

POINT-TO-POINT CONNECTIONS for the ALL-BRITAIN THREE

Amateur Wireless

3d
Every
Wednesday

and
Radiovision

**LOSING THOSE HIGH
FREQUENCIES**

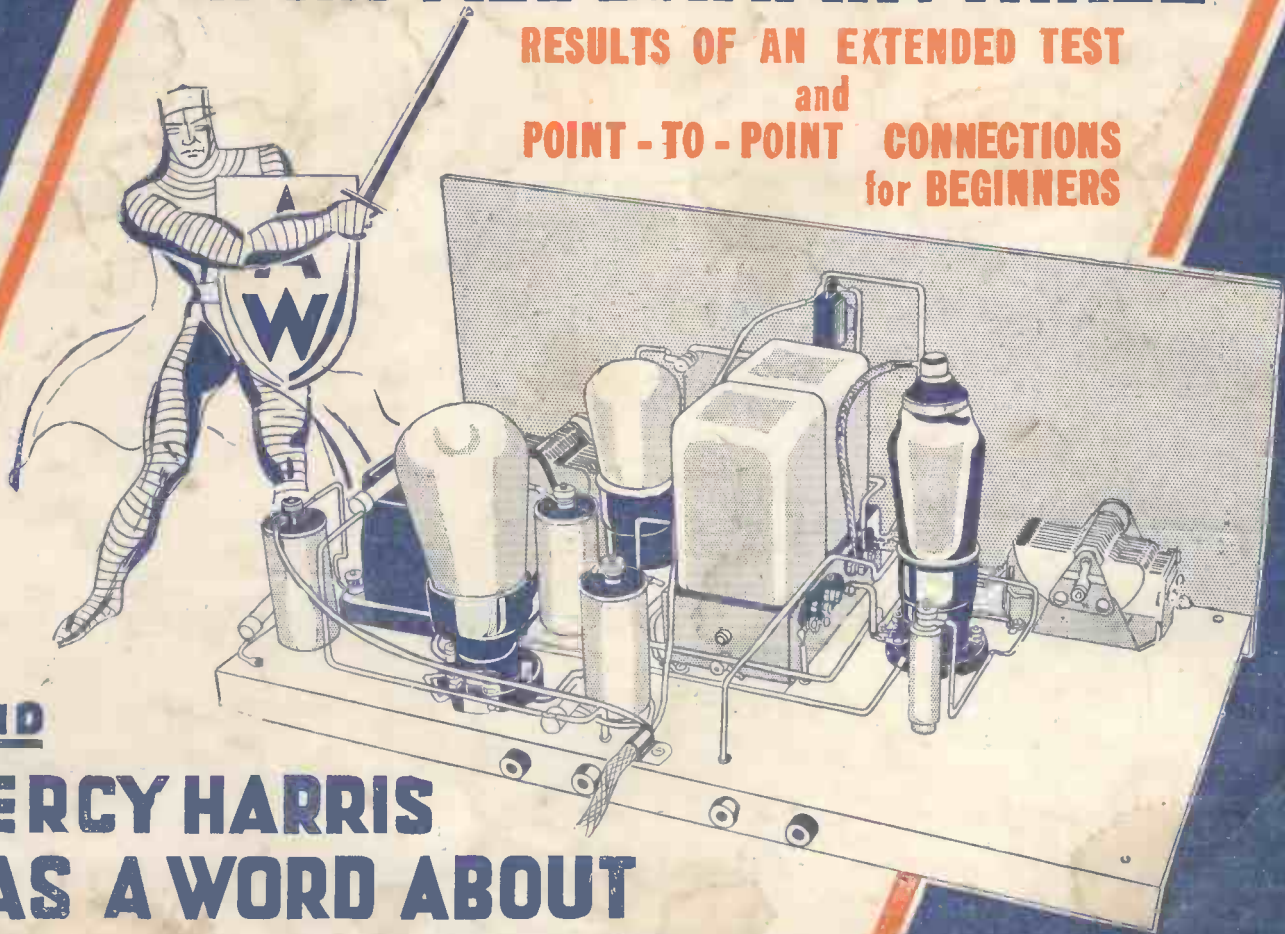
**HAVE YOU TRIED
AN H.F. PENTODE?**

**CONVERTING THE
S.W. SCEPTICS**

**CRUSADER'S
CORNER**

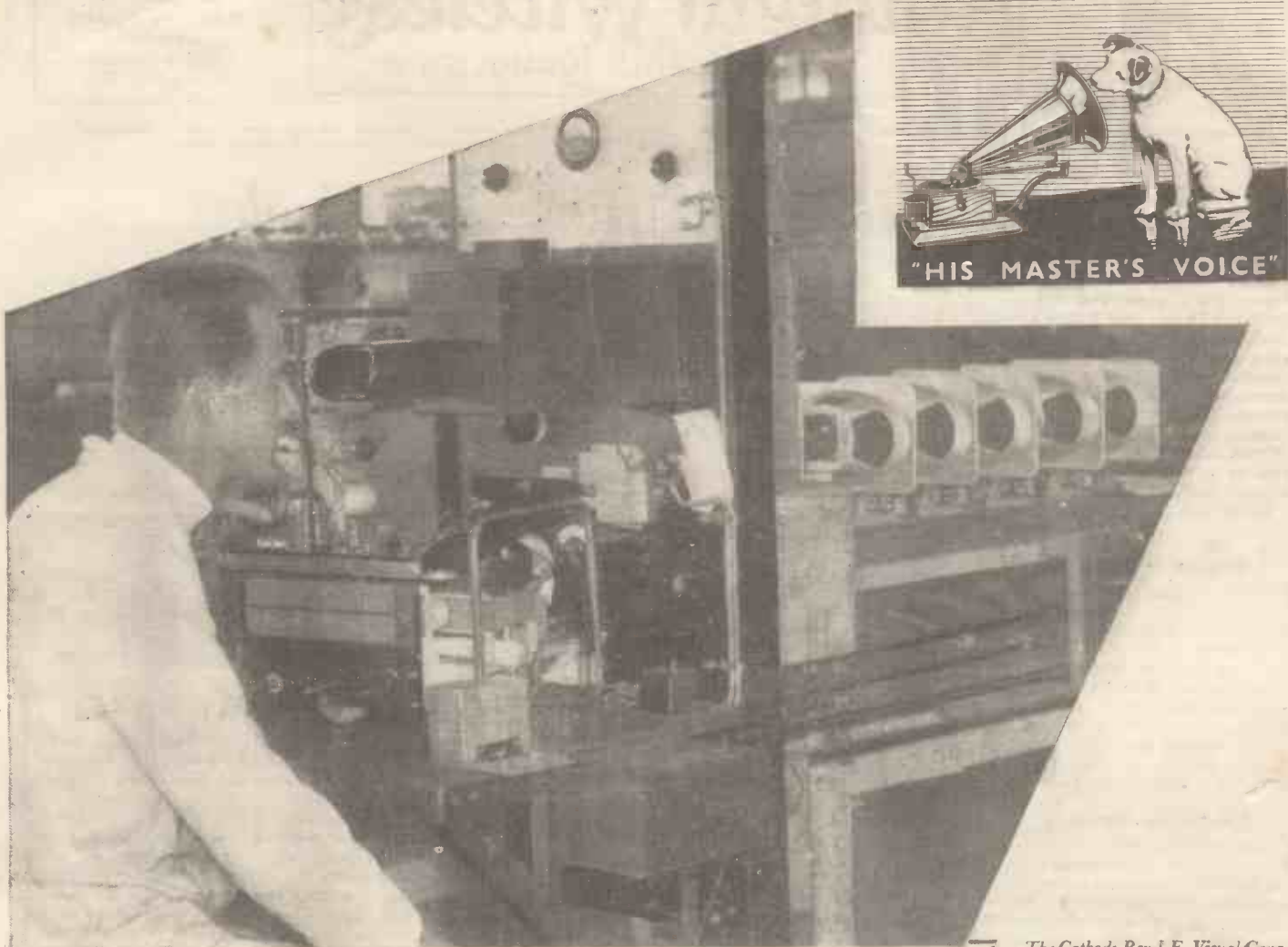
GETTING ALL EUROPE on the ALL-BRITAIN THREE

**RESULTS OF AN EXTENDED TEST
and
POINT - TO - POINT CONNECTIONS
for BEGINNERS**



**AND
PERCY HARRIS
HAS A WORD ABOUT
LOUD-SPEAKERS**

The ear alone is not enough...



Science and sight combine to test "HIS MASTER'S VOICE" true-to-life tone • The Cathode Ray oscillograph is one of the wonders of science, for it turns sound into something you can see. It converts a musical composition into a graph. This has been incorporated in apparatus specially designed by "His Master's Voice" Research engineers for checking the performance of the intermediate frequency stages of "His Master's Voice" superheterodyne instruments.

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"HIS MASTER'S VOICE"

THE GRAMOPHONE COMPANY LTD 98-108 CLERKENWELL ROAD LONDON EC1

Don't Forget to Say That You Saw it in "A.W."

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News and Gossip of the Week

Have YOU built the All-Britain Three yet? It's one of the best threes of the year—easy to build and capable of a first-class performance. Read about Alan Hunter's personal test in Sussex on pages 401 to 404 of this issue. Don't forget this is a Crusaders' set—a sure hall-mark of reliability and good design.

Weaker Signals?

RESEARCH engineers are at Droitwich experimenting with aerials for Midland Regional. The problem is to get a strong signal over the East Midlands.

Leicester and Nottingham are twenty-odd miles from the new site, and with the drop in wavelength it seemed that the signal might be weaker in these parts, though the power will be doubled.

Umbrella Aerial

A SEMI-DIRECTIONAL aerial of the "umbrella" type is now slung from the masts and measurements have been taken from the carrier wave of a low-power transportable transmitter.

The polar diagram shows a nice elongation in the right direction. A permanent aerial system will be erected in the next few weeks.

The two masts supporting the long-wave transmitter's T-aerial will also carry the Midland Regional wires. The masts themselves have a shielding effect of the transmission, but not in the important direction.

Better Broadcasting

NOEL ASHBRIDGE and L. W. Hayes are attending the C.C.I.R. meeting at Lisbon, where the international brains of radio are discussing knotty problems.

The subjects on the agenda show the way the wind is blowing. The big men are considering: single-sideband transmissions, anti-fading devices, directional aerials, separation and synchronisation of broadcasting stations and electrical interference.

For Henry Hall

MICROPHONE tests have revealed that some rehearsal rooms near Oxford Circus are suitable for broadcasting when the walls are draped with curtains.

We shall not be surprised to find Henry Hall and his boys in

these quarters after a very short spell at No. 10.

Maida Vale will, of course, be their eventual home.

The New Studio

MEANWHILE work goes on at Delaware Road. Four transmission positions are being fitted in the control room at the new premises.

The output of the orchestral studio will be fed to the transmitters through the control room at Broadcasting House and the S.B. system, but a spare line will connect with the London trunks exchange for use in an emergency.

If Broadcasting House were put out of action, Maida Vale could still carry on!

"Regional" Plymouth

A NEW music circuit from Bristol to Plymouth has just been taken over on a permanent basis to carry West Regional programmes to Devon.

Now that Droitwich is giving the west country the National programme, Plymouth is becoming quite "regional."

Good Luck, Les!

So Les Allen has left! In two years with the B.B.C. Dance Orchestra he has become extreme-

ly popular and now he is off to reap his reward.

Good luck to his music-hall act, which is already booked up for thirty weeks.

A piano, violin, guitar, and trumpet will accompany his songs.

Sharing the Blame!

THE B.B.C. Committee on spoken English has been enlarged, as we forecast several weeks ago, and its first task was to revise several pronunciations announced by its predecessor.

Announcers will have to forget some of the tongue-twisters that they have been taught. No one will envy the committee's job, but there are now twenty-three members to share the blame!

Less Uplift

WHILE the B.B.C. is cutting down the uplift in its programmes, the Germans are reducing the propaganda in theirs.

Licences have fallen and Chancellor Hitler seems to have given the order to "lay off" a bit.

Catching On!

THIS signature business is extending. John Sharman now opens all his shows with "Here Goes," which was composed by Sydney Baynes.

If the choice is left to Kneale Kelly he will often play a fanfare—an arrangement from *Pagliacci*, "Come, ring up the Curtain."

Should Churches Pay?

SHOULD the churches from which the B.B.C. broadcasts be paid?

Question has arisen. Apparently the B.B.C. already pays the out-of-pocket expenses for those participating.

But no actual fees are paid.

HOLD UP AT BELFAST

A BRICK strike at Belfast has held up work on the building at Lisburn which will house the Northern Ireland transmitter.

Progress was fairly rapid after some delay in starting, when the supply of bricks ran out!

Blaris is the name of the village where the building is situated, but Lisburn, like Droitwich, will give its name to a station which is actually two or three miles away.

In testing sites, the B.B.C. attached great importance to subsoil and Blaris was chosen for the absence of volcanic rock which is common in that part of Ulster. All very Irish!



Philips photo

The Radio Rogues getting an earful of London Regional! Now touring England, this happy gang is just as keen on listening as on broadcasting. In the front row, from left to right, you see Teddy Joyce, Greta Keller, Evelyn Hayes, and Joe Griffin—a well-known combination on the broadcasting networks in America

Regional Status

WITH the promotion of Northern Ireland to full Regional status, fewer local programmes will be broadcast from Belfast during the day, when the transmitter will relay bands and cinema organs shared by the other regions.

The advantage of Droitwich will be felt in the evenings, when original material will be produced in the Belfast studios in place of National relays.

Television Matinée

THE first television matinée occurs on Saturday when the producer is putting on programmes that should appeal to listeners as well as lookers.

We regret, by the way, that the second article on "What is this Television" has been unavoidably held over for a week.

These Crusaders Want a Chassis!

