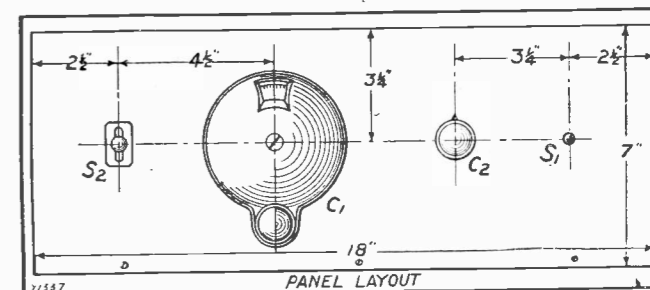
prevented, and so a 4-mfd. unit was thought desirable when it was remembered that many of the mains units now in use are a little prone to produce motor-boating troubles with really powerful receivers.

Now let us take a look at the constructional work. The general details of drilling the panel, layout of the components thereon and upon the baseboard, and wiring-up are carried out just as usual, as we do not think that any special instructions will be needed here. No special order need be followed, since everything is nicely spaced out and the various connections are quite easy to get at. We would only just give you the usual hint that it is a good scheme to keep the wiring diagram in front of you while you do the wiring and to cross out each connection thereon as you solder the corresponding wire into your set.

The Switch Wiring.

The only constructional point we think we need go into with any detail concerns the wave-change switch. There are several suitable types upon the market, but if you use one of those other than the one shown

JUST TWO CONDENSERS & TWO SWITCHES



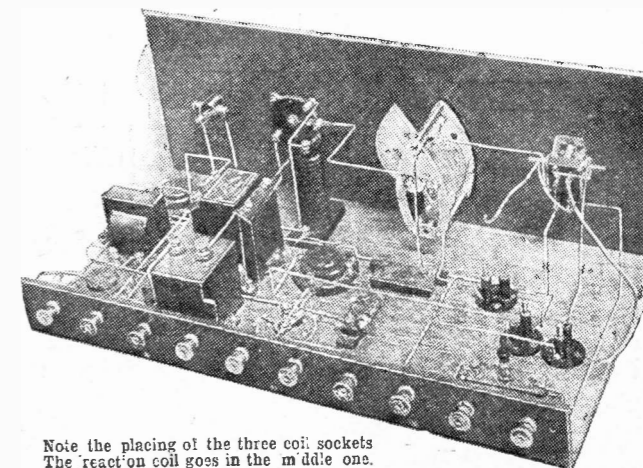
The panel lay-out indicates how remarkably the design of the set has been simplified. Note how few are the controls.

in the original set, you will just have to be a little careful in working out your connections to suit. The connection points of the other makes of switches are usually placed somewhat differently, so just look out for this point when you reach it.

The original switch was of the lever-controlled type, and this requires a small slot to be cut in the front of the panel. This is much easier than it sounds, because

(Continued on next page.)

SELECTIVE AND SENSITIVE



Note the placing of the three coil sockets. The reaction coil goes in the middle one.

THE "EUROPEAN" THREE.

(Continued from previous page.)

you need not make a particularly neat job of it, for the reason that the front plate of the switch covers up any irregularities in your cut. An easy way of doing it is to drill a series of small holes on the outline of the required slot, break out the piece of ebonite so isolated, and then finish off the edges with a suitable file. A better method still, of course, is to drill four small holes at the corners of the piece to be removed, and then join them up with a fret-saw.

You will find that this particular type of switch has eight connection points to

which wires must be soldered, and you will observe, on reference to the wiring diagram, that the four middle connection points are to be joined together in pairs with two short pieces of wire, as a preliminary to the attachment of the various other leads. The remainder of the connections you will find quite easy to follow out from the wiring diagram, just taking care to identify them correctly by their positions.

Making Certain!

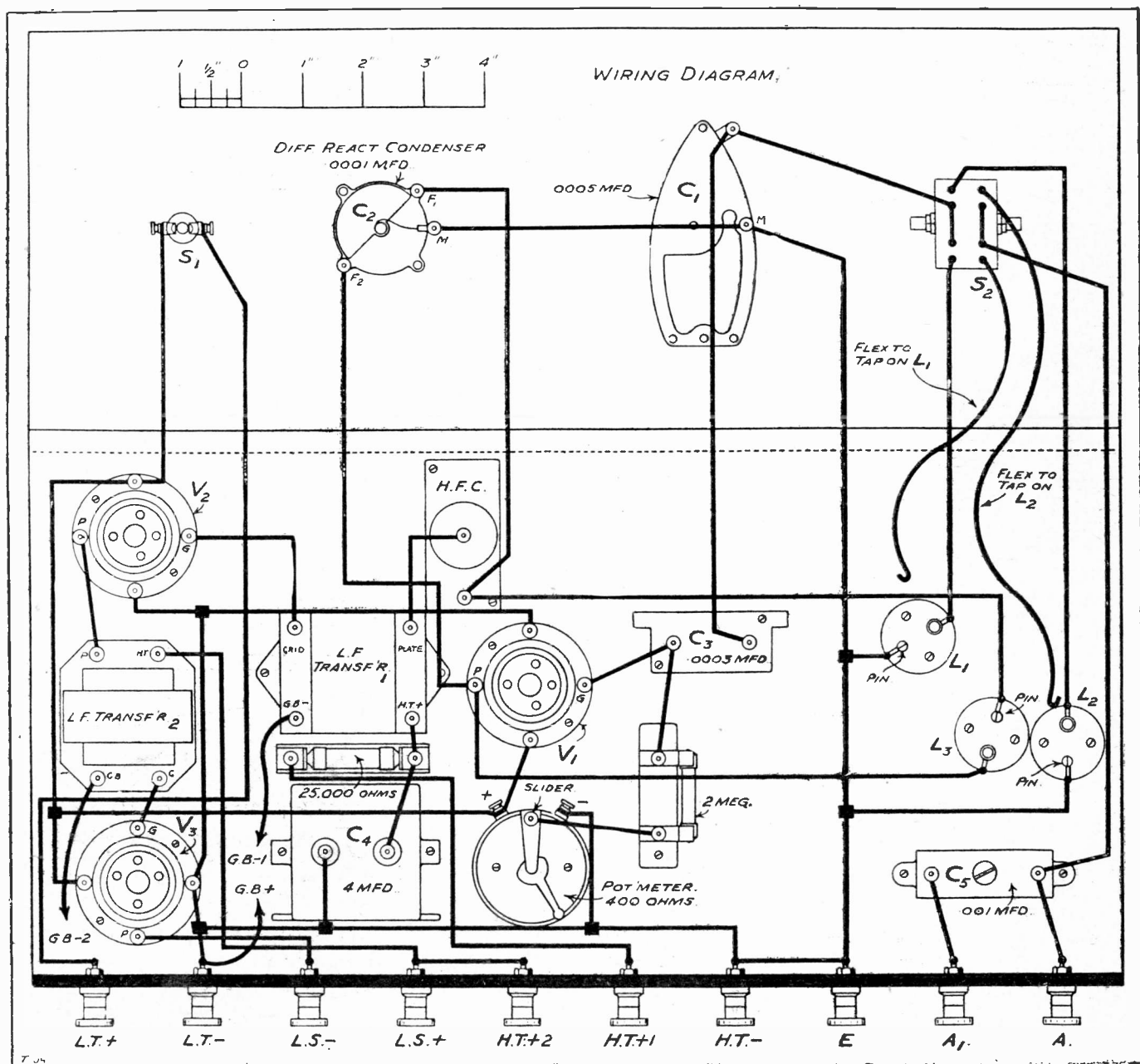
Now we will suppose that you have got the last wire soldered into position, and you feel that the set is finished. Before you put it on test, let us give you a hint which we ourselves find saves lots of trouble later on in some cases. It is this: go over all your screwed-down connections and give them an extra twist with a pair of pliers, to make sure they are really tight. Then turn your attention to the

various soldered joints and give them a sharp pull, so making sure that you have no dry joints anywhere, but, on the contrary, that every joint is a really good, sound one.