Although the majority of our Crusaders most definitely want panel-and-baseboard sets, there is a vocal and equally definite minority that insists on the metal-chassis type of construction, as proved by the typical letters we publish below. Promise is made of a chassis version of the All-Britain Three—and then everyone ought to be well pleased!

Become a Crusader

- Because you will be helping your fellow amateurs to get better radio—your co-operation of ideas will produce sets that are really wanted.
- Because you will personally benefit by receiving free blueprints of Crusader star designs—blueprints that would normally cost you 1s. or 1s. 6d.
- Because if you are in trouble with any of the Crusader designs, you can obtain from us free technical advice.
- Because the Crusade is a really vital element in home construction to-day—everybody's joining up!

NOW that we have a little more space, let us quote in full the letter from A. B. Curran, of Dublin. He is all for chassis sets and gang condensers. Well, there is much to be said in favour of his remarks—though our first design of the All-Britain Three exemplified the new-type metal baseplate very adequately.

We are so much impressed with the genuine advantages of both chassis and baseboard types that we have decided to produce a second All-Britain Three as a chassis set with a two-gang condenser. You will admit that we are nothing if not impartial in this controversy!

Well, here's A. B. C.'s letter *in extenso* :—
 "I must have a metal chassis. Not merely a glorified baseboard affair like that of your A.V.C.4, but a real, honest-to-goodness chassis with components above and below deck. It is so much neater and handier. The fellow who says he gets mixed up over the wires passing through is not fit to be a Crusader. Use a baseboard for experimental work if you like, but get your design finally fixed on a chassis.

"I work out my circuit and component values on a base-



Are You a Crusader yet? Join up NOW by filling in the form on page 411

board, then get them spaced out and their positions settled on a wooden chassis, and finally fix all upon a metal chassis and solder all connections. No terminal connections to come loose for me!

"I don't see any good in using separate tuning condensers. With correct ganging and matching there is no reason why a ganged component should not be equally as efficient, especially when a panel-operated trimmer is fitted, and no one will deny its superior handiness. In agreement with most other Crusaders, I don't like self-contained speakers. They seem to go better outside.

All-wave Coils

"Don't think much of all-wave coils. I may be wrong, but I cannot see how it is possible to tune on the short waves with a .0005-microfarad condenser. It's sometimes hard enough with a .00015-microfarad. Ask Kenneth Jowers about this. He should know!

"You ask what we want in your next set. Well, why not make it a real constructor's set? After all, most of your designs only have to be assembled. I mean, you buy the chassis (ready drilled) and the coils, transformers, chokes, etc., ready wound, and just stick 'em all together. Now, what I should like to see is a set for which I could make the coils.

"I suppose three pentodes would be O.K., but I would like to be able to make chassis, transformer, chokes and coils.

"Condensers, resistances, etc., are no proposition for the home constructor. There should be no need to screen the coils individually, as one can be mounted on deck and one below, somewhat on the lines of your modernised £5 5s. S.G.3—a good wee set, by the way.



This is the metal baseplate used for the All-Britain Three—a compromise between chassis and baseboard

"By making the components suggested and using wire-end and 'stripped' types for the rest, it should be possible to produce a really 'hot' design at a really low price. By the way, you've never told us anything about making iron-cored coils. I've made them, and they're the goods.

"Without wishing to get up against Crusader No. 1, there are some points in your article on his tour of the show that I really can't let pass unchallenged. He doesn't like the idea of 'stages.' Well, the number of valves in a set is no guide to its capabilities these days. A four-valve superhet can have the equivalent of seven or eight single valves. There is also the vexed question as to whether the rectifier in an A.C. set should be counted. It's the only one which works purely and simply as a 'valve,' anyway.

"Frequency," he says, "is an intangible thing." He wants to use wavelength. Well, a wireless "wave" isn't a wave at all, but an alternating magnetic and electrical stress in the (quite intangible and non-material) ether. And you obviously can't measure the length of a thing that doesn't exist! The periods of stress, have, however, a definite frequency, so I think kilocycles are better.

All School-masterish!

"Excuse me getting all schoolmasterish here, but I think I'm correct.

"If he's so fed up over dials, why doesn't he make one to suit himself? It's quite easy.

"I seem to have given No. 1 a bit of a slating, but actually I agree with 80 per cent. of his views.

"From some of my above statements it might be thought that the only set I consider worth while is the all-metal, all-pentode, last-minute affair, but, as a matter of fact, I think that for ordinary, everyday use it is hard to beat a good screen-grid-detector-pentode.

Every Satisfaction

"I have built several for various friends on a wooden baseboard; high-frequency section metallised, and with a vertical screen, large,

efficient coils and separate condensers. They all give every satisfaction, but there is no need for you to show us how to build these, since any Crusader should be able to design one himself.

You can get the Crusaders' badge, price 1s. post paid. This is the design



"Big Ben has just struck twelve now (not twenty-four—that was a silly idea, wasn't it?) and all stations are closing down.

"All the best to 'A.W.' and to all

the Crusaders."

A. B. CURRAN.

Dublin, S.3.

To return now to the chassis controversy. E. Clayton also has some good sense to talk on the subject. Listen to him, chaps!

"As a Constructor Crusader I should like to add my name to the apparently small list of those who prefer sets built on chassis. I have three reasons.

"1.—By using a chassis one can obviate the use of long leads, which are usually prevalent on a baseboard set.

"2.—Instead of a baseboard about 2 ft. by 10 in., you have a chassis about 1 ft. by 10 in.

"3.—By reserving the top, more or less, for high-frequency components and having low-frequency components underneath the metallised chassis between, complete screening between the high and low frequency is obtained. I am not saying this desirable state of affairs is not possible with a baseboard, but I maintain that it is easier on a chassis."

Well, that is a good shot on the side of the chassis merchants. Can you refute his points, baseboard fans?

PERCY W. HARRIS says

Just a Few Words About Loud-speakers

Our Research Consultant thinks that many listeners with new-type sets that they have bought instead of building are missing the ultimate in performance through neglect of the many small points in wireless reception. He is particularly exercised about the question of the loud-speaker, and revives the old controversy as to whether we should put the loud-speaker inside or outside the cabinet of the receiver.

EVERY modern wireless receiver is simple to operate—if operating it may be defined as the action of bringing it into tune with a station and setting the volume control—but this does not mean to say that any form of knob-twiddling will do!

If you have watched the same car driven at the same speed down the same road by two different people, you will know what a difference there can be in car handling, even when it is fitted with all the modern easy-change gears, automatic starters and such-like aids to driving.

Advantage of Making

There is one great advantage about making your own wireless receiver—you *do* learn how to get the best out of it, and you appreciate the various refinements. The modern commercial set, turned out in vast quantities from a stock pattern, is never *just* what its designer would like it to be, for in adapting it to certain easy manufacturing processes, allowing for rapid assembly by relatively unskilled labour, and utilising standard parts produced at low cost, certain sacrifices have to be made to which the home constructor need not submit. In spite of all this, however, the modern set is a remarkably fine production and amazing value.

I have been wondering just how many people get the best out of these good-value receivers. Certainly nine out of ten do not. I want to show you why they miss something—to indicate how a considerably improved performance can often be obtained.

Varied Acoustic Problems

The acoustic problems which face the designer of a wireless set are many and varied. If every set were always used in the same room, with the same furniture and the same level of volume, matters would be much easier to settle. As it is, some sets give their best performance in large and sparsely furnished rooms, others in small rooms at low volume, and still others in large and softly furnished places such as hotel lounges. So much depends upon the combination of receiver characteristics and loud-speaker response.

When moving-coil speakers were first placed on the market there was a tendency among experimenters to run them too loud. Indeed, it was sometimes said that moving-coil speakers did not show to their best at volume



"An empty or barely furnished room in the modern style favours the reproduction of the higher frequencies . . . disappointing results are sometimes obtained when a set is taken home"

levels suitable for the ordinary living-room.

The reason really was that the cone-suspension was far too stiff. Imagine a cone suspended by a ring of fairly stiff material so that it can move in and out according to the motion imparted to it by the moving-coil at the point of the cone. On weak signals the cone will be given weak impulses and these will not be strong enough to overcome the comparatively heavy resistance of the stiff suspension ring.

Now turn up the volume loud so that the signals behind the cone are really powerful, and the resistance offered by the suspension ring will be relatively negligible. We thus get a more faithful reproduction of what is put out.

Natural reproduction is a blend of strong and weak notes of all kinds of frequencies, the weak notes sometimes being of vital importance as over-tones in giving correct characteristics of the sound. Cone-suspension problems are not easy to solve, but you will realise that for ordinary room volume it is essential that the cone should be quite lightly suspended if we are to get the best from our set. And light

cone suspension is neither easy nor mechanically strong in sets which have to be turned out very cheaply in great quantities.

Size of the Baffle

Then again, there is the question of the size of the baffle used with the loud-speaker. Good low-note reproduction is dependent upon the inability of the sound waves from the front of the cone to get round to the back of the cone by a short path. It is generally considered that a baffle a yard square is advisable as a minimum if even medium-quality, low-note reproduction is to be obtained, and those who are after really good low-frequency response make their baffles much bigger. In the case of a baffle a yard square, the shortest path from the front of the cone to the back is about a yard, and the path need not be straight, so that speakers can be included in the cabinet and a reasonable baffling effect obtained from the cabinet itself without making the set too big.

There is nothing whatever to prevent you
Continued at foot of next page

Radio Scotia— Edinburgh!

FOR years Scotland has had one of the most interested and intelligent band of home constructors to be found in the British Isles, and a very large number of them have been consistent readers of AMATEUR WIRELESS.

Fifth Radio Show

It is with pleasure, therefore, that we call their attention to the opening of the fifth Scottish National Radio Exhibition in the Waverley Market, Edinburgh, on Wednesday, October 10; the show remains open until Saturday, October 20.

As in past years, Mr. Bentley, the organiser, has again placed at the disposal of the B.B.C. a fine model studio from which broadcasts will be made during the run of the exhibition. There will be more special features about the show than ever before, and even the canniest Scot will not be able to complain that he has not had his money's worth—for the fee for admission is only 6d.

The Post Office will stage their well-known

anti-interference exhibits and the complete model railway that created so much interest at Radiolympia will be seen on this stand. Another interesting point is that arrangements have been made for visitors to make records of their own voices in a special studio.

There will also be special television demonstrations to show visitors to the Exhibition just how far this side of radio has been developed.

In short, it is evident that here is a fine opportunity for Scottish enthusiasts to see for themselves all the newest and most interesting radio gear. Something to interest everybody will be going on all the time.

Special Railway Vouchers

Special railway vouchers for getting return tickets at single fare can be obtained from the organiser, Mr. P. Bentley, at 7 Waverley Market, Edinburgh, 2; a stamped, addressed envelope must be enclosed for reply.

The exhibition will be open daily from 2 p.m. to 10 p.m.

making a very interesting experiment with a modern small cabinet receiver by taking a large baffle and cutting out a hole of the size of the front of your loud-speaker fret and placing this in front of the set to see what happens. In such a case you will probably find improved tone when you take the back off the set, as the alleged bass given by many of the cheap sets is really a box resonance in an enclosed space.

Loud-speaker Characteristics

Next let us think a moment about the loud-speaker characteristics with regard to reproduction of frequencies. Some loud-speakers on the market have a very poor response, giving little of the high frequencies which are so vital. In order to mask the absence of these vital frequencies, the speakers are designed to have a peak somewhere about the 3,500 figure in which range a number of important frequencies come.

Other sets have truly remarkably characteristics—not by any means high-priced sets, either—but the fine reproduction of the higher frequencies is often lost through the bad placing of a set or by using it in an unsuitably furnished room. Remember that soft drapings, heavy curtains, velvet upholstery and the like all tend to absorb high frequencies and make reproduction muffled.

An empty or barely furnished room in the modern style favours the reproduction of the higher frequencies. This is why such disappointing results are sometimes obtained when a set is taken home and compared with those given in the dealer's demonstration room or at an exhibition.

Remember, too, that

a loud-speaker cone does not radiate all frequencies equally in all directions. The higher the frequencies the more the directional effect of the loud-speaker, so that for very high frequencies it is necessary to be in line with the loud-speaker to get a really good effect. You can prove this for yourself by setting up a receiver at about eye level in rather a wide room, and turning it on at fair strength.

Walk sideways across the room so that one moment you are centrally placed with regard to the loud-speaker and a little later you are well away to the side. You will notice in many cases a very distinct difference in reproduction in different parts of the room, the best being obtained when you are in line with the speaker.

Volume, direction, and furnishing therefore all have an effect on what reaches our ear. The human ear itself varies in its response to

News from the Radio Societies

The Radio Physical and Television Society of 72a North End Road, West Kensington, W.14, have now started their activities for the coming season. A very strong programme is being arranged, and those interested should communicate with the hon. secretary at the above address.

The Bradford Experimental Radio Society; its syllabus for the 1934-35 session contains many interesting lectures and demonstrations by well-known personalities in radio. The meetings take place every Wednesday, at 8 p.m., at the society's headquarters, Cambridge House, 66 Little Horton Lane, Bradford. The annual subscription is 5s. Full details of membership can be obtained from the Hon. Secretary, E. P. Burgess, Esq., 23 Baslow Grove, Heaton, Bradford.

Croydon Radio Society celebrated its tenth birthday on Tuesday, October 9, by holding a very fine opening meeting to inaugurate the coming session. A lecture on "From Writtle to 1934" was given by Captain P. P. Eckersley, M.I.E.E., F.I.R.E. The Hon. Secretary is E. L. Cumbers, Esq., 14 Campden Road, South Croydon.

different frequencies according to the volume level. If a set is turned up too loud, the human ear will respond more to the low frequencies than to the high, and reproduction will sound boomy although the actual audio-response curve of the receiver has not altered its shape but only its level.

A still further point concerns tuning which can vitally affect tone, particularly in some of the modern receivers with automatic volume control. In a set without automatic volume control—and I am now referring to a modern sharp-tuning receiver—the low notes only come through properly when you are dead in tune.