Now, assuming that the set is really finished, and that you are satisfied that every constructional point has been given the attention it deserves, let us see about getting the receiver into working adjustment. First of all you want a valve of the H.F. type for the detector, one of the L.F. type in the V_2 socket, and a power or super-power type in the V_3 socket. The grid bias will be $1\frac{1}{2}$ or 3 volts negative on the G.B.—1 plug, and somewhere about 6 to 9 on G.B.—2, if you are using an ordinary power valve. A super-power type will naturally require a good deal more grid bias, and you should decide this from the maker's data slip.

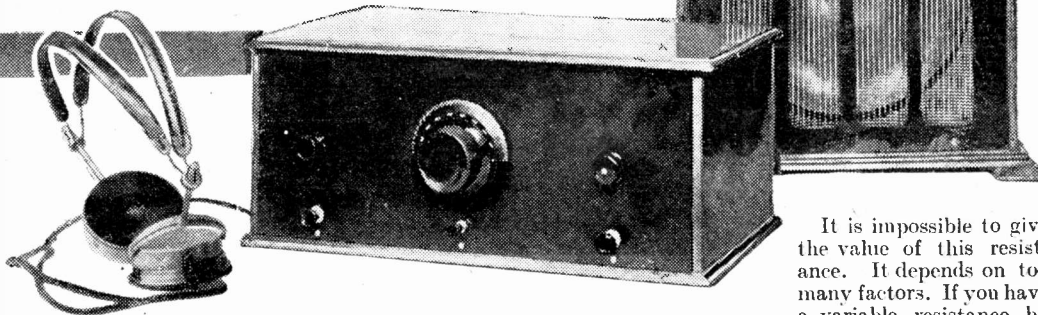
(Continued on page 552.)

HOW A GOOD LAY-OUT IMPROVES THE WIRING



The design of this receiver has been worked out so carefully that the wiring is as easy to do as that of an ordinary non-wave-change set.

DOUBLE-DUTY LOUDSPEAKERS



A novel plan for connecting extension leads to a set.
By L. C. MUNN.

THE advantages of an output choke are well known to readers and there is no need to repeat them here.

One of the advantages is that it is easy with a choke output to take an extension to any room of the house (or to the garden). A single wire can be employed, the return going to the nearest earthed object such as a water- or gas-pipe.

We thus have no high-voltage wires running round the place, and quite a small-gauge wire will suffice without elaborate precautions as to insulation.

Simple and Cheap.

Many sets have not an output choke or transformer, consequently often when a 'phone or speaker extension to another room would be useful, one is not inclined to go to the trouble of putting it up.

Such an extension requires double-stranded flex (which looks untidy), careful insulation, and produces a general complication of the output wiring, besides tending to upset the working of the set.

There is, however, a very simple, neat, and cheap way of running a 'phone extension to another room or several rooms from

unless several pairs of 'phones are wired in series. Particulars of this resistance are given later.

The fixed condenser can have any value from about 0.1 mfd. upwards for 'phone work, but a 1-mfd. condenser is better, since it passes more of the low notes than a smaller condenser.

There is no need whatever to use heavy-gauge insulated wire. Just take a $\frac{1}{4}$ lb. reel of No. 26 or No. 28 D.C.C. wire, soak it in some melted paraffin wax (a candle can be used), and you have a neat, cheap, efficient extension wire that will serve your purpose.

The fixing of this wire is easy. A length of rubber-covered flex is taken from the set to the nearest convenient point on the wooden skirting-board and anchored there with a small staple.

To it you join one end of your waxed D.C.C. wire.

Then this wire is carried via the top edge of the wooden skirting-board—or under the carpet—to the door.

It can be held in place with an ordinary drawing pin every few feet, the wire being given one turn round each pin as it is pushed in.

This is a much better plan than using staples or special insulating pins, which are not necessary in this case. It is easier and neater. It does not damage the woodwork, and you would not notice the extension wire unless it was pointed out.

The Extension Leads.

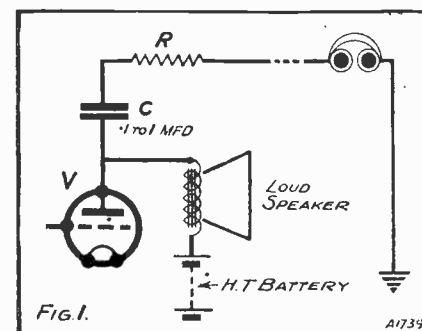
Continue on to the room where the lead is to end by following any convenient woodwork on the way, along the side of the stairs, or up the sides of door frames.

Finish off at the other end with a short length of flex, anchored as before, to take the strain of any movement of the 'phone leads, or use a wall 'phone plug.

The "return" lead is also of D.C.C. wire, and no precautions regarding insulation are necessary. It is taken to the nearest or most convenient "earth," such as a gas- or water-pipe, and good contact is made with a clip or spot of solder. Solder is best for a permanent job.

As already mentioned, it will probably be found necessary to cut down the 'phone strength with a series resistance when using a 1-mfd. bypass condenser and a normal loudspeaker.

SIMPLE CONNECTIONS



One fixed condenser and a home-made resistance are all you want to put the plan into practice.

an ordinary direct-output set by using the loudspeaker as a choke. It is also quite safe even with a mains unit.

Fig. 1 will make the general scheme plain. The windings of the loudspeaker are represented in the conventional manner as a low-frequency choke, and the single-wire extension is taken to a fixed condenser C via a resistance R.

The other side of the condenser is wired to the anode of the last valve. Alternatively, of course, it may be taken to that terminal on the loudspeaker which is connected to the anode.

The resistance R will probably be needed

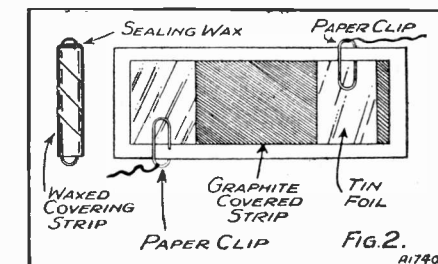
you, you can try it.

If not, you can easily make a resistance (see Fig. 2) with the following simple materials: Some notepaper and tin foil, several wire paper clips, and a soft lead pencil.

Cut out a strip of the notepaper (which should have a rough surface) 4 in. long and $1\frac{1}{2}$ in. wide, and another of the same length 2 in. wide. The latter is for wrapping.

Cover one side of the $1\frac{1}{2}$ in. strip evenly with the "blacklead" finely scraped from the "soft" lead pencil (B.B.). This is your resistance.

EASILY-MADE RESISTANCE



Here are the details of the resistance.

Connection at one end is made with the bared end of the D.C.C. wire bent over a slip of tin foil (from a cigarette packet). A wire paper clip holds it in place.

For the other end a similar slip of tin foil is provided, and is moved along the black-leaded strip towards the other tin foil until, by audible means, you have found the right resistance.

You should determine this at the 'phone end where the speaker will not interfere with your judgment; but, having found the correct adjustment, the resistance is finished off and wired-in at the set end.

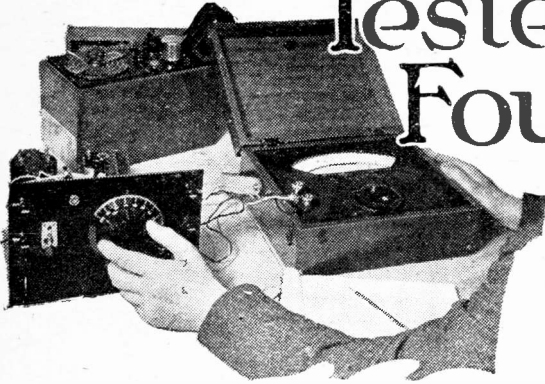
Finishing off.

You finish it off by clipping the second foil connection in place with another clip, but before doing so, put the 2 in. paper under the $1\frac{1}{2}$ in. strip, leaving a $\frac{1}{4}$ in. margin each side of the conducting strip.

The one clip and wire is on the right and the other on the left of the strip. It is then rolled up lengthwise, a little sealing-wax put on each end, and a strip of warm, waxed paper wrapped round it.

FROM THE TECHNICAL EDITOR'S NOTE BOOK.

Tested and Found-?



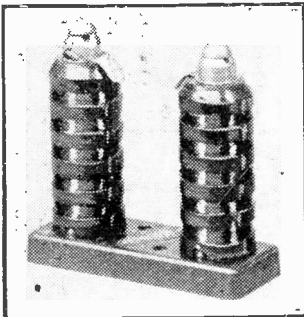
FERRANTI LITERATURE.

NEW leaflets published by the Ferranti people deal with their Radio Meters, Fixed Condensers and Valve Tester, while there are two constructional charts giving details of H.F. units. Any of the lists or charts are available free to "P.W." readers on application.

WATMEL H.F. CHOKE.

Watmel Wireless Co., Ltd., have placed two new types of H.F. chokes on the market, the DX 2, which retails at 1s., and the DX 3, which retails at 6s. The first is designed as a reaction choke, while the DX 3 has a higher efficiency and can be used for H.F. choke coupling.

Both types are similar in general construction and appearance. They are wound in binocular form and each includes two section-alised formers. Both types cover the normal broadcasting band efficiently, and I regard them as meritorious productions.



The Watmel DX 2 H.F. Choke.

A WONDERFUL TWO-VOLTER.

Some years ago most of us held the opinion that two-volters would always be some long way behind the six-volt valve in efficiency.

It was a fairly general impression, but there has been so much intensive research accompanied by successful results in the development of the two-volter that to-day it is miles in front of the six-volter of two or three years ago.

Of course, the six-volter still leads, but you can do practically everything you want to, in the way of ordinary reception, with two-volters up to and including the operation of moving-coil loud speakers with satisfactory results. There is now even a super-power two-volter, having the extraordinary characteristic of 2,300 ohms impedance and an amplification factor of 6.5. These you see, give you a mutual conductance of 2.8, which is about 500 per

cent better than anything to be found in the two-volt line a year ago.

But this P.2 valve, which is one of the latest additions to the Marconi range, takes only .2 amperes at two volts. It is, therefore, a particularly economical valve. Indeed, in view of such filament economy one cannot but marvel at the characteristics achieved.

In actual operation I find it a most excellent valve, and its performance is absolutely in line with what one would expect from it. Those who are forced to economise in the way of L.T. need no longer look with such longing eyes at the six-volt range.

LIGHTNING PROTECTION.

The Melbourne Radio Supply of High Street, Walthamstow, recently sent us a sample of their combined lightning arrester, earth switch and lead-in tube. This device retails at 3s. 6d.

It consists of an insulating tube, through which runs the rod actuating the switch. The arrester, switch and terminals are grouped beneath a protective cowl.

The aerial connection is via the switch rod from which it can be taken away by a soldering tag.

It is, of course, very nice to earth the aerial outside the house, but I am not quite sure of the weather-resisting properties of this particular article, and I am going to carry out some rather extended tests. I hope readers will not get tired awaiting the results of them! However, in the meantime, I must point out that I consider the price very reasonable, even should the device need to be renewed every two or three years.

NEW IGRANIC LITERATURE.

Recently published leaflets received from Igranic, Ltd., deal with the A.C. Filament Transformer and the Igranic Response Corrector.

ELECTRIC TESTING SIMPLIFIED.

This is the title of a book by Harold H. Cross, published at 5s. by Crosby Lockwood & Sons, Ltd. It is copiously illustrated, and describes in simple language how to use electrical measuring apparatus, more particularly in the diagnosing of troubles concerned with domestic electrical appliances, motor-car electrical equipment, and various other things.

BLUE SPOT LOUD-SPEAKER UNITS.

The merits of the Blue Spot loud-speaker unit will be far too well-known to need more than but a brief reference on this occasion. There must be a million or more speakers embodying Blue Spot Units in satisfactory service.

In these circumstances, the introduction of two new Blue Spot loud-speaker units

must be a matter of some importance. These two units are known as Blue Spot 66P and 66R, and we have received test samples mounted on their respective chassis. The 66R is the larger, and will appeal to those constructors who deal in outsizes in the way of volume. Large magnets figure in these new units, and they are provided with scientifically designed laminated pole pieces.

The movements are first-class in every respect, and the results given are just as

WHEN YOU ARE BUYING—

(24) AERIAL EQUIPMENT.

An aerial insulator needs to have mechanical strength as well as good electrical properties in order to stand up against the pull of the wire.

It should be made of a very smooth, weather-resisting material such as glazed porcelain or high-quality glass.

There should be a fairly long surface on the insulator between the wire and the securing halyard or rope.

Halyards need to be of pliable, reliable material, and ordinary rope is seldom satisfactory. Special cord materials are freely available.

The actual wire must be strong, and phosphor-bronze stranded wire is to be recommended. An aerial wire does not have to be insulated throughout its length, though an insulating covering will not prevent it working.

good as would be expected. There is all that brightness long associated with Blue Spot loud-speaker devices together with a really commendable bass free from boominess.

ATLAS MAINS UNIT.

Messrs. H. Clarke & Co. inform us that the Mullard people are recommending the use of their A.C. 38 Atlas Battery Eliminator for use with the Mullard Orgola Senior Receiver. That is a compliment which we are sure Messrs. Clarke appreciate and which will be accompanied by material benefit of a definite character.



One of the new Blue Spot loud-speaker units complete with its chassis.



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

The Editor will be pleased to consider articles and photographs dealing with all subjects appertaining to wireless work. The Editor cannot accept responsibility for manuscripts or photos. Every care will be taken to return MSS. not accepted for publication. A stamped and addressed envelope must be sent with every article. All inquiries concerning advertising rates, etc., to be addressed to the Sole Agents, Messrs. John H. Lile, Ltd., 4, Ludgate Circus, London, E.C.4.

The constructional articles which appear from time to time in this journal are the outcome of research and experimental work carried out with a view to improving the technique of wireless reception. As much of the information given in the columns of this paper concerns the most recent developments in the radio world, some of the arrangements and specialities described may be the subject 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.