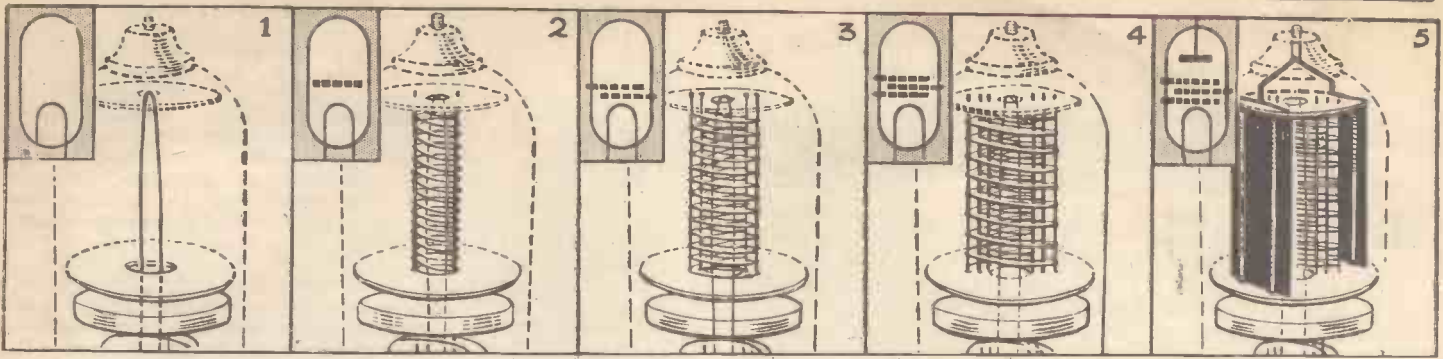
Tuning to one side or the other tends to accentuate the high frequencies at the expense of the low, and some sets which are deficient in high frequencies actually sound better when slightly de-tuned. The old idea of tuning-in a set at full volume and then de-tuning to reduce the volume is bad practice with modern sharp tuning sets.

In receivers with automatic volume control it is often very difficult to tell when one is centrally tuned because a uniform volume will be given over a band of frequencies due to the compensation of the control. You should then listen for the low notes and stop at the point where the low notes come out best (unless, as I have just suggested, the set is one of those which is a bit weak in high frequencies and sounds better just off tune).

When a receiver has a local-distance switch do not forget to use it. There is a very sound idea in these switches because unless the receiver is properly compensated the sharpening of tuning necessary to get clean-cut reception on foreign stations sacrifices higher frequencies.



"The fine reproduction of the higher frequencies is often lost through the bad placing of a set, or by using it in an unsuitably furnished room"



How the high-frequency pentode is built up. (1) Filament, (2) with control grid, (3) with screening grid, (4) with suppressor grid, and (5) with anode

Tried a High-frequency Pentode Yet?

BEFORE any of you have time to write in—either to congratulate the Editor on getting us back or bitterly recriminating him over what you consider is perfervid folly—we will let loose article the second in our new-season's campaign.

It is going to be all about high-frequency amplification. What set us off on this tack was the very interesting suggestion made by

Ask The Experimenters

sad state of affairs was the entire lack of any specialised valves for the job—components, too, for that matter. We well recall using an old Ediswan RC210 with an impedance of 90,000 ohms and a slope of something like .4 milliampere per volt.

To-day the ordinary triode is quite *passé* for high-frequency amplification—in fact, that old-type triode has gone out completely.

Let us trace through the successive "crazes"—so called—of high-frequency amplification. Crazes through the ages, in fact. Seriously, though, the first big step in real high-frequency amplification, as distinct from the screaming, howling, up-the-loop sort of stunt that passed for high-frequency amplification when wireless was beginning, was the recognition that *the impedance of the anode circuit must be as much as and preferably greater than the valve's impedance.*

That led to all sorts of trial-and-error experiments with valves of different impedances, finally settling down to the old tuned-anode with a medium-impedance valve around 25,000 ohms. It worked—after a fashion—but nearly always there was the lurking fear of instability. The valve was working too near its maximum efficiency to be really safe. Then some bright genius—it

wasn't us!—started off with a high-impedance valve with a high magnification, using it with a resistance in the anode circuit. Here the valve was well off its maximum gain, but

was much more stable—just because of that. Resistance-coupling for high-frequency never caught on because everyone realised that improvement was possible with tuned circuits—even though instability was the snake in the grass.

Fig. 1 shows the sort of high-frequency amplifier circuit we used to be very proud of. There is an ordinary triode with a straight tuned-anode coil—all the elements of complete instability present and correct; but we didn't know that then.

Came the Screen-grid Valve

Came the first real craze—as many called it. The screen-grid valve. Before this, the inherent instability of the Fig. 1 arrangement had been partially counteracted by various systems of *neutralising*. The high-tension supply was fed not to the end of the coil but to a centre-tap on the coil, and a small variable

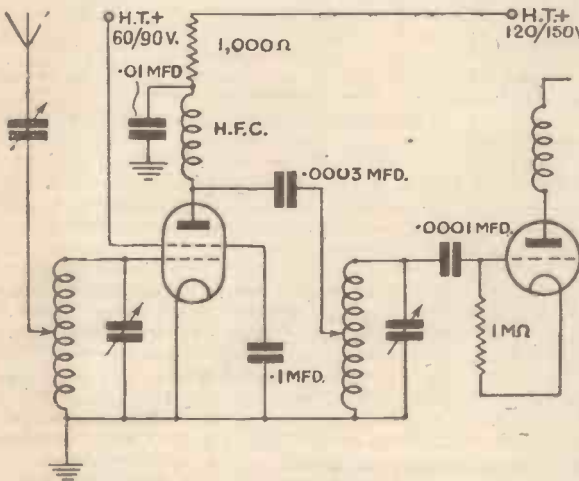


Fig. 3.—Something like a high-frequency stage—a screen-grid with tuned-grid coupling. We can assure you this is both selective and stable!

the designers of the All-Britain Three to try an ordinary screen-grid in place of the specified high-frequency pentode.

Ever on the alert for knotty little questions, we asked ourselves quite frankly:

Is this high-frequency pentode just a craze—or does it represent a natural development in the progress of high-frequency amplification?

Our minds went back to those excitingly early pioneer days, when high-frequency amplification was a genuine scream—in more senses than you spoon-fed modern constructors adequately realise, perhaps.

Another Pair of Boots

To-day you can throw a set together with an enormous amount of high-frequency amplification without the slightest fear of the set going up the loop. But in the days when we stood more or less—er—shoulder to shoulder with Marconi it was quite another pair of boots.

In fact, most wireless men sneered at the whole idea of worth-while high-frequency amplification—except perhaps on long waves, with resistance-capacity couplings of very low stage-gain.

Of course one very obvious reason for that

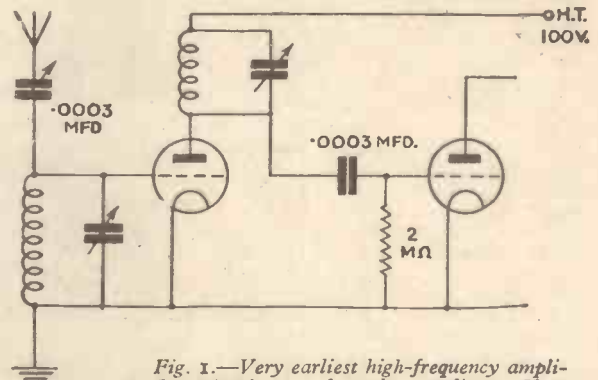


Fig. 1.—Very earliest high-frequency amplifier circuit—tuned-anode coupling. Very unstable and altogether a very unsatisfactory type of circuit for these hectic days

condenser was connected between the end of the coil and the grid of the valve. This little capacity passed a neutralising current that counteracted the inter-electrode capacity feedback. A stabilised valve thus gave more gain because it could be worked nearer to its maximum output without spilling over.

Even we realised that all the complication of neutralising was temporary and "botchy." Every time you changed a valve you had to change the neutralising.

Came, as we say, the screen-grid with a screen between the grid and anode, decreasing the inter-electrode capacity to practically nothing. Away went all the paraphernalia of neutralising, thank goodness!

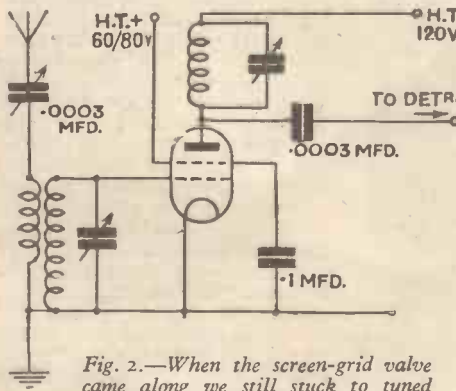
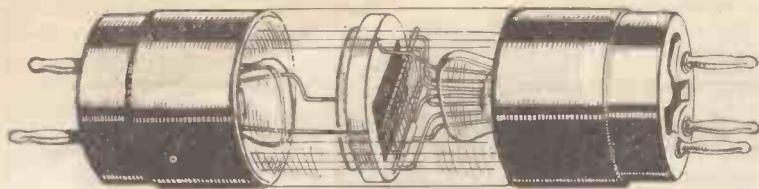


Fig. 2.—When the screen-grid valve came along we still stuck to tuned anode—and suffered accordingly!



Relic of the dim past ages—but that was only in 1927!—an S610 Marconi screen-grid. It had a double-ended bulb, as shown, with anode and grid at opposite ends to prevent all chance of feed back

To complete the idea the anode was brought out at one end and the grid at the other, so as to keep the vital anode and grid leads as far apart as possible. With an ordinary four-pin type valve with grid and anode coming down through the pinch side by side you really make up a little condenser that completely spoils any chance of stable high-frequency gain—due to feedback.

Looked At with Suspicion

Screen-grids, looked at with suspicion by most amateurs at the start, really came into their own with the production of the standard four-pin base with a top terminal for the anode. Here was an easy way for the amateur to put in a screen-grid where once a triode had been used.

As soon as we came to use these valves we came up against a real snag. The impedance of the screen-grids was around 200,000 ohms. In theory this seemed to indicate a valve about twice as bad as a good triode. Amateurs soon found that as the theoretical amplification for this impedance was something near 200—as against the maximum of 45 for a triode—there was the chance of a volume increase, no matter how badly the valve might be used.

That was the key point. Putting in one of these screen-grids did at once give a definite increase in sensitivity and therefore in reaching-out ability.

At Fig. 2 you see the sort of tuned-anode circuit we used to use with these early screen-grids. Simply the old triode circuit without any modifications at all—other than an attempt to increase the selectivity of the aerial-input circuit.

It was all very amusing, really. We got a kick out of the circuit that made up for all its absurdities. Anyway, it was a jolly hot circuit on long waves, thanks to the impedance of the coil going up. On medium waves, though, the tuning was terribly flat.

Well, we didn't put up with the Fig. 2 arrangement very long—within a year came tuned-grid coupling to make the most of the screen-grid. At Fig. 3 you see a typical tuned-grid coupling between a modern screen-grid valve and an ordinary triode detector.

Really High Impedance

The idea is to get a really high impedance in the anode circuit of the screen-grid valve. We put in a very good high-frequency choke having lots of impedance—wound with from ten to fifteen thousand turns of wire, in fact.

Add a little decoupling with a 1,000-ohm series anode resistance and a .01-microfarad fixed condenser to earth from the junction—and there you have the beginnings of a real good circuit.

Then by leading the high-frequency current from the anode of the screen-grid valve through a blocking condenser to a tuned-grid circuit connected to the detector we complete the entire arrangement.

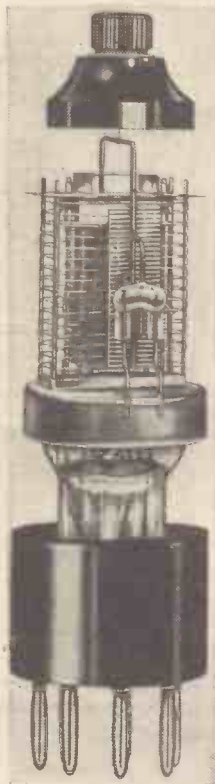
greater selectivity, this system enabled the moving plates of the tuning condenser to be earthed—and thus paved the way for the metal panel. Hand capacity—one of the bugbears of tuned anode—disappeared like magic.

We were still only on our way—not at the end of the road. We made all sorts of detailed improvements, such as increasing the aerial selectivity with bandpass, using a better high-frequency choke, messing around with coupling values, and so on and so forth. We seemed to be almost at a standstill.

Practically Paralysed

Stations were beginning to increase their power by leaps and bounds. The input from the aerial created by many of the foreigners was becoming so great that the first high-frequency stage was practically paralysed with overloading.

Distortion was, in fact, brought into the set right at the beginning—no wonder there was such a nasty noise at the output. Something had to be done—and done quickly. As a temporary measure we put in a "pot." to vary the screen volts on the screen-grid valve.



VP2 high-frequency pentode

As you do this you alter the impedance, of course, and so for strong signals we were able to reduce the impedance and incidentally increase the valve's ability to handle a moderately big input.

Came the long-grid-base screen-grid to act as amplifier of strong inputs without overloading. With this valve we had a fixed screen voltage but a variable grid bias. The valve had a construction that enabled this variation of bias to vary the amplification or *mu* of the valve. A tapered grid did the trick—and the result was the variable-*mu* valve.

This had a jolly good run for its money; in fact it is still considered the bee's knees among somewhat backward amateurs. Sorry, no intention of being rude!

The variable-*mu* was undoubtedly a very big step in the right direction. Why weren't we completely satisfied, then? Well, we realised that there were still unnecessary losses in the construction of a screen-grid valve—due, of course, to the remaining amount of inter-electrode capacity.

Something was wanted to get rid of that residual capacity. For a little while we used a neutralised screen-grid—we were among a high-brow few, though.