HILVERSUM'S WAVE-LENGTH.

E. T. (Sheringham, Norfolk).—"During the week I often get Hilversum on about 300 metres, but never on Sundays except on his long wave-length. Is this the rule of the station, or have I been unlucky when searching for him on 300 metres on Sundays?"

Hilversum works only on 1,071 metres on Sundays, but during the week and before 5.40 p.m. the transmissions are made on a wave-length of 298 metres. All the evening transmissions from 5.40 p.m. onwards are on 1,071 metres.

CAN WE HELP YOU WITH YOUR SET?

Perhaps some mysterious noise has appeared, and is spoiling your radio reception?—Or one of the batteries seems to run down much faster than formerly?—Or you want a Blue Print?

Whatever your radio problem may be, remember that the Technical Query Department is thoroughly equipped to assist our readers, and offers an unrivalled service.

Full details, including scale of charges, can be obtained direct from the Technical Query Dept., POPULAR WIRELESS, The Fleetway House, Farringdon Street, London, E.C.4.

A postcard will do. On receipt of this, an Application Form will be sent to you free and post free immediately. This application will place you under no obligation whatever, but having the form, you will know exactly what information we require to have before us in order to solve your problems.

LONDON READERS PLEASE NOTE: Inquiries should NOT be made by phone or in person at Fleetway House or Tallis House.

IS THE SET OSCILLATING?

B. S. S. (Ipswich).—"I am given to understand that even a one-valve set can cause interference, and I don't want that to happen. How can I tell if it is oscillating?"

⚡ Different sets show oscillation in rather different ways. We will describe some of the effects, from which you will be able to tell whether you are oscillating.

First of all, what do the neighbours say? Do they complain that when you switch on your set their reproduction is spoilt? Do they notice that when you are out in the evenings their programmes are clear, but when you get home and switch on, their programmes become muffled and distorted? Do they find that when you tune your set it sets up squeals in theirs? If so, you are oscillating!

A great deal of helpful advice will be found in the B.B.C.'s book on "Oscillation," which is supplied free upon application at Savoy Hill, W.C.2, or to any broadcasting station. No new listener should be without this book if he wants to get maximum results from his set and not interfere with his neighbours.

You will never get much enjoyment from your set if it is allowed to oscillate, so it is worth going to the trouble of finding out just how to avoid this. To recognise oscillation, choose a time when there is no broadcasting on, such as early Sunday morning, and carefully listen-in, not to other stations, but to your own set.

Set the tuning dial about halfway round and then turn the reaction so as to increase it slowly, from minimum to maximum. You will notice that as you leave the minimum position and get towards the maximum (provided you do this slowly enough), the little "breathing" noises which at first are hardly audible become louder as the maximum reaction point is neared. The set gets more and more sensitive as more and more reaction is applied but at some position on the reaction dial (possibly halfway round, possibly three-quarters, or even right at the top), you will hear a soft "plop" and a kind of hissing or rushing sound, which indicates that the set is oscillating.

How to Know.

This sound is not very loud, but it is quite continuous and definite, and if you have been listening carefully to the noises which are caused by the gradual increasing of reaction up to this point, you will soon recognise the difference between the set's condition when it is nearly oscillating and when it has actually passed into oscillation.

Here is another tip. Wet the end of your finger and, opening the set, tap gently first of all on the moving, and then on the fixed, vanes of the tuning condenser. The reaction condenser should, for this test, be set at zero, and you will probably find that the clicks which you hear in the 'phones as a result of tapping your finger are louder on one set of vanes than on the other. The probability is that when you tap the moving vanes you will hardly hear anything, but when you tap the fixed vanes you get quite a distinct click every time you touch them.

If you increase reaction slightly, this effect becomes more marked. The further you increase reaction the louder become the clicks, but before reaction has been increased far, listen carefully to the type of click which you get. Supposing it is the fixed vanes of the tuning condenser which you have tapped, you will probably find that when the set has enough reaction to be really sensitive you hear before the finger touches the plates the little breathing sounds, followed by quite a loud click as your finger touches the plates.

Test by the Double Clicks.

If the finger is allowed to rest on the plates the noises disappear, but they appear again when the finger is removed. Increase reaction still a little further, and the effect is still more marked.

Increase the reaction a little further still, until you hear the soft plop which indicates that the set is oscillating, and then tap the finger on the fixed plates again. As the finger makes contact the click is a very loud one, and all noises cease immediately until the finger is removed, when there is an equally loud click, and the rushing sound denoting oscillation.

Notice that when the set is merely being made more sensitive by reaction and it is not oscillating, the finger clicks are fairly loud, and the intervals between are filled with a very gentle whispering breathing sound.

When the set is actually oscillating, the finger clicks are louder still, there is a definite double click as loud when the finger is removed from the condenser as

when it touches, and instead of the whispering breathing sound there is a distinct rushing noise in the 'phones.

It is not easy to put into words the exact difference, but a little patience at a time when no broadcasting is on will teach the intelligent listener the difference between reaction properly applied, and reaction applied beyond the oscillation point. In the first case—that of the clicks and the very gentle whispering breathing noise—the set is sensitive, good for long-distance reception, and not interfering with neighbours. In the second case, when double clicks are noted on touching the condenser vanes, when the gentle breathing sounds give place to definite rushing noises (and when turning the condenser dial results in squeals or squeaks), the set is no good for long-distance reception and is causing interference with your neighbours.

JOINING 'PHONES "IN SERIES."

R. A. (Sheffield).—"The instructions say 'A second pair of 'phones can be joined in series.' What does 'in series' mean?"

There are two ways of connecting two pairs of 'phones together, viz. "in parallel" or "in series." To join them in series undo both pairs and connect one of the 'phone tags of the first pair of 'phones to one of the tags of the second pair. That leaves you with two free tags, one on one pair and one on the other.

Place one of these free tags on one of the set's "telephone" terminals, and the other free tag on the other terminal, leaving the two which were joined together dangling free. The 'phones are then connected "in series."

"A HUM WITH THE SAME CONNECTIONS."

F. R. (Grimsby).—"I was going to use all old components and I mounted them for Det. and 2 L.F. (transformers), and first wired up with bits of 24 D.C.C., just to test results on that aerial and earth. Reception was first-class, really good in strength and tone, so I left all mounted as before, and changed the thin wires for good stuff, well soldered or screwed-down.

"Naturally, I expected results as good, if not better, for only the wire itself was different. Yet now I get a hum, with the same connections, components and batteries. What can be the cause?"

We think that in re-wiring you must have reversed the two leads to one of the L.F. primaries, or to one of the secondaries. Try changing over and we expect you will get your good results again.

H.T. BATTERY LIFE.

L. S. S. (Manchester).—"Since getting a good outdoor aerial my set has been more than satisfactory. In fact, it is now so good that I am adding the extra valve I have always wanted to use, bringing it up to four valves for real loud-speaker reproduction.

"I suppose I shall need a large-size battery in this case? Is there anything I can do to
(Continued on page 550.)

TECHNICAL TWISTERS

No. 20.

CARE OF THE L.T. BATTERY.

CAN YOU FILL IN THE MISSING LETTERS?

The liquid in an accumulator is liable to loss by especially in

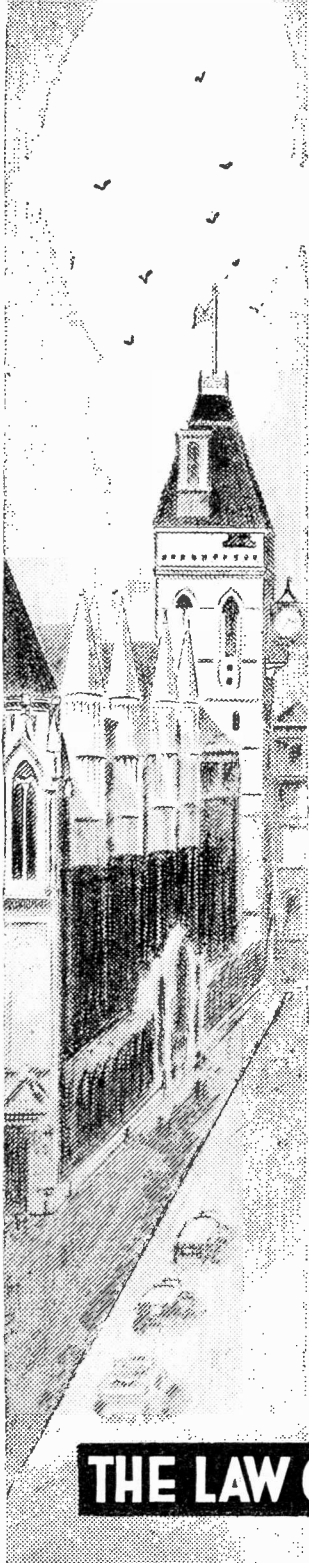
Its level should always be kept just the top of the plates.

It is not necessary to replenish with but water should be poured in.

The "strength" of the acid (or) should be checked from time to time by means of a

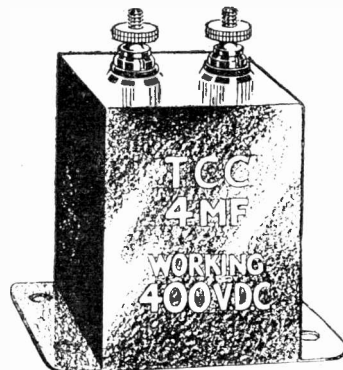
Last week's missing words (in order) were: Earthed; Under (or Below); Short; Cover; Weather.

TESTS OF TIME



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... the Law Courts, has been standing since 1832—for 43 years! It has stood the test of time and is likely to go on standing it for a long, long time. T.C.C. Condensers too, have stood the test of time—and come through with flying colours. If you want your Set to be a success—you cannot disregard the condenser chosen by experts with such astonishing consistency. Ask for T.C.C.—“the condenser in the green case.” The condenser with a guarantee!



The condenser illustrated is 800 volt D.C. test. 400 D.C. working . . . 8/6

THE LAW COURTS

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MARCONI VALVES



RADIOTORIAL QUESTIONS AND ANSWERS.

(Continued from page 548.)

improve the life of the battery, as to me the constant H.T. renewal is the one bugbear of wireless? (I use an output filter)"

When buying the new battery be sure that you get one of adequate size to supply the current required for the four-valve set. If you get too small a battery it is always being overrun, and consequently its life is invariably much shorter than it should be.

You can ascertain from the maker how many milliamps the battery will usefully give, and your valve curves will tell you exactly how much anode current is required, if you have no milliammeter in the negative lead to measure the current. The use of a filter output, and adequate capacity of the battery, are the main safeguards, but apart from these, important points to watch are to keep the battery cool, dust-free, and, of course, protected from metal, wires, etc., which can be carelessly laid upon it. Correct grid bias is vital to long H.T.B. life.

EARTH EFFICIENCY.

G. N. (Colindale, London, N.W.).—"After experimenting with several different kinds I have come to the conclusion that the best earth in my house is not outside, but is a water pipe.

"One thing I have proved, and this is that the earth connection makes an enormous difference to the strength of reception on a crystal set, and I want to make a really good connection and maintain it as perfectly as possible for a long time. Do you think it would be a good plan if, after I have done all I could in the way of tightening-up, etc., I were to cover the whole joint with petroleum jelly to protect it from the air?"

If you make a thoroughly good, clean job of the electrical connections and smear the whole of the joint with petroleum jelly to protect it from the atmosphere, you can be sure that the water-pipe connection will continue to give you an excellent earth. (It is sometimes thought that an outside earth is better than a water pipe, but very often the water-pipe is far more satisfactory.)

Usually some form of acid rejuvenator is relied upon, and unfortunately such materials have to be bought, and as they are not always easily obtainable the methods have never found universal popularity. Generally the falling-off of the H.T. battery is accompanied by a tendency to instability, followed by pronounced distortion and a general lack of life and clarity in the set, and in this condition practically everybody discards batteries and gets new ones as the simplest way out of the difficulty.

WHICH H.T. BATTERY?

H. A. M. (Stratford-on-Avon).—"Knowing nothing about wireless I was quite content with the information that I should require 'a 100-volt battery for H.T.' To my surprise, when I inquired at the shop for one I was told there are several different sizes, some costing more than others and apparently being larger in size. Which do I need?"

Whilst a small battery is O.K. for small sets, the larger sets require the larger type of battery, owing to the extra current consumed by the greater number of valves.

The ordinary small H.T. battery is capable of supplying about 5 milliamps. If you look at the valve makers' figures for the plate current required by the valves you are using in the set you will find that the detector valve is taking say, one milliamp, and the power valve about 3 or 4 milliamps, so that two valves can be supplied from such a battery.

It is, however, generally being over-worked when called upon to supply the current for three valves, especially if the other valve is of the screened-grid type or of the super-power or pentode type.

If the total anode current of your receiver as measured by a milliammeter in the H.T.—lead or by reference to the valve makers' curves, is more than 5 milliamps, you require something more than the ordinary small H.T. battery; and it will be cheaper to buy a larger-capacity model, sometimes called a "double capacity" or "power" battery, for these are capable of supplying very much more than the small battery. (For very large sets triple capacity—or more—is required.) The point worth remembering is that if the battery is called upon to give more current than it is designed to give, it will deteriorate very rapidly indeed.

FOREIGN STATION RESULTS.

D. X. (Stepney).—"Why is it that a crystal set which normally can only receive signals from one station is sometimes able to receive a foreign station situated hundreds of miles away? And why is it that sometimes on a valve set on some nights plenty of stations can be received, whilst on other nights with just the same valve and everything else as before there are not so many stations?"

The energy from a broadcasting station is radiated in different ways. In the first place there are direct waves which, travelling along the ground, are strongest in the vicinity of the transmitter, and get weaker and weaker as the distance increases, becoming attenuated and too weak for crystal reception at distances of perhaps twenty miles from a main station.

These direct waves are very reliable, and are not much affected by atmospheric and external conditions, so they are used by the B.B.C. as the basis of their service areas. In addition to the direct rays, stations also send out indirect waves which are not "earth bound."

These do not travel along the surface of the ground, but they travel off into space. After they have reached a height of sixty miles or so above the earth surface they are, owing to a peculiarity of the rarefied atmosphere, reflected or "bent back" to earth again, but they come to earth at a tremendous distance from where they originated.

It is this "indirect" radiation that is the cause of the extraordinarily long-distance results you hear about from time to time. The remarkable thing about it is that not only are the waves bent back, but sometimes they appear to be concentrated at certain points, so that reception is really loud and good whilst conditions are favourable.