What we wanted was a still higher impedance, a still higher magnification, and a still lower internal capacity. Now we'll let you into a trade secret. We were

We tap this grid coil so as to reduce the damping of the screen-grid stage on the tuned-grid circuit—thus increasing the selectivity.

Quite apart from any advantage in

the first amateurs to use a high-frequency pentode in this country. We had them made up specially, as a matter of fact nothing like the valves you buy now. The extra connections came out to side terminals, for instance.

That was in 1928, so we might be excused for not having the thing taped up. We were able with one of these very "duff" pentodes in the high-frequency stage to equal the performance of a set with two ordinary screen-grids. There seemed no doubt as to what was going to happen. But it took a long time to develop.

To day, in 1934, we can point to Fig. 4 as a good standard high-frequency pentode circuit—actually it is practically the All-Britain Three arrangement. We go so far as to say that this type of circuit will be used

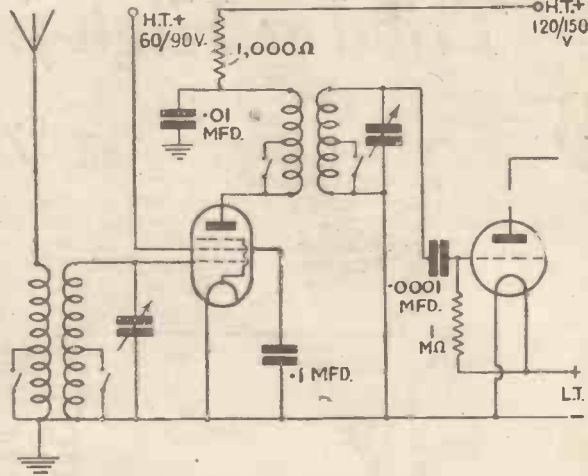


Fig. 4.—Latest thing in high-frequency amplification—basic circuit of the early part of All-Britain Three, using high-frequency pentode and tuned-transformer couplings

everywhere during the forth-coming months.

You have a transformer with tuned secondary for the aerial tuning input to the high-frequency pentode, and the same type of coupling between the high-frequency pentode and the detector.

Virtually we are compromising between tuned anode and tuned grid. We save the cost of the high-frequency anode choke and coupling condenser. We match up the impedances of valve and tuning circuit fairly well—still not high enough, but then the valve has an enormous amplification—actually some 300 to 400 times.

Another thing in favour of Fig. 4 is the vast increase in selectivity that you can bring about by reducing primary turns on the transformers. As there are separate primaries for long and medium waves you don't have to put up with poor selectivity on one band in order to get things just right on the other. Aerial presets and other fiddlesome gadgets also go into the limbo of forgotten things.

We have been trying out the All-Britain Three with the specified Cossor 210SPT high-frequency pentode. Needless to say, the results have confirmed all our own ideas on the subject.

We noted that iron-cored coils were used in the set, so just for fun we tried out some of our air-cored coils. Result: absolutely punk! We hardly need tell you why. The air-cored coils had a much lower impedance and did not match up with the pentode. In fact we found that by putting in an ordinary screen-grid valve, better results were obtained with the air-cored coils than with the pentode.

The only way we could improve the results with the pentode was to lower the impedance by varying the screen volts—adjusting the

Continued on page 400

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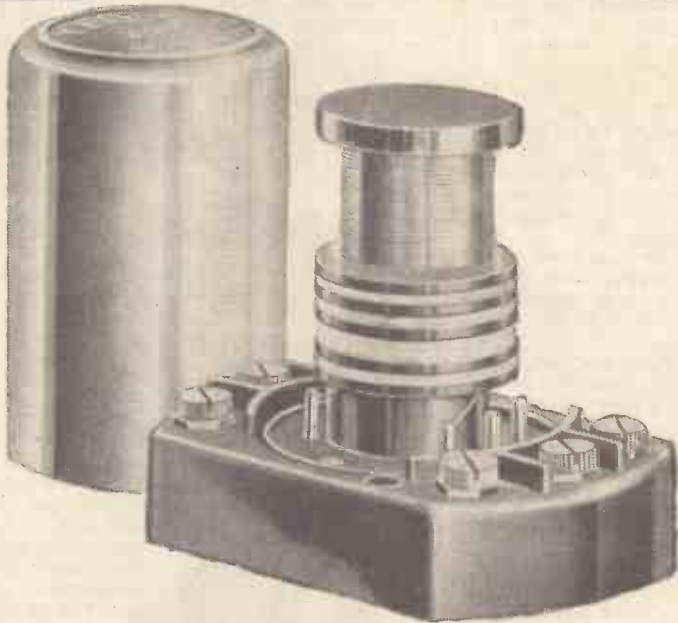
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On Your Wavelength

The Week's Radio Gossip :: By THERMION

Wireless Beats the Band

A VERY distinguished musical critic recently startled lovers of music by declaring that concerts heard over the wireless might often be better than the real thing. This is a most interesting point of view, and it shows what a change has come about in the last few years. Not so very long ago musicians were united in holding that loud-speaker reproduction could never be anything but a poor, pale ghost of genuine music.

Now they admit that with a first-rate set the quality so closely approaches perfection that even the most delicate ear can listen with the keenest pleasure to broadcasts of concerts.

Mr. Ernest Newman's great point about wireless is that you hear the music without seeing the mannerisms of soloist or conductor. Therefore you hear it as you ought to hear it, without your attention being distracted by other things.

One up to wireless!

Luxembourg and Other Stations

LUXEMBOURG is quite one of the best of the long-wave stations, coming in as it does at full loud-speaker strength at any time when it is working. But it is causing some rather queer effects on the reception of other stations.

Many readers have asked me why it is that they hear Luxembourg as a background to Beromünster and sometimes to other Continental transmissions. This queer business

is an instance of what may be called the van de Pol effect, to which I referred last week.

If you happen to live at a place which is more or less in a straight line with Luxembourg and Beromünster, you may find the long-wave station's transmissions superimposed on the others at times.

The Unsuspected in Wireless

IT is curious how often the adoption of some new thing in wireless brings totally unsuspected results in its train.

When, for instance, long-wave stations first came into use, it had scarcely been realised that they might generate harmonics. I can remember how puzzled lots of us were many years ago when we heard harmonics of big commercial stations on quite short wavelengths.

Then, again, no one expected that a long-wave station would be able to butt in on to the medium waveband as Luxembourg does.

The worst of it is that both the harmonics and the butting in considerably reduce the number of really clear channels available within the limits of the broadcast band.

A Crystal Surprise

THE recent outcry against the B.B.C.'s proposal to close down the London, West and North Nationals has shown that the numbers of crystal sets still in use run to truly astonishing figures. Some time ago, when I suggested in these columns that there couldn't

be many crystals at work nowadays, piles of letters came from readers who said that they were using crystal sets and intended to go on doing so.

But even then I didn't realise how many crystalisers there were in this country. Now it appears that they form quite a considerable proportion of the big band of listeners. There is a great deal to be said for the crystal set, when you come to think of it.

You can make it for well under a sovereign, it is easy to operate, running costs are practically nothing, and with ordinary care it will last for years and years.

I suppose that the development of high power has given a new lease of life to these simple receivers, for they will now give a very good account of themselves at quite long ranges.

Short Waves in the Wilds

A COUPLE of months ago I sent a well-known all-wave set to a young relative of mine who is stationed in one of the most out-of-the-way spots in India—so out of the way, in fact, that the camel is the chief means of transport.

I have just had from him a letter describing his delight on receiving his set and getting it into action. It arrived perfectly safe and sound, which speaks volumes for the skill of the packers.

Within an hour or two he'd got it working and was able at once to pick up the Empire

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broadcasts from Daventry as well as the Dutch transmissions from Java. He tells me that he has also had quite a few of the European medium-wave stations at times.

The Battery Problem

THE biggest problem for those who are situated in distant corners of the Empire is that of filament heating. It is not much good having accumulators when the nearest charging station is several hundred miles away.

The youngster in question is running his set from large-sized dry cells and, though it is rather an expensive way of heating filaments, he tells me that wireless is such a godsend that it is well worth the cost.

You can imagine what a joy it is for a fellow so situated to be able to pick up news and entertainment from home day after day. If you are wondering what to send as a Christmas present to any relative of yours who is living in a lonely part of a far country, I can strongly recommend a short-wave or, better still, an all-wave set. The one I chose was the Lissen Skyscraper.

Rome's New Station

THE Italians are not satisfied that their capital city should have nothing bigger than a 50-kilowatt station, so they have decided that Rome must go up as soon as possible to 120 kilowatts. The work is already in hand and by the end of the year the enlarged plant should be at work. Even with 50 kilowatts Rome has always been one of the best medium-wave stations. When it goes up to 120 it should give superb reception in this country.

I hear, too, that a second Rome transmitter, also of the super-power class, will be at work within the next few months. Just how it is going to be squeezed into the medium-wave

band I don't quite know, but if it also has a power of 120 kilowatts, which seems likely, it should be able to muscle in, as the Americans put it.

Cavalry Wireless

THIS year the 1st Cavalry Brigade goes on manoeuvres with a complete equipment of wireless. Each regiment has three sets for telephonic and telegraphic transmission and these are carried in baby cars.

I hear that the new equipment is extraordinarily successful. It is the result of years of development and research. All sorts of queer problems arise when it comes to designing satisfactory transmitters and receivers for use by mobile troops, but these appear to have been overcome successfully.

Though I can't say for certain, I expect that "scrambling" apparatus is used in order to make telephonic communications completely unintelligible to the enemy. What a war it will be—next time!

Splendid New Sets

LATELY I have been trying out some of the new season's sets, both three-valvers and superhets. I must say that, taking them generally, they are a splendid lot.

So good, in fact, are sets nowadays that it is difficult to make a selection. They all seem to be bristling with good points, whilst bad points are hard to find.

When friends ask me what set they should choose, my answer is: If there are two or three whose performances you like equally well, select the one which has the best guarantee of service-after-sales behind it. That, I think, is sound policy; for if the manufacturer can afford to offer a watertight guarantee, you can feel pretty sure that his sets are reliable. If they weren't, all his profits would go in giving free service.

Art of Listening

I SEE that the mentality of the radio listener, as a class, is becoming the subject of serious study by psychologists. They want to know, for instance, why men announcers are generally more acceptable here than women, particularly in view of the undoubted success of the latter in other countries.

What exactly is the peculiar quality that distinguishes microphone speakers like Bernard Shaw and Sir Oliver Lodge from others who are less successful at the part? Why is it that certain outstanding comedians of the music-hall are unable to "get across" on the ether. What, in fact, is the essence of broadcast humour and how can it be developed?

Does a wireless receiver bring company into the home of a single listener, or does it only serve to emphasise loneliness? Why does a certain type of listener—who often professes to hate broadcasting—invariably turn on his set for the edification of visitors? And so on, and so on. Quite enough, in fact, for any keen psychologist to sharpen his teeth on.

The Stenode Again

IT is good to see that so much interest is being taken in the fine Stenode receiver that Paul Tyers has designed for the *Wireless Magazine*. Readers may remember that I have always been a strong believer in the Stenode principle.

Actually, the very first published description of the Stenode principle was written by me in "A.W.," and I was the first private owner of a Stenode receiver.

And a jolly fine set it was in its day. It was quite twice as selective as any other superhet then available, and with it I heard, at one time or another, pretty well every station in Europe as well as between forty and fifty in the United States.

Continued on page 409

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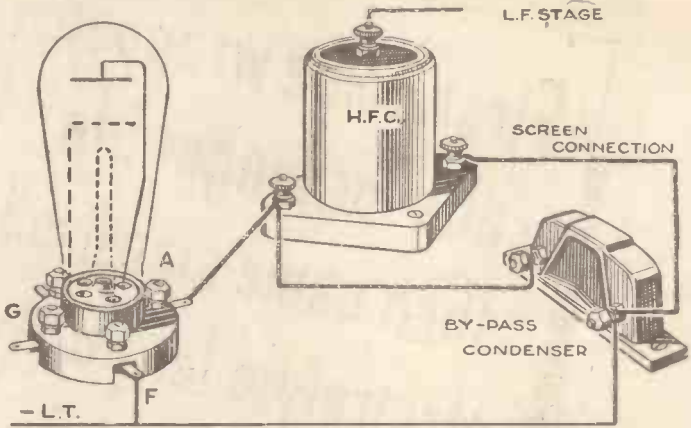
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Losing High-frequency Currents

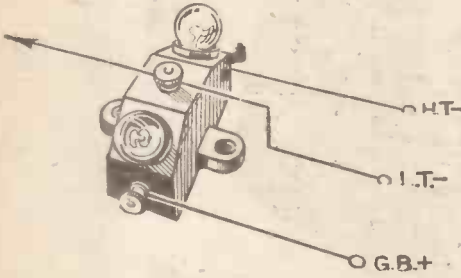
This week, the good Smithers learns from our contributor, L. O. SPARKS, just why we need a high-frequency choke and a fixed condenser at the anode of the average detector circuit. He also touches on other problems, such as the construction and action of the modern local-and-distance switch. Read this series every week—and learn the theory of wireless with a smile as Smithers is doing

THE evening Smithers was due to visit me I had a feeling that I was going to have a busy time and, believe me, I did. He could hardly wait until we had settled down before he started firing off questions at me. "I say, old man, would you mind settling a couple of points, before you tell me about these things you told me to get?" Taking a deep breath and nestling further down in the chair, I told him to open fire. "I notice," he continued, "that some sets have what they call a 'local-and-distance' switch. If it is not too complicated I would like to fit such an arrangement, as my esteemed uncle is pretty close to a B.B.C. station." "Oh, that's quite simple, big boy," I replied,

Do you see the idea?" "Yes," answered Smithers, gazing at the diagram for a second or so. "I see, this means the negative of the low-tension and the high-tension, and the positive of the grid bias are connected." "That is so, my dear Watson; that is the usual arrangement in practically all battery sets. What is more, these points are invariably connected to the earth side of the circuit."



From this pictorial diagram you can easily see how a high-frequency choke and a fixed condenser are used to bypass those unwanted high-frequency currents at the anode of the detector



This is the fuse that Smithers was worrying about—how it is connected in the battery circuit to avoid disasters

thinking that here was an easy one to start with. "All you want is a small fixed resistance and an ordinary push-pull switch. Look, here is the idea," I told him, as I sketched it out. "When you want to receive only the local station you simply pull out the switch which, as you can see by the diagram, connects the resistance right across the aerial and earth terminals of the set. This allows quite a large amount of the signal to take a short cut to earth and, incidentally, prevents the first valve from being overloaded."

Is It Worth Fitting?

"Is that all it is?" exclaimed Smithers. "Well, I'm darned! I thought there was much more in it than that. It is worth fitting, isn't it?" "Why yes, it certainly is, because not only is it very cheap and effective, but it also reduces to a great extent background noises." "I think we will consider that item O.K., then. Now the other thing was this. I saw in one of the papers that it is always advisable to put a fuse in a set and arrange it so that it is effective for all the batteries. The trouble is that the writer didn't mention how to connect the thing. Would you mind?" "Oh, simple again, old lad! I can show you that in a couple of ticks. "This arrangement," I explained, as I drew the thing out, "protects your valves from harm which might be caused by any fault in the low-tension, high-tension, or grid-bias battery circuits. This particular gadget uses two little bulbs which are selected so that they burn out when they are called upon to carry more current than that required for all the filaments.

"Oh, this is good," burbled Smithers, as he proceeded to dig out many leaflets and bits of paper from his pockets. After unloading many and various items he at last brought to light a neat little box I recognised as containing a well-known high-frequency choke.

I had told him during the week to get hold of some of the components I knew he would require to modernise his uncle's set. The choke was one of them and, as he was now examining it, it did not require a master mind to guess that the "whys and wherefores" of high-frequency chokes was going to be the next item on the programme. I had better get in first, so off I started.

"A high-frequency choke is one of the most useful little components in a receiver. Without it we should be liable to many nasty little snags and effects which would undoubtedly cause much hair-tearing and, shall we say, illuminating remarks. Don't think I mean that a set won't work without one—it depends on the type of circuit one is using. But it is pretty safe to say that the addition of a high-frequency choke has definite advantages and is well worth its cost.

"I am afraid you won't be able to see what actually forms the choke," I said to Smithers, as he was still looking at the one he had. "That is what we call a screened one, but here is one 'in the raw.' You can see for yourself that it is only a slotted former wound with a whole heap of fine enamel wire. If you like you can make one of these things yourself; in fact, I should think it would just be your mark." I added, remembering his virtues.

"Um... yes, I suppose I could," he said, examining the exhibit with his usual careful detail, "but how much wire does one want and what gauge is it?"

"There are six slots in

it, so if you wind, say, 1,100 turns of 44 SWG enamel wire in each you will form an efficient and quite neat high-frequency choke."

"Why the slots?" he asked. "Why can't you wind the wire in one big slot?"

"Aha!... my seeker after knowledge—that's where we come to the properties of chokes. At least those belonging to the family of high-frequency.

High Inductance Wanted

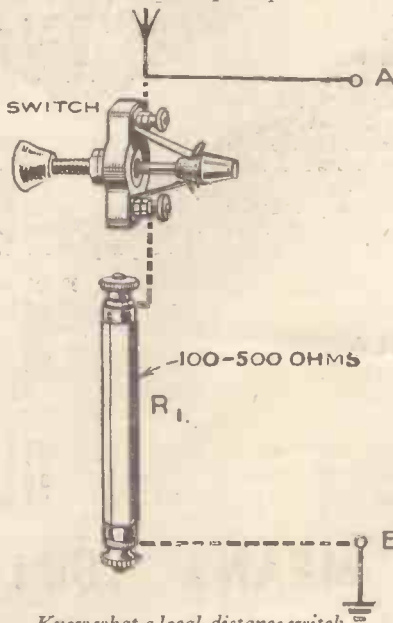
"The first thing we want in any self-respecting choke is a high value of inductance. No, I'm not going to explain what that is, so you needn't look worried. All I am going to say about it is that inductance is something with a very strong objection to irresponsible currents that don't seem to know the way.

"This inductance stuff—that is, if there is enough of it—decides that it is not going to put up with these high-speed, or frequency—just as you like—changes, so rightly chokes them off. In other words gives them the cold shoulder and tells them to amble off somewhere else.

"Now, if you want to get a good portion of inductance you must remember that old motto, 'One good turn deserves another,' because the more turns of wire we have the more inductance will be present. To get the number of turns we require, we use fine wire so that the size of the article is kept within reasonable limits. Of course, when selecting the wire we have to bear in mind the current which will be flowing through the choke and choose a gauge that will carry it safely without offering excessive resistance to it.

"Now there is one thing which we don't want in a choke and that is capacity. To try—"

"Excuse me a minute, old man, why isn't this capacity wanted?"



Know what a local-distance switch is? Here's the explanation—a resistance across the input of the set, with a make-and-break switch in series



Two typical high-frequency chokes. That on the left is an ordinary slotted type, but on the right is one of the latest fully screened chokes

"Why? . . . well, if we have too much capacity present in the winding we shall defeat the object of using a choke, as the capacity would simply enable the high-frequency currents to pass. To try and overcome this, we split the winding up into sections—likewise the need for a former having several slots."

"I've got you," exclaimed Smithers, looking very pleased with himself, "but there is still one point which you haven't touched on yet and that is—why does one use a high-frequency choke?"

I sagged back into the chair. The bland question was such a blow that I nearly missed taking the cigarette he was offering me. But there, he was quite right. I had been chortling merrily along and missed out the sole object of the thing.

How Detector Separates

"If you read the 'A.W.' data chart for last week you will see that the detector valve in a circuit has the job of separating what the technical johnnies call the radio (high) frequency currents from the audible frequencies. Unfortunately, some of the high-frequency manages to get through to the anode circuit of the valve and, if allowed to wander

Smithers Learns This Week About Chokes and Condensers

about as it likes, will very soon cause instability, distortion and other objectionable effects.

"To stop this gate-crashing business we trap the little blighters by means of a high-frequency choke which, as I explained previously, presents too hard a path for them to follow."

"So far so good," smiled Smithers, with a little gleam in his eye, "but what happens to them if the choke won't let them pass?"

"Oh, very hot, my boy, very hot! That is so, though. We can't have them hanging about all over the anode. That would never do. This is what is usually done," I explained, as I drew out the circuit showing the valve complete with choke and a small fixed condenser.

"A small condenser is connected between the anode of the valve and earth or low-tension negative, and this offers a very easy path for the high-frequency currents to dash along, thus getting them away from the anode. In some cases we make them do some useful work while they are escaping. We use them to obtain reaction by transferring some of them back into the grid circuit—

(Right) How a slot-wound choke is made can be seen from this drawing. A large number of turns of fine wire are wound in each slot as one continuous winding. (Below) Typical fixed condenser as used for high-frequency bypassing



by various methods. Care must be taken in doing this or else the valve starts protesting most violently, and lets everybody know by weird shrieks and whistles."

"I think that has made the general idea pretty clear," exclaimed Smithers, "you might say if this is the gist of the whole thing. As I understand it, you don't want to let any high-frequency currents get through into the amplifying portion of the set, or into the positive leads of the high-tension supply."

"To prevent this one uses a high-frequency choke in conjunction with a small fixed condenser. Is that right?"

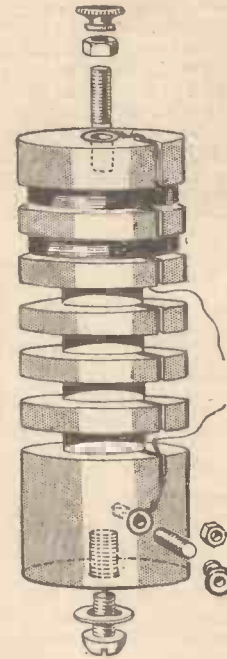
"In a general sense, yes," I answered. "But we usually call the condenser a by-pass condenser. There are many more uses for a choke and I will tell you about them one of these days, when you are more familiar with the bare facts."

"Even with your quite limited knowledge it is, you see, quite easy to understand some of the elementary aspects of radio theory. I refuse to believe that it is necessary for an amateur to be a fully qualified text-book theoretician just to understand what his set is all about."

Wrapping Up Theory

"Far too many people try to wrap up the theory of wireless in cotton wool—bringing it out in incomprehensible chunks whenever a poor listener wants to know something."

"If you will be patient I think we can sort out this wireless business without getting brain-fever. The great thing is to take it a little bit at a time—not try to swallow the whole circuit at one gulp."



Tried a High-frequency Pentode Yet?

Continued from page 394

volume control, that is—and then we were back to screen-grid-valve standards.

May we therefore stress this point: if you have an ordinary sort of set with a screen-grid valve it is more than probable that there will be no gain in performance—in fact results may easily be worse than before.

It is utterly useless to put in a high-frequency pentode unless you are prepared to match it with really good high-impedance coils—as transformers, of course. Air-cored coils are almost certain to be out of the running for high-frequency pentodes. Most of the well-known iron-cored coils seem to match up pretty well and justify the existence of the pentode in the high-frequency stage.

Real Dead End

Now we are up against a real dead end. Nothing much more to be done until the coil makers get down to the production of a really super high-impedance coil. Then the fun will begin. Of course, the valve makers may, in the meantime, decrease the impedance of the pentode and at the same time increase the amplification—which can be done by more careful making and decreasing the clearances between the electrodes.

That would pave the way to better results with existing coils—matching would be better. Meanwhile, though, we think we have given you something to chew over.

Tips for Crusaders

To the Editor, AMATEUR WIRELESS,

THE following tips I pass on to my fellow Crusaders, if you think them of any value.

Firstly, present-day sets designed for the home constructor I find generally are rather high on high-tension consumption, especially if a super-power valve is employed.

Double the Volume

I have successfully overcome this difficulty by using a pentode, to wit, the Triotron P225; it gives double the volume of a super power and at approximately half the high-tension consumption, which I find is roughly 10 milliamperes at 150 volts and $7\frac{1}{2}$ milliamperes at 120 volts, using $4\frac{1}{2}$ volts grid bias and $4\frac{1}{2}$ milliamperes at 100 volts and 3 milliamperes at 80 volts using 3 volts grid bias, and gives off enough volume to fill an ordinary room at 80 volts, thereby allowing the use of a standard high-tension battery.

Secondly, when using a pentode (to overcome the necessity of having to shunt the terminals of the loud-speaker with a fixed condenser to cut top), to use a low-frequency compensating transformer (I use a Telsen Audioformer) instead of the usual low-frequency transformer. This not only regulates the amount of top cut but improves reception when listening-in

to foreigners and other more distant stations.

Thirdly, to overcome the usual snags associated with the ordinary push-pull switches and to give a more "manufactured" appearance to the panel, to use the Snap switches manufactured by Graham Farish.

Fourthly, I find on test that a pilot dial light takes as much current—.6 ampere—as all the valves added together—thereby reducing the length of use from accumulator to half the usual time. To overcome this fix a Snap switch at the back of the set—one can then use dial light only when needed—that is when tuning.

Volume Without Reaction

One thing I should like to see in your valuable paper is (if not infringing any patent right) the way manufacturers manage to obtain good volume on both wavelengths on locals and high-powered foreigners without use of reaction. I have tried several methods but only station I can get loud without using reaction is Droitwich.

Having in mind's eye at the time of writing the Pye G.B. battery model.

Wishing you all success in your crusade.

D. R. POOLE.

Landport, Portsmouth.

GETTING ALL EUROPE on the All-Britain Three



Just to find out exactly what the All-Britain will do under typical conditions, ALAN HUNTER took the set down to his Sussex cottage (which you see above) and put it through its paces. Here is a true record of what happened when he and his friend Bill sat down to an evening's knob-twiddling



ALMOST within sight of the Sussex downs I go "truly rural" in spare moments—and to that haven of peace I took the original model of the All-Britain Three last week-end.

Below is a minute-by-minute account of what happened—a record given in all sincerity of my own luck with what I consider is a very jolly little thing in threes.

Endless Conglomeration of Wrappings

"Where the deuce IS the set?" moaned Bill, as we both delved down among and endless conglomeration of wrappings. "Patience, little man," I murmured, "We aren't risking any damage to this baby!"

At last we found the set—underneath one package containing the three valves and another wrapping the moving-coil loud-speaker chassis.

"Wonder where the baffle is?" I enquired. "Why, what's the mystery?" asked Bill. He wasn't trying to be funny; but he is rather a fool at wireless. That's why, by the way, he's in this article. I regarded him as a Heaven-sent foil to my test reactions. If he could understand what it was all about, I felt sure "A.W." had scored a distinct point.

Well, it didn't take us long to fix the set up in the cottage lounge. We cleared the decks of our pet four-valve super-het and gently laid down the All-Britain Three. "Only four battery leads," I said, "just for high- and low-tension—the grid bias is automatic."

"I don't know what you're talking about," said Bill, "but I can see the set is jolly simple. Where's the loud-speaker thing go, though?"

I had to guess that, because the four sockets on the back weren't marked. But I soon saw which must be the aerial and earth sockets—and that left the other two for the loud-speaker—for the W.B. chassis, that is.

Plugs that Actually Fitted the Sockets!

Another moment of joy arrived when I found that my aerial and earth lead plugs actually fitted into the set's sockets. Being quite superstitious I took that as a very good augury.

"What about that baffle, though," I wondered, getting a little peeved at the lads for not having packed it. Then the good Bill had a brain wave. "Why not use the loud-speaker in our set?" he exclaimed, all excited-like.

Not so easy as it sounded. Six unmarked terminals on that loud-

speaker—I tried every combination, but it was a very weak output, even when I had got the set tuned-in properly. "The impedances don't match up," I said decisively, and that kept Bill quiet for a little while.