But mysterious alterations in the reflecting properties of the upper layer of air may at any moment affect them, and then their wonderful long-distance properties are gone. Such indirect radiation is sufficient to affect a good crystal set only occasionally, but on a single-valver the skilful use of reaction will generally enable the set to pick up at least half a dozen different European stations at any time after sunset.

A two-valve set, of course, is better still; whilst three valves, if properly handled, can bring in quite a number of stations with regularity.

WAVE-LENGTHS COVERED BY SHORT-WAVE COILS.

R. A. A. (Peterborough).—"I am thinking of fitting short-wave coils, but have not much idea of the wave-lengths they cover. What are the usual sizes?"

As a rule, with a four-turn coil you can go down to about 18 or 20 metres, with a six-turn for the reaction. (The upper limits you will reach will, of

WHAT DO YOU THINK ABOUT THIS?

Loss of volume was the trouble of a Stafford reader, the set being a three-valver which had given good loud-speaker results for a year with no trouble.

One day all the volume disappeared suddenly, the set sounded "dead," and tapping the grids of the valves gave no corresponding click. Even shifting the H.T. plug gave no click, though the accumulator was O.K. and all other connections, valves, etc., looked all right.

Could you have told

WHAT WAS WRONG?

N.B.—There is no prize for answering this, but from time to time we shall give a radio problem (followed the next week by the answer) in the hope that readers will find them both interesting and instructive. (Look out for the solution to the above next week.)

Last week's trouble (experienced by a Yeovil reader) was traced to the output choke, the insulation of which had become defective, causing some of the turns to be short-circuited.

course, depend upon the size of the condenser used for tuning.)

A six-turn coil will go down to about 25 or 28 metres, and an eight- or nine-turn coil will begin at about 30 or 32 metres.

There is one little group of broadcast stations in the region of 32 metres, and another roundabout 25 or 26 metres, so that these figures will help you to identify your approximate range when the set is in use.

POSITION OF CONDENSER OF L.S. FILTER CIRCUIT.

M. J. (Yarmouth).—"Will the output filter circuit shown on the accompanying sketch completely take away the high tension from the loud-speaker lead which goes to the next room?"

When using a choke and single condenser in this way the position of the condenser is important. If the space is limited inside the set and an external filter is to be fitted, the filter-condenser must be placed close to the set's output terminals.

You will note that only one side of the condenser is connected to the loud speaker, the other side of the condenser being joined in circuit by a lead to the plate of the valve and L.F. choke (in practice this goes to the output terminal which is connected internally to these points).

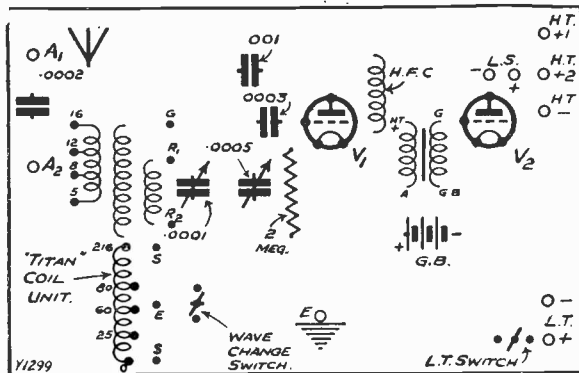
For the filter circuit to be efficient you must place the condenser close to the set, as the lead between these points is "alive." The other side of the condenser and the remaining loud-speaker wiring can then be as long as necessary, no H.T. voltage being present there.

PHYSICAL JERKS BY RADIO.

"Box Scott" (London, S.E.7.).—"As you will see by my nom de plume I am interested in other things besides radio, and one of my specialities is physical jerks. I understand that some of the Continental stations broadcast exercises in the early mornings, and I should like to listen to one of these if you can tell me which one, out of the list of stations I enclose, all of which I am able to get at good strength."

Your list shows Langenburg to be the best station, and you will find that such a course is given from there on most mornings (except Sundays) at 7.45 a.m.

POPULAR "WIRELETS" No. 15



Here are all the necessary "components" for a two-valve set (Det. and L.F.) with a "Titan" tuner for wave-change. The .0001 reaction condenser has a .001 fixed condenser in series with it, to prevent shorting, and the circuit is otherwise perfectly straightforward. Could you wire it up? (Look out for the answering diagram next week.)

RENEWING OLD H.T. BATTERIES.

M. F. (Pendleton, Manchester).—"Is there any way of 'gingering up' old H.T. batteries? I always hate to throw them away because it seems such a waste of money, and yet nobody seems to be able to find a use for them after they have become useless on the set.

"Is it worth while trying to evolve some method of renewing their voltage?"

A good many "P.W." readers have in various ways tackled this problem, and some very interesting letters on the subject have appeared in our correspondence columns (and no doubt many more of the same kind will appear, for most of us hate throwing batteries away).

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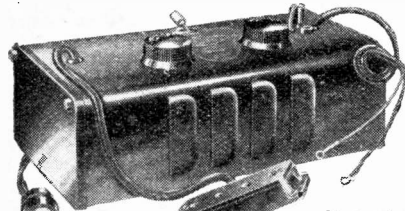
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Either of the above models is available for 25 cycles at an increase in cost of 10/-.



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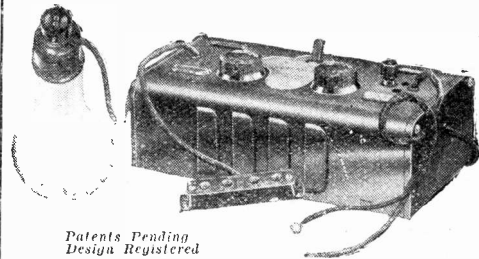
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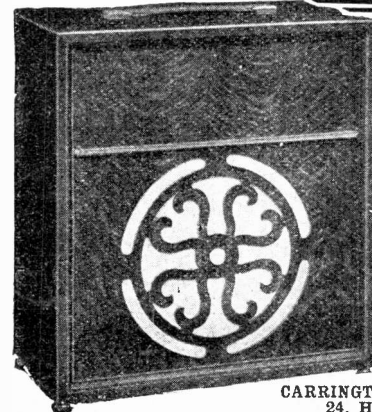
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THE "EUROPEAN" THREE.

(Continued from page 546.)

By the way, you will find space for a grid-bias battery at the end of the base-board, between the grid leak and H.T. — and H.T. + terminals.

The H.T. voltages will be just the usual ones—namely, about 60 volts on H.T. + 1 and somewhere about 100 or 120 volts on H.T. + 2. A little adjustment on the H.T. + 1 terminal may be desirable later on to enable you to get the very best results and the smoothest reaction control, but these voltages will suit most valves.

To begin with, you should place the potentiometer slider somewhere near the middle of its travel. Later on, after you have made various other adjustments, you can return to this and try moving it towards either the positive or negative end until you find the point which gives you the best combination of good volume and really smooth reaction control. This adjustment is best made on a rather weak signal, such as that of a distant station.

Coil Adjustments.

Now we come to the important question of the choice of coil sizes, and the adjustment of their positions so as to obtain the desired satisfactory reaction effects on both wave-bands. Coils L_1 and L_2 are both of the "X" type, L_1 being a No. 60 and L_2 a No. 250. To the tapping points on these coils you should attach the flex leads from the switch S_2 , remembering that you can obtain an adjustment of selectivity by the use of one or other of the two tappings on each coil.