Then I had THE brainwave. "Let's unscrew the loud-speaker chassis from the set," I said, "and fix in this W.B. affair—it looks pretty useful to me."

While Bill did all the work, I had a good look at the set. Two of the cleanest-looking tuning dials I had seen for years. How odd, I thought, to handle a couple of tuning controls—having become accustomed to one-knob gang control. It was going to be all the more interesting for that.

Four other controls. Top centre for on-off, obviously. Left of that a "pot" for volume control. Right of it the reaction—differential, too. Below, the wavechange switch of the two-coil unit.

Simple enough—if those tuners acted up to expectations. Ought to be easy to find one's way, I pondered, with those scales so clearly marked and so easy to read.

Now Turn On Some Music!

Bill looked up, slightly hot under the collar. "There you are, mister bally expert," he grunted, "now turn on some music."

With our W.B. chassis snugly inside our own set's cabinet we went right ahead. Turn on the music, indeed! First impression—cross my heart and all that—was of the beautifully absent background noise.

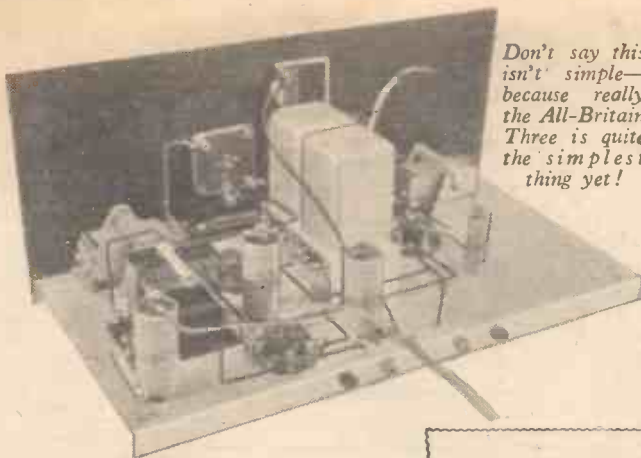
Real clean-cut output. Crisp top-note stuff you read about in books but don't always hear on the wireless. Enough bass for us—and we're not uncritical of that sort of thing.

Quality, though, is not an attribute that one can talk about very convincingly, is it? I mean, hearing's believing. There are other points that do bear the strain of a printed record—and on these let me concentrate, as I did during tests.

We hit on Harold Ramsay's "Symphony and Rhythm" on the London National. Liked it so much that we both agreed to suspend the test for half an hour—and just enjoy ourselves with the jilting melodies. That chap Ramsay—he plays the organ, too, doesn't he?—certainly knows his stuff—long may he live to mix Viennese melody with American "pep."

As I say, we had got Ramsay on London National—but here under

TO GET A FULL-SIZE BLUEPRINT OF THIS SET JOIN THE CONSTRUCTOR CRUSADERS! •



Don't say this isn't simple—because really the All-Britain Three is quite the simplest thing yet!

the Downs of sleepy Sussex, "little Nat" is not the stentorian voice he is in, say, Pinner. In fact Nat 261 is feeble—wobbly, too, at night. We run up to Daventry—or, if late, Droitwich—for any National offerings.

Infinitely Cleaner Signal

Automatically, then, I switched over to Daventry for a perhaps slightly less crisp quality but an infinitely cleaner signal. While I was up there, I gently flicked the right-hand dial pointer to the right—clockwise, that is—and in belched Radio Paris, recounting an endless series of *causeries* to be inflicted on the long-suffering Gauls the morrow.

A little flick on the left-hand pointer and I had right well cleared out Daventry and was dead in tune with Paris. As good a signal as you could wish for. Strong, crisp, clear of background, altogether satisfying—except the, er, programme.

Pestered by the Frenchman

Greatly cheered, I ambled up a few more degrees. "Moscow"—one word caught out of an incomprehensible jumble of sounds. So it was—the 500-kilowatt just above Radio Paris. Strong but slightly pestered by the Frenchman.

"What are you twiddling at, there?" petulantly wailed Bill, as I tried vainly to separate the warring elements.

"A bit of finesse, my lad," I boasted, "which I'll explain if you really want to know."

"Well, I am vaguely interested to know what you hope to do by messing about with all four knobs at once," he half sneered.

"Right! You see this knob here (pointing to the volume "pot") well, now, that cuts down the amplification of the first valve."

"But what's the sense in that—don't you want it to amplify?"

"Er, yes, we do. But unfortunately it won't just amplify the Muscovite gentleman's blather, which we want it to do. It also amplifies a bit of the Frenchman, whom we are tired of."

"You might say now—but I'll save you the trouble—that if we cut down the amplification of the valve, we shall lose both signals—the one we want with the one we don't. True—but that's where the knob here (pointing to reaction) comes right into the picture.

Reaction Is Amplification—With a Difference

"Reaction boosts up the signals just like an amplifying valve—but with a very important difference. The valve amplifies the wanted signal and the interference in the same proportion. But the reaction tends to amplify selectively. It will amplify the signal to which the set is tuned much more than it will amplify the interference—to which the set is only partially tuned."

Bill looked a bit "phased" over that—though it's simple enough to you technical fans, of course. So I then gave a little demonstration.

I tuned down to Luxembourg. Clear as a bell—though there was a high-pitched whistle that screamed to be suppressed with some sort of high-note-cutting circuit. A flick and I was down into Kalundborg—down where the announcer pours forth his unlovely Danish tongue. That wasn't all—there was quite a bit of splash-over from Luxembourg. After all, what's even 75 kilowatts against 200?

"Now watch," I exhorted, and Bill watched, goggle eyed. I turned down the volume control until we could hardly hear Kalundborg—and

certainly could hear nothing of Luxembourg's interference. Then I twiddled reaction up to the scream point—and that brought Kalundborg back to decent strength, without a trace of Luxembourg.

"Smarvelous," chirped Bill, really impressed. And so it is—this selective function of reaction. I do hope you will all take advantage of it with the All-Britain Three.

More than pleased with the long-wave show the set was putting up—it got seven really good programme signals for me—I moved the wavechange switch to the left for medium waves. Quite arbitrarily, I started near the top end of this band and worked downwards.

The Two Dials were Usefully in Step

At 97 degrees on the right-hand dial I got Athlone—strong and clear of all but the faintest trace of background from Stuttgart. The left-hand dial registered 95 degrees—usefully in step, you see, with the more important inter-valve tuning.

Beromunster just above quite good—though I thought it ought to be louder with its 100 kilowatts. Budapest right at the edge of beyond

PARTS YOU SHOULD USE TO BUILD THE ALL-BRITAIN THREE

BASEPLATE

1—Aluminium baseplate, 16 in. by 8 in., with two 16-in. lengths of $\frac{1}{2}$ -in. channeling (Peto-Scott).

COILS

1—Two-gang unit (Telsen type 478; or Varley type BP51, Goltone type R11/GIC4).

CONDENSERS, FIXED

1—.0005-microfarad tubular (T.C.C.; or Dubilier, T.M.C.).

1—.1-microfarad tubular (Formo screened paper type).

3—.1-microfarad tubular (Formo screened paper type).

CONDENSERS, VARIABLE

2—.0005-microfarad, with Mystic slow-motion dials (Formo type SU5; or Jackson, Telsen).

1—.0003-microfarad differential reaction (Graham Farish; or Jackson, Bulgin).

HOLDERS, VALVE

2—4-pin (Telsen; or Graham Farish, W.B.).

1—5-pin (Telsen; or Graham Farish, W.B.).

PLUGS AND TERMINALS

2—Wander plugs, marked: H.T.+, H.T.— (Clix; or Eelex, Goltone).

2—Spade terminals, marked: L.T.+, L.T.— (Clix; or Eelex, Goltone).

4—Plugs and sockets, marked: Aerial, Earth, L.S.+, L.S.— (Clix; or Eelex, Goltone).

RESISTANCES, FIXED

1—350-ohm (Dubilier; or Ohmite, Erie).

1—5,000-ohm (Dubilier; or Ohmite, Erie).

1—25,000-ohm (Dubilier; or Ohmite, Erie).

1—3-megohm (Dubilier; or Ohmite, Erie).

RESISTANCE, VARIABLE

1—100,000-ohm potentiometer (Erle; or Ferranti, Graham Farish).

SUNDRIES

Connecting wire and sleeving (Goltone).

2 yd. thin flex (Goltone).

6 in. screened sleeving (Goltone).

12—6 B.A. soldering tags (Peto-Scott).

24— $\frac{1}{8}$ -in. 6 B.A. bolts and nuts (Peto-Scott).

3—Matched knobs (Bulgin type K10).

1—Set of tags, numbered 1 to 50 (Readichex).

$1\frac{1}{2}$ yd. 4-way flexible lead (Goltone).

SWITCH

1—Three-point shorting (Bulgin type S87).

TRANSFORMER, LOW-FREQUENCY

1—Inter-valve, ratio 1:3.5 (Ferranti AF8; or Varley Niclet, Telsen Ace).

ACCESSORIES

BATTERIES

1—120-volt high-tension (Vidor type 13080)

1—2-volt accumulator (Exide type DTG).

CABINET

1—Table model with 16 in. by 7 in. panel (Peto-Scott).

LOUD-SPEAKER

1—Permanent-magnet moving-coil (W.B. Stentorian type PMS2).

VALVES

1—High-frequency pentode, metallised (Cossor 210SPT).

1—Triode detector, metallised (Cossor 210HL).

1—Output pentode (Marconi PT2).

(Complete kits of parts or individual components for this set can be obtained from the Peto Scott Co., Ltd.)

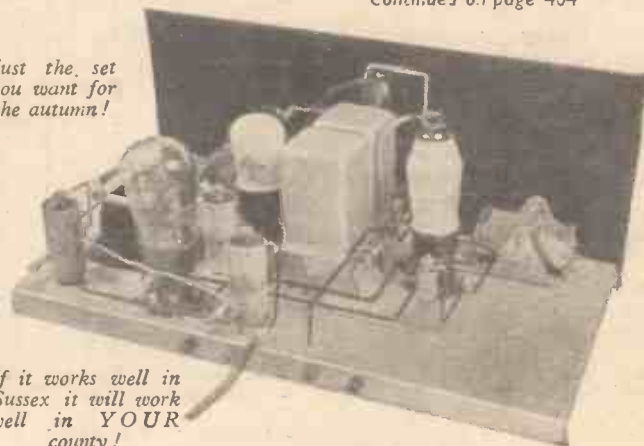
on the dials came in fine—no fading and plenty of punch. So did Stuttgart below Athlone.

Round the waveband I roved, sampling some delicious snips from various corners of Europe. If I say the ether at 10 p.m. was alive with good signals, you won't think me unduly laying it on with the proverbial trowel; because, the All-Britain Three apart, there are now a round dozen broadcasters on the medium waves with 100 kilowatts or more. And I counted up 15 stations with 50 kilowatts or more—many of which, I gather, are going into the super-power class this season.

There is, obviously, a *prima facie* case for a goodly bag of broadcasters—even on an insensitive set. True enough, but don't overlook

Continue on page 404

Just the set you want for the autumn!



If it works well in Sussex it will work well in YOUR county!

IF YOU HAVE ANY DIFFICULTY ABOUT GETTING PARTS FOR THIS SET WRITE TO US AT ONCE

Point-to-point Connections

WIRE No. 1.—From negative filament of high-frequency pentode to fixing bolt on aerial-tuning condenser.
No. 2.—From terminal No. 6 on aerial coil to fixing bolt of high-frequency pentode valve holder.

No. 3.—From one side of on/off switch to fixing bolt of coil chassis.

No. 4.—From negative filament of detector valve to fixing bolt of detector valve holder.

No. 5.—From negative filament of detector valve to terminal No. 3 on inter-valve coil.

No. 6.—From one side of reaction condenser to fixing bolt on high-frequency tuning condenser.

No. 7.—From grid terminal on output pentode valve holder to GB terminal on low-frequency transformer.

No. 8.—From one side of 350-ohm bias resistance to bolt on chassis.

No. 9.—From other side of 350-ohm bias resistance to terminal G on low-frequency transformer.

No. 10.—From terminal No. 3 on the aerial coil to fixing bolt of coil chassis.

No. 11.—From moving plates of aerial-tuning condenser to grid terminal of high-frequency pentode valve holder.

No. 12.—From grid terminal of high-frequency pentode valve holder to terminal No. 1 on aerial coil.

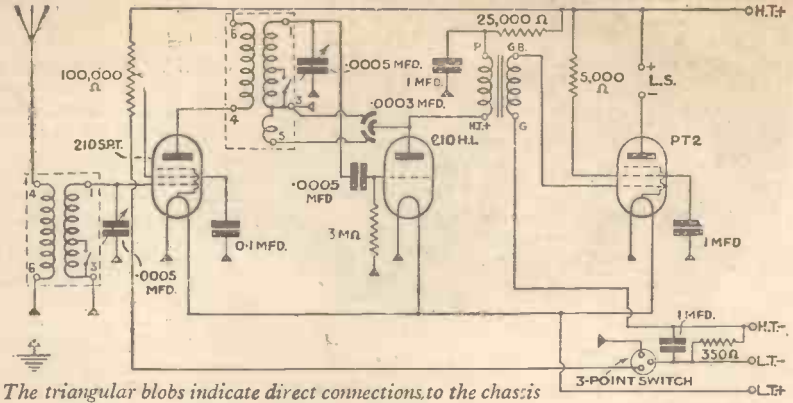
No. 13.—From positive filament of high-frequency pentode valve holder to positive filament terminal of output pentode valve holder.

No. 14.—From positive filament terminal of output pentode valve holder to positive filament terminal of detector valve holder.

No. 15.—From terminal marked HT on low-frequency transformer to anode terminal on detector valve holder.

No. 16.—From terminal marked A on high-frequency pentode valve holder to top terminal on 1-microfarad fixed condenser.