The reaction coil L_3 will normally be a No. 100, but in some cases you may find that better effects are obtained with a No. 150. Start off, however, with a No. 100, and note that all you have to do is to find such positions for the three coils that satisfactory reaction is obtainable on both wave-bands.

In the constructional work it is advisable to fix the L_2 and L_3 coil sockets at the slight angle shown, and leave the fixing down of L_1 until later. Temporarily, you should make the connections to L_1 with short pieces of flex, leaving the holder loose upon the baseboard so that you can move it about. Start off with the coils roughly as shown in the photographs, and see whether you get suitable reaction on both wave-bands.

Getting The Reaction Right.

Possibly you will find that you are obtaining rather more reaction on the long waves than on the medium wave-band, in which case you should move L_1 a little nearer to L_3 , and then try varying its angle a little. A little experimenting in this way will soon show you exactly where this coil should be placed, whereupon it can be screwed down and its flex leads replaced with proper stiff ones.

A very few minutes' testing will settle these points, and thereafter you will have no further adjustments to make. All that you will need to do is to operate the switch S_2 to go over from one wave-band to the other, and tuning and reaction will be carried out in just the usual way. The switch positions, by the way, are these: knob downwards for low waves, upwards for high waves.

FOR THE LISTENER.

(Continued from page 538.)

30 feet added to the length of her delicate little ears would help her. The farmer climbed the roof of the farm and fastened the guy-rope round his chimney.

The farm-hand, who has only one eye, but it is a good one, tethered the other end to an upstairs balcony outside the cottage. The women and children watched from below the mysterious line being slung from roof to roof.

Belinda Talks Italian.

I shouted to them that they might hang their washing on it, if they could reach; whereat they laughed excitedly, a little bit timidly; I thought, as if they were not quite sure what was going to happen.

It was time I showed Belinda off. It was 6.30 p.m. Continental stations do not wake up much before then. I put Belinda on a table in the open window, carthed her, plugged the outside aerial in, and in a jiffy she was talking Italian.

She spoke it perfectly, though I prefer her English. At the sound of her voice, my neighbours came stealthily across from the farm and stood among the bushes, listening. I think they were surprised to hear her talking Italian.

They probably imagined that, since she came from England, she would talk English.

"Italiano!" I heard them saying to each other. I asked them if they could understand. "Yes, yes!" they cried, laughing. "A meraviglia!" which, I suppose, meant "splendidly!"

So Belinda made her debut.

Barrage.

The reception from Rome, southward, proved so clear that, on the next night, I determined to try my luck on the long-wave. That would be northward towards Paris and Hilversum. I was doomed to disappointment.

* Belinda sputtered and crackled and roared. She was like a thousand fishwives explaining a black eye. I thought she would burst. Nothing could live in that row except a few Morse signals which, like microbes, seem to be able to live anywhere. There was only one word for it—Donnerblitzen!

Jack Payne Again.

The storm brewed for two days. Northward I was cut off. It broke on Friday night.

The cauldron boiled over into a deluge. Saturday was clear. I guessed that there wouldn't be a single atmospheric left, and waited until night. Then I began to feel northward again, searching the ether for England.

I got a lot of Morse—a very annoying feller, Morse! Then I heard a voice chattering, and music behind it. It was about ten o'clock. The voice was speaking French, so I tried to cut it out and get English.

After infinite twiddlings of patience—for I really do not know very much about Belinda's innards—I succeeded fairly well. It was Jack Payne and his Band. So will you please present Belinda's compliments to Jack Payne, and tell him that he "was the first that ever burst" from England into this lovely wilderness on the shores of Maggiore! Addio!

TECHNICAL NOTES.

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

The Pentode.

THE fact that the screen-grid valve as well as the pentode have established themselves firmly in popularity in America is shown by the large number of sets exhibited at the recent Radio Exhibition at Atlantic City having screen-grid on the H.F. side and a pentode on the output side. A particularly popular set employing these two types of valve is the three-valve set.

Battery Sets Still Sell.

Another interesting feature of this exhibition is the large number of battery-operated sets which are on view, showing that the all-mains receiver has not completely displaced the battery-operated set, even in cases where electric supply is available, and further, that there is a large market still to be found amongst homes where there is no electric supply.

Filters.

Talking about all-mains sets, particular attention is given in the exhibition referred to above to special filters incorporated in these sets for the purpose of cutting down landline interferences and noises produced by the switching of electric lights or electrical machinery, or local electrical disturbances such as those from electric railways, advertising signs, and so on. I mention this because it is a matter which was discussed in these Notes some little time back.

Tone Control

Naturally, these devices, since they were to be applied to an ordinary gramophone, were mechanical in their operation. When we come to electrical reproduction, either of gramophone or radio music, we have available to us electrical methods of tone control and very soon you will hear of some ingenious methods for regulating the relative values of high and low notes in the reproduction. Not only this, but actually the *quality* will also be to some extent under the control of the operator.

Should Control be Used?

It is always a question whether the listener should be put in a position to adjust the quality of the reproduction—at any rate, the relative intensities of, say, high and low notes. It comes back almost to the same question as to whether a piece of music should be played exactly as the composer intended, or whether modifications by the performer should be permitted.

At any rate, apart from questions of this kind, there is a large section of radio experimenters and listeners who will certainly welcome a simple device whereby they can modify the reproduction of their radio or gramophones to suit their own taste—and, after all, that is what really matters.

Getting Quality.

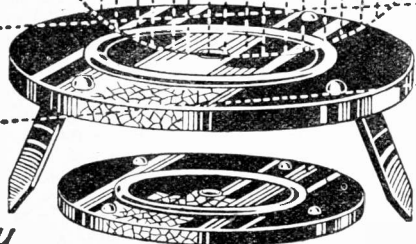
Low-frequency amplification often involves loss of quality, and this may be due to several causes. In the case of a transformer-coupled amplifier, the interference with the quality may be due to

(Continued on page 554.)

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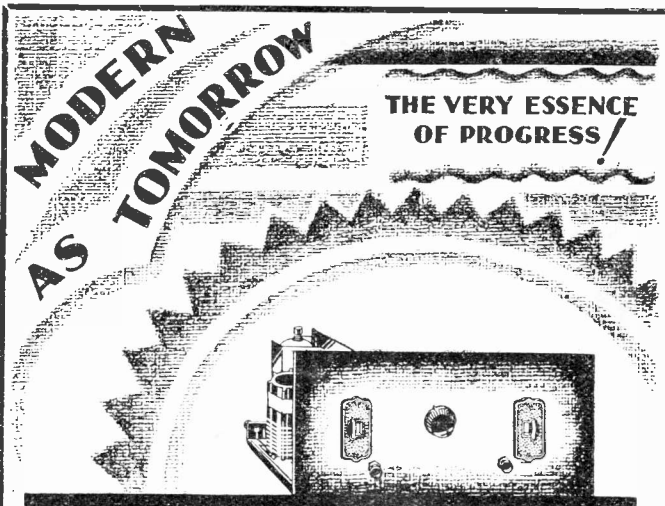
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TECHNICAL NOTES.

(Continued from page 352.)

any one of a number of defects in the coupling transformer as well as to other causes which are not directly connected with the transformer itself.

I mention this matter because I have had several inquiries arising out of my remarks on low-frequency transformer ratio which I made in these Notes a few weeks back. Transformer coupling is still very greatly used by amateurs and constructors, and it is no exaggeration to say that the better types of present-day L.F. transformers have been improved out of all recognition as compared with those of four or five years ago.