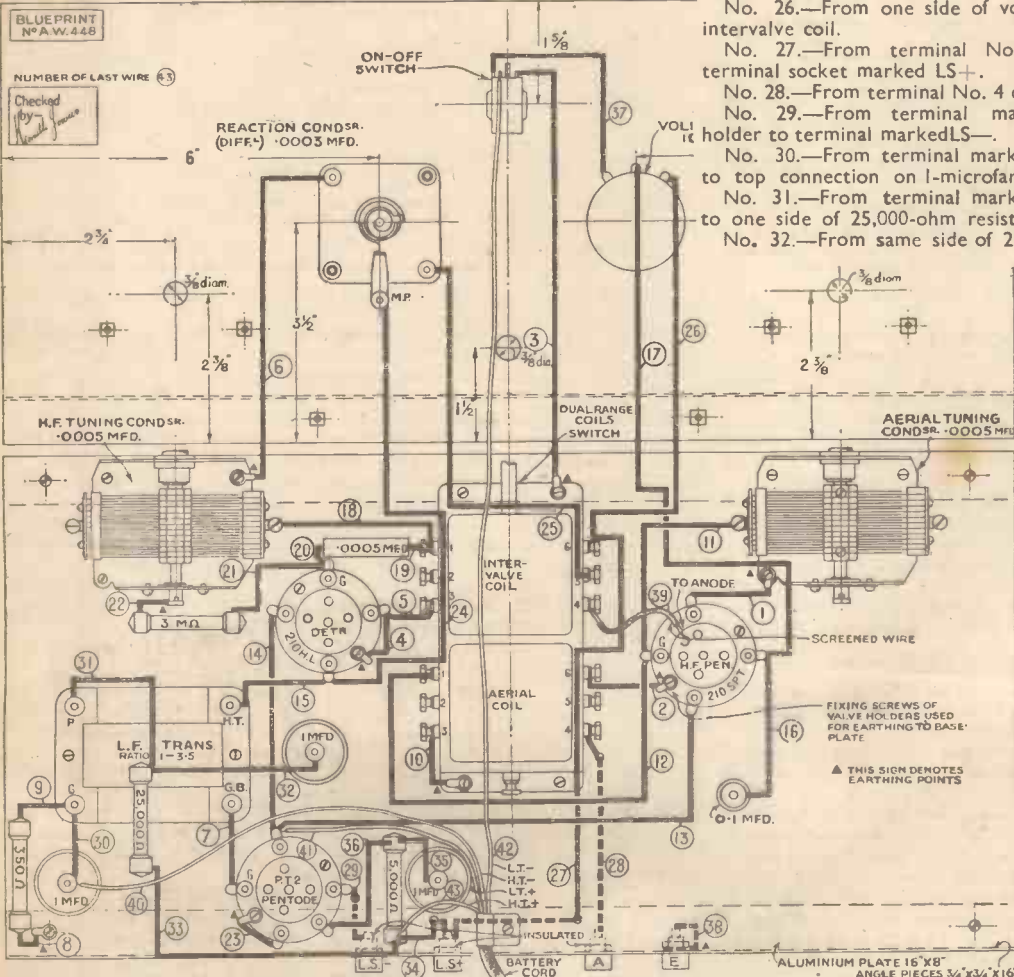
No. 17.—From centre contact of volume control to terminal marked A on high-frequency pentode valve holder.



The triangular blobs indicate direct connections to the chassis

- No. 18.**—From fixed plates of high-frequency tuning condenser to terminal No. 1 on intervalve coil.
- No. 19.**—From terminal marked I on intervalve coil to one side of the .0005-microfarad fixed condenser.
- No. 20.**—From other side of .0005-microfarad fixed condenser to terminal marked G on detector valve holder.
- No. 21.**—From terminal marked G on detector valve holder to one side of 3-megohm grid leak.
- No. 22.**—From other side of 3-megohm grid leak to moving plates of high-frequency tuning condenser.
- No. 23.**—From negative filament terminal of output pentode to fixing bolt of output pentode valve holder.
- No. 24.**—From moving plates of reaction condenser to anode terminal of detector valve holder.
- No. 25.**—From other side of reaction condenser to terminal No. 5 on intervalve coil.
- No. 26.**—From one side of volume control to terminal No. 6 on intervalve coil.
- No. 27.**—From terminal No. 6 on intervalve coil to chassis terminal socket marked LS+.
- No. 28.**—From terminal No. 4 on aerial coil to terminal socket A.
- No. 29.**—From terminal marked A on output pentode valve holder to terminal marked LS+.
- No. 30.**—From terminal marked G on low-frequency transformer to top connection on 1-microfarad fixed condenser.
- No. 31.**—From terminal marked P on low-frequency transformer to one side of 25,000-ohm resistance.
- No. 32.**—From same side of 25,000-ohm resistance to top terminal of 1-microfarad fixed condenser.

- No. 33.**—From other side of 25,000-ohm resistance to one side of 5,000-ohm resistance.
- No. 34.**—Same side of 5,000-ohm resistance to terminal socket marked LS+.
- No. 35.**—Other side of 5,000-ohm resistance to top terminal of 1-microfarad fixed condenser.
- No. 36.**—From same side of 5,000-ohm resistance to terminal C on output pentode valve holder.
- No. 37.**—From one side of on/off switch to one side of volume control on panel.
- No. 38.**—From terminal socket marked E to behind fixing nut of this socket.
- No. 39.**—Flexible metallised connection from terminal No. 4 on inter-valve coil to top terminal of high-frequency pentode.
- No. 40.**—Flexible wire with HT—wander plug, from top terminal of 1-microfarad fixed condenser.
- No. 41.**—Flexible wire with LT+ spade terminal from positive filament terminal of output pentode valve holder.
- No. 42.**—Flexible wire with LT—spade terminal from remaining switch contact on panel.
- No. 43.**—Flexible wire with HT+ wander plug from LS+ side of 5,000-ohm resistance.



Everybody can get a full-size photographic blueprint of the All-Britain Three—and of three other Crusader sets—by filling in the application form that appears on page 411

THIS THREE-VALVER is ONE of the MOST ADAPTABLE DESIGNS EVER OFFERED to the HOME-CONSTRUCTOR

Your Choice of Valves and Coils



This is the Varley two-gang coil unit that can be used in the All-Britain Three

Connections for Alternative Iron-core Coil Units for All-Britain Three		
Telsen coil connections in original set.	Corresponding Connections for	
	Varley coils*	Goltone coils†
No. 1	No. 1	No. 1
No. 3	No. 2	No. 2
No. 4	No. 4	No. 6
No. 5	No. 8	A
No. 6	No. 3	No. 4

*An additional wire is needed for both Varley coils; connect terminals Nos. 2 and 7 together. †An additional wire wanted for both Goltone coils; connect terminals B and 2 together.

coil the distance is 1 1/8 in.; while for the Varley coil the distance is 1 1/2 in.

We have found that with the Goltone coil you must shift the little 1-microfarad fixed condenser from behind the coil unit—but there is plenty of room around, as you will readily discover. For the Varley coil there is no need to move anything else.

We do, therefore, want to emphasise that you have ample scope with this design to please yourself. You are not tied down to anything like the usual extent. That has been our

PERHAPS the most attractive feature of the whole design of the All-Britain Three is that you have plenty of scope for individual experimentation.

As we have already made very clear to you, the actual construction of the set has been reduced to the utmost simplicity—not because we think you are incapable of putting a set together that is not ultra-simple, but because simplicity happens to be part of the secret of success of our team of three valves.

These valves consist of a high-frequency pentode for the first stage of pre-detector amplification, a normal triode detector, and a transformer-coupled pentode output valve.

No Need to Scrap that Screen-grid

The high-frequency pentode has come to stay—make no mistake about that. But it is just possible that you have on hand a perfectly good screen-grid valve you simply cannot afford to scrap. There is no need to.

You can just as easily use your own screen-grid as the specified high-frequency pentode. It will not give such pep, of course, but with the high-frequency transformer it will sound quite good.

You are restricted, of course, in your choice of the actual high-frequency pentode because the Cossor is the only one made with a four-pin base. We naturally have used this because we wanted this valve to be interchangeable with screen-grids.

As to the detector valve—almost any good triode will do, as you can imagine from our extensive list of alternatives this week.

When you come to consider altering the specification of the output pentode valve you have to be careful because of that automatic grid-bias resistance.

This resistance is chosen not merely on the bias-voltage figure required for the power valve, but by taking into account the actual anode current passing through the anode circuit—and therefore through the resistance.

For the pentode type power valves the 350-ohm resistance under the column (b) in the valve table is suitable. For the ordinary triode power valves as under column (a) you will need a 750-ohm bias resistance.

Plenty of Scope

Apart from these small points, though, there is plenty of scope for you to experiment and get what you consider is the best possible team of valves for your own needs.

Now about the coils. Here again the design, though modern in conception, leaves you with much more freedom of choice than is usual in a so-called “boom” set.

We give a little table from which you can see that the terminals of the alternative coils are not standardised—but if you note the differences in the numbering and act upon that knowledge there is nothing to stop you using either a Goltone or a Varley coil in place of the one actually embodied in the original model.

One little point, though. The wave-change switches are also not a standard height from the bases. If you use the specified Telsen coil the switch spindle hole comes 1 1/2 in. above the bottom of the baseplate; if the Goltone

aim—to give you Crusaders—and others, too, for that matter—as much freedom as possible in the actual building.

We are now working hard on a chassis version—and that will offer still more scope to the experimentally inclined. As you will see from the Crusader's Corner page this week, there is a definite demand for real chassis sets—and who are we to say them nay? We want to please you all!

Suitable Valves for Set

Make	H.F. Stage	Detector	Power Valves	
			(a)	(b)
Marconi ...	S23	HL2	LP2	PT2
Cossor ...	*210SPT	210H	220P	220HPT
Osram ...	S23	HL2	LP2	PT2
Mullard ...	PM12A	PM1HL	PM2A	PM22A
Mazda ...	S215A	HL210	P220	PEN220
Hivac ...	SG220	D210	P220	Z220
Tungsram ...	S210	LD210	P215	PP220
362 ...	SG2	HL2	LP2	ME2

NOTE.—*This is the only high-frequency pentode suitable for the set. Power valves in group (a) need a 750-ohm bias resistance and in group (b) a 350-ohm resistance. High-frequency and detector valves should be metallised.



Another set of iron-core coils that can be used—made by Goltone



Here is the under-side of the Goltone coil unit, showing the switching mechanism

Continued from page 402

the necessity of selectivity and the advantage of easy control. Both these attributes are prominent in the All-Britain Three.

In spite of its two tuning dials, I think it an easy set to operate. There is no need to turn them both at once. The aerial tuning it is flat, is just less definite than the inter-valve tuning, that's all.

The dials aren't in step all the way round—they come out of phase appreciably at the lower end of the scales. It doesn't matter a hoot, though. You can still find the lady, so to speak, in the twinkling of an announcer's eyelid.

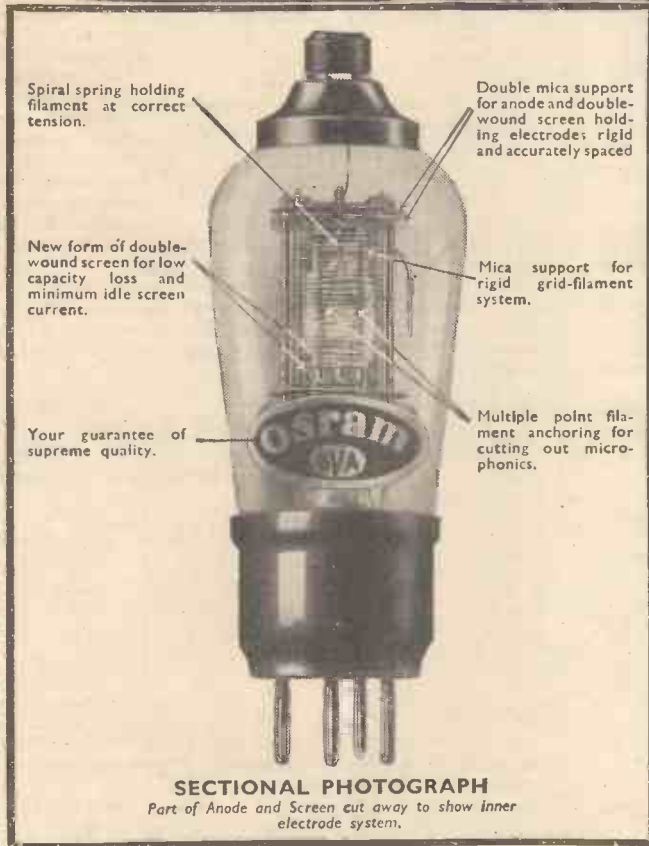
Reaction is, perhaps, a bit “nifty”—rather potent, I mean. Robust spirits will revel in it. Afraid I have got too used to a set without reaction—being a quality fan—to be entirely nonchalant in its lusty pepping-up presence. It is smooth, this reaction, right up [to screaming point—which, of course, I never stayed upon.

I was genuinely surprised at the daylight range. All Germany seemed to be on the air at 7 o'clock in the morning, as well as a few of the Frenchmen.

Huizen on long waves; at 7.40 a bit weak but Hilversum on the medium waves very satisfactory. So, inevitably, was Fecamp—roared in and nearly paralysed the pentode.

FULL CONSTRUCTIONAL DETAILS OF THE ALL-BRITAIN THREE WERE PUBLISHED LAST WEEK

Revitalise your set



3 2-VOLT SCREEN-GRID VALVES

mean —

- 1 GREATER SENSITIVITY WITH COMPLETE STABILITY—owing to low capacity and higher impedance.
- 2 ENTIRE ABSENCE OF MICROPHONICS—due to latest multiple anchored filament.
- 3 H.T. CURRENT CONSUMPTION FROM 1.5 M.A. ONLY.