Effect of Proper Impedance.

One of the most important properties of an efficient L.F. transformer for radio work is a high impedance, and the poor reproduction given by many cheaper transformers is due to stinting materials (the iron of the core and the copper wire of the windings) with the result that the impedance is insufficient.

The impedance, as you know, is not a constant quality of a transformer, but must be defined for each particular frequency. Everybody knows that the effective impedance increases with the frequency of the alternating current fed into the transformer, but perhaps you may not have realised how rapidly the impedance rises with the frequency.

For instance, in a particular case, whereas the impedance at 100 cycles may be, say, 40,000 ohms, at 500 cycles, it may be 350,000 ohms—that is, nearly nine times as much.

Question of Frequency.

This brings us to a very important point in the design and use of L.F. transformers. It is obvious from the figures just given that almost any transformer will have a high impedance at a high frequency, but the frequencies with which we commonly deal in the case of speech, and also in the case of many kinds of musical instruments, are not much higher, and frequently are actually lower, than 500 cycles.

Consequently, you must have a transformer which has a sufficiently high impedance, even at comparatively low frequencies; if it has not, then it cannot be relied upon to amplify these comparatively low frequencies without distortion.

Matching Impedances.

Another point which often arises in queries from readers is the question of the matching of the impedance of the transformer with the impedance of the valve with which it is used. According to some opinions, the best results are obtained when the impedance of the valve and the impedance of the transformer are equal.

But a note of warning is necessary here, for this theory is based upon the assumption that we want the best conditions for the transference of power, whilst obviously in the case of intervalve coupling we are not so much concerned with power as with voltage.

Now, it has been laid down as a general rule that, so far as quality is concerned, it is best to have the highest possible transformer impedance in each transformer-coupled

(Continued on next page.)

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TECHNICAL NOTES.

(Continued from previous page.)

stage, quite irrespective of whether the impedance of the transformer matches that of the valve.

Ratio and Amplification.

The remaining point, and the one which I really intended to mention more particularly, is the question of the transformer ratio, as several readers have again referred to the possibility of getting a higher amplification by using higher-ratio transformers. With the ratios of between 3 to 1 and 5 to 1 it has been found that the best all-round results are obtained without incurring unduly high losses at high frequencies.

As a matter of fact, this question of transformer ratio is often exaggerated, and you will find that in many cases you will get much better results by using a comparatively low-ratio transformer, say, even 3 to 1, than you will with a higher ratio, say, 5 to 1. When it comes to still higher ratios, such as 7 or 8 to 1, these may only be used in special circumstances, and for general purposes it is much better to stick to the lower ratios of 3 to 1 or 4 to 1.

Primary Inductance.

So far as getting good amplification at low frequencies is concerned, this depends largely on having plenty of magnetic material in the core of the transformer, a high value of primary inductance and a comparatively low step-up ratio. The question of the air gap in the transformer is one upon which opinions still differ, but it is generally conceded that a very small air gap is better for the amplification of low frequencies.

So far as the amplification of high frequencies is concerned, this is influenced by the design of the windings of the transformer, so that self-capacity and eddy current losses may be kept to a minimum.

It is a common practice to connect a condenser across the primary of the transformer, but in my opinion it is preferable that this condenser should be included in the transformer itself by the manufacturers, as then there is no danger of an unsuitable capacity of condenser being used.

The Perfect Curve.

As you know, the perfect transformer should have uniform amplification ratio throughout the whole of the range of frequencies with which it is intended to be used. Actually, of course, no transformer reaches this ideal, although the best types of transformer made to-day will give remarkably uniform amplification over a considerable portion of the desired frequency range.

Most of the second-rate transformers fail in the lower frequencies. They generally give a fair performance at frequencies between, say, 1,000 and 3,000 vibrations per second, but then fall very far short of the ideal at frequencies much below 500; this is almost invariably due to the transformer impedance being insufficient, for the reasons I mentioned above.

In the Future.

During the past few days there has been a good deal of newspaper talk about the possibility of television (accompanied by sound broadcast) becoming a serious rival

(Continued on next page.)

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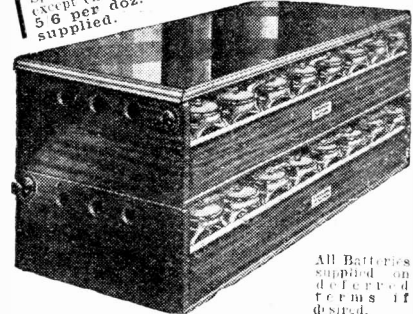
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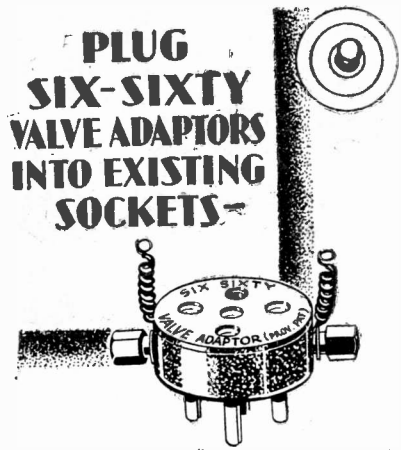
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TECHNICAL NOTES.

(Continued from previous page.)

to talking pictures in the cinematograph theatres.

This is largely based upon the fact that some experiments have been made in America, over a short distance, about a mile, in which television pictures have been received and projected upon a screen some 6 ft. square. Nothing is stated as to the "definition" of these pictures or as to the amount of subject-matter which is comprised within the picture.

As you know, I have always been averse to exaggerated and extravagant statements being made with regard to television and its "possibilities." No one, and least of all a scientific man, wishes to place any unreasonable limit upon what may be accomplished by scientific research, but at the same time one should be equally careful not to go to the opposite extreme.

In my opinion, any suggestion that television will ever be able to give us upon a full-size cinema screen a picture approaching in any way, for clearness and detail, the ordinary cinematograph pictures, is quite without foundation, and the excited newspaper accounts that one reads must be set down to the fact that the authors of the same, in the majority of cases, have little or no knowledge of the technical difficulties involved in television.

It is easy to bring up the old story that, twenty years ago, nobody ever thought the Atlantic would be flown by an aeroplane, that thirty years ago no one thought we would have cinematograph entertainments or talking pictures. Television is, in my opinion, in a totally different category from any of these, and it will not do to argue by analogy that because remarkable achievements have been made in one sphere they must necessarily be expected in another.

Remarkable Achievements.

I do not want to be misunderstood in any way. I think that the achievements which have already been made in television, particularly those of the General Electric Company in America, are very remarkable, almost as much so as the development of radio telephony, and I have no doubt that improvements will continue to be made.

What I object to, however, is the immediate publication of what I can only regard as wild-cat suggestions that within a comparatively short time we are going to see on the cinematograph screen televised pictures, comparable in any sense with an ordinary cinematograph show. As a matter of fact, I personally am of the opinion that television will never be able to give us anything comparable with the cinematograph, but that is only my own private opinion.

I am convinced that television will not in any practical sense rival the cinematograph during the lifetime of anyone at present living. One is getting a little weary of hearing everlasting predictions (by people with no technical knowledge whatever) about "sitting in an armchair at one's own fireside and seeing a Test Match played in Australia." It would be very nice if the non-technical prophets could think of something new.

Incidentally, I think exaggerated newspaper talk does more harm than good to the cause of television, by leading the public to expect too much.

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