S23 A low H.T. non-microphonic screen-grid valve for kit sets and portables employing one or more screen-grid valves. Mutual conductance 1.1 ma/volt .. **Price 12/6**

S24 A high-slope, non-microphonic screen-grid for all single-stage H.F. sets, using screened coils. Mutual conductance. 1.4 ma/volt. **Price 12/6**

VS24 A "variable-mu" screen-grid to give full and distortionless control of volume with only a 9-volt bias battery. Mutual conductance. 1.5 to 0.01 ma/volt. **Price 12/6**

These Valves can be supplied metallised or plain.

Osram

2 VOLT BATTERY

Valves

MADE IN ENGLAND

SOLD BY ALL RADIO DEALERS

WRITE for the OSRAM VALVE GUIDE (1934 Edition.) Sent post free.

Advt. of The General Electric Co., Ltd., Magnet House, Kingsway, London. W.C.2.

Are You Sceptical of Short Waves?

EVERY week I convert another broadcast listener to the advantages of possessing a short-wave receiver, but it is a long job trying to convert all AMATEUR WIRELESS readers, a good percentage of whom do not know anything about the short waves.

It is owing to the fact that the short waves are so good that I have difficulty in persuading readers to give them a trial. Who can blame

Ask KENNETH JOWERS

W2EF, W2KR, W3MD, all on telephony, with several New Zealanders on common wave.

F. H. Wingett, writing from Southampton, says that he has built the "A.W." World-beater and is getting fine results. (Other readers tell me that this set is one of the best short-wavers of the year.) He has added class-B and band-spread, so it should be some set. Stations logged include W9DXJ, SUI5G, W9USA, and a station he thinks was H17G. All these stations were on telephony.

I have just received my first letter from the Channel Islands, from H. A. le Lissen, BRS1481, who wants me to make a special point of differentiating between C.W. and telephony stations. Well, BRS1481, this will be done. He has logged this week W3DC, W9USA, W3QV on telephony and LA3G, LA1G, working on C.W.

By the way, H. H. Gent, of Harlesden, tells me that W5BCU, of Houston, Texas, wants reports from European listeners. Here is a good chance to get a real DX "veri." I heard this station early in the summer, so he can be logged. He uses 100 watts, is on the 20-metre band at the moment, but will be going over to 40 metres very shortly. Every report will be answered.

Norman Hobbs must have missed my notes on the absence of Italian stations. Actually what has happened is that amateurs are not very popular with the Duce, so as the licences expire they are not renewed. In a couple of years or so they will all have gone, so there will be a little more room on the band. Pity the French Government don't think the same way about things.

Here is some information from G6KV of the Hills of Laindon. The Anglo-American Radio and Television Society is arranging special tests with ZL4CE and other ZL members of the AAR and TS club. G6KV has been asked to participate in these tests, and will be on the air on the first and fourth Saturdays of the month from 2 p.m. to 3.30 p.m. on 40 metres. So look out for these tests; they should be interesting.

If you are not an ardent fan, perhaps these few notes will convince you that short-wave listeners are not akin to fishermen, and that there really is something doing below the broadcast band.

At the moment, thanks to the clock having gone back, the 20-metre telephony stations will be coming in a little earlier in the evening. The commercial broadcast stations on 16 metres fade out after 1700, while the 19-metre stations seem to be erratic.

If you want to show some friends how good are the short-wave stations, tune either W3XAL on 16 metres in the afternoon about 1500 or wait until 2200 when the 48-metre stations come over.

D. W. Morgan, of Kenton, Middlesex, has had a real brainwave. He photographed his QSL cards. A most amusing one, reproduced here, was received from the Cuban station CM2AN. This idea is worth copying.



This is an amusing QSL card received by D. W. Morgan, of Kenton, Middlesex, from the Cuban Station, CM2AN

them anyway, for it does sound a bit steep to say that stations from all over the earth can be tuned in on a two-valve, lash-up, doesn't it?

Once I can get anyone to come along and hear my set for themselves half the battle is over, for they rarely go away disappointed.

I cannot do better than to give a chunk of W. A. Clemenson's latest letter, showing that short-wave fans are helping to increase the interest in the best of all hobbies.

Mr. Clemenson writes: "While at Eastbourne this summer I ran into a chap who, although interested in broadcast reception, went a little cross-eyed when I spoke of short waves and America on one valve.

"When I mentioned New Zealand he almost lynched me. This Sunday he arrived here on his motor-cycle to see my gear. Result—he left me at 1.30 in the morning with a fine impression of the shorts for broadcast reception."

Several listeners have sent me letters written in the same strain, so those of you who are still sceptical should just make a simple hook-up. It will not cost much and you will be able to judge for yourselves. If you are in trouble about starting, drop me a line and I will fix it.

According to Mr. Clemenson reception seems to be fading out on the 20-metre band, although after midnight conditions seem to improve a little. He goes on to say that the 40-metre band is much the better for reception of Indian and other stations in that direction. In his log for the week he has two Indian stations and one from Ceylon. Good going, W. A. C.

Jack Wilson, who has been away for some time, is back again and doing some serious listening. Many will remember that he started a short-wave club in the summer. So far he has twenty members and they have their own club room. How about extending this idea in other parts of the country? If I can help any prospective club secretaries, let me know.

By the way, Jack Wilson, writing from Lanarkshire, says that he logged W2ZC, VP5BG, W9BGQ, W4ZE, W8FSK, W8BJAN,

The Family Portable on Test

IT is certainly a family portable. I had hardly sat down, prior to trotting round the stations on it when, sure enough, all members of the family had designs on it. The appeal about the set, apart from other very fine features, is undoubtedly the wonderful tonal quality of the reproduction.

To say that it will put many a large console model in the shade in this respect is no exaggeration. One could hardly realize that the volume and tone were coming from a portable.

When I had shushed the other members of the family away, I started to see how the more distant stations would come in. There was one thing I did notice when using the reaction, and that was that this control does not need hand-handling, or, in other words, it requires gentle administration.

Continental Transmissions Romped Home

Once I had got the touch of the set—and that certainly didn't take many seconds—the stations started to come in in a most satisfactory manner. All the usual Continental transmissions romped home at more than ample volume, while the degree of selectivity was very good.

On the long waves this was most noticeable, and another very good point I appreciated was the directional properties of the frame. Even on the local station it was possible to arrive at a silent point by virtue of the frame aerial. The beauty of a set of this type is that one is not tied, in any degree, to listening in any

particular part of the house. With the cold evenings coming on it is quite an asset to be able to listen by the fireside.—L.O.S.



Here is the family Portable, a good straight four for battery operation. Entirely self contained—needs no outside aerial or earth



"Look what Smith's got..the lucky dog. His old man's bought him a **PIFCO ROTAMETER**"

Every wireless constructor possessing a Pifco ROTAMETER is envied by his friends, but there is no element of luck in the positive way in which you are able to make tests with this amazing instrument. The Pifco De-Luxe ROTAMETER is a moving-coil meter and has a resistance of 200,000 ohms. ensuring absolute accuracy, whilst the voltage scale registers up to no less than 400 volts. Both standard and de-luxe models have eight separate dials for distinct tests, each brought into use at the turn of a knob.

Ask your dealer to show you one now or write for new Pifco Test-meter Folder, describing all instruments to PIFCO LTD., SHUDEHILL, MANCHESTER, or 150, Charing Cross Road, London, W.C.2.

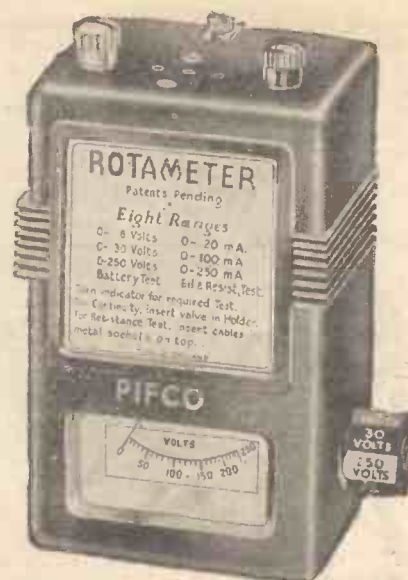
ROTAMETER

1. 0—8 volts. For low-tension voltage test.
2. 0—30 volts. For grid-bias voltage test.
3. 0.250 volts. For high-tension voltage test.
4. BATTERY TEST.
5. 0—20 M.A. For individual valve test.
6. 0—100 M.A. } For testing current taken
7. 0—250 M.A. } by total valves in set.
8. FILAMENT AND RESISTANCE TEST (4,000 ohms). For D.C. and rectified A.C.
9. Plug-in test for valves.

ROTAMETER-DE-LUXE

1. 0—5 volts.
2. 0—20 volts.
3. 0—100 volts.
4. 0—400 volts.
5. 0—10 milliamperes.
6. 0—50 milliamperes.
7. 0—250 milliamperes.
8. Resist/valve test.
9. Plug-in test for valves.

9 SEPARATE METERS IN ONE



Radio testing is made easier, quicker, and more accurate by the Pifco ROTAMETER. Any one of eight dials are brought into view by turning the octagonal knob at the side of the instrument. Size of each dial, 1 1/2 in. by 1 in. Convenient in size and of amazing accuracy. Finished in black bakelite, complete with leads, in velvet-lined case.

29/6



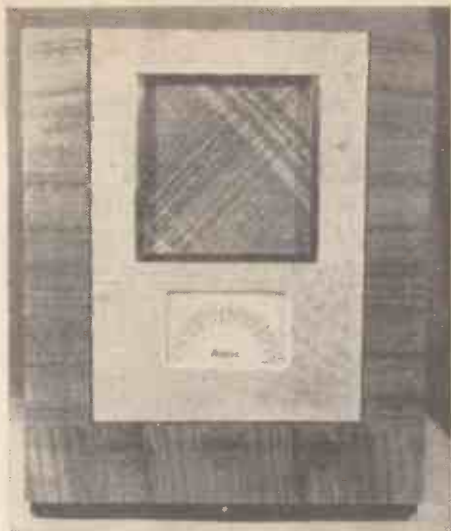
Without question the finest radio testing instrument in the world to-day. Entirely self-contained, it is a complete testing and radio research laboratory in miniature. Every conceivable test can be made with this amazing instrument. Size of each dial, 1 1/2 in. by 9/16 in. Finished in black bakelite, complete with leads and fitted in handsome velvet-lined case.

42/-

PIFCO

ROTAMETERS

PIFCO ON THE SPOT WILL TRACE YOUR TROUBLES LIKE A SHOT



Exceptionally good-looker, isn't it? A really nice tuning dial—and ultra-simple controls

It is rather an achievement to make a portable receiver that gives results almost equal to a similar type of set with an external aerial and earth.

By careful design it is possible to overcome the difficulties that crop up when the aerial is wound around the loud-speaker. When we say that it is possible to overcome these snags, do not take that literally and assume that all mains transportables are as good as standard receivers.

Relatively few portable sets of this kind are "super" sets, for in addition to the sensitivity being poor, hum and mains interference are generally bad.

A Hard Test

When the Portadyne people sent their receiver for us to try, we decided to test it as we would an ordinary set and not to make any allowance for the aerial being inside the case.

The methods adopted for our preliminary tests were hardly conventional, but they did show up the points which will interest all those who contemplate buying a new set.

Remember that the receiver can be plugged into any A.C. power point and will work right away without any other connections. We took the set into a living-room of a modern villa and connected it to the reading lamp socket. The first evening I had to be careful not to wake the household, for over thirty stations could be tuned to give 2 watts output.

To overcome this we pressed down the little switch on the side of the case, which brought the noise suppressor into action. Then the volume was reduced to a more normal level and only stations of a pre-determined strength were brought in.

Even so the receiver did not have the "feel" of being connected to a frame aerial, for all of the stations that we wished to hear could be tuned-in without any trouble. Several times we listened to the Poste Parisien or Fécamp programmes until very late. One point that interested us was that the one or two whistles there were could usually be cut out by rotating the frame aerial.

Good Tuning Indicator

This set's tuning indicator makes use of a good idea. A tuning dial calibrated in wavelengths is fitted to the front of the cabinet, and when the set is switched on an arrow shows up behind the scale. When on the long waves, the arrow is on the outside edge of the dial and on the inside for medium waves.

With this dial you can immediately tell to which station the receiver is tuned

Portadyne Transportable Super-het

SELF-CONTAINED TABLE SET THAT PLUGS INTO A.C. MAINS

During daylight the receiver is not so good, except for the more powerful local and Continental stations. But in the early morning several stations could be tuned-in at good strength—Hilversum, Langenberg, Poste Parisien, both Brussels stations, and several German transmitters were heard at good strength on the loud-speaker.

On the long waves conditions were different. The difference between daylight and night-time reception was barely noticeable. Over

The second detector is a double-diode-triode, which rectifies, amplifies, and provides automatic-volume-control voltage. For an output valve they have used a pentode that gives 3,400 milliwatts output.

This is fed into a Rola loud-speaker, which really does give exceptional quality, so that the user with a musical ear will not be disappointed.

Attractive Cabinet

Feminine interest will be aroused by the attractive cabinet, constructed of polished walnut and bird's-eye maple, with a chromium-plated fret edging.

There are only three control knobs, which are all simple to handle. On the left-hand side is the combined volume control and on-off switch, with the tuner in the centre. On the right-hand side is the wavechange switch, which also brings into circuit the gramophone pick-up when required.

But do not forget a further control, which we almost overlooked. It is the tone control. You will find it just below the main tuner. When the knob is pushed in the reproduction is normal, while the top-note response is attenuated when it is pulled out.

We took the receiver to pieces and examined the inside. A fine job it is. All of the joints have been well soldered on and cleanly finished off. All of the components are bolted or eye-

letted to a steel chassis, so there is little or no possibility of anything coming loose if the receiver is carried around.

We have noticed more than ever this year that, as a general rule, a set that is going to work particularly well is usually well constructed. Invariably receivers that look untidy, are badly assembled and with stray wires all over the place, do not work as well as they should. So, as a guide, when you are thinking about buying that new set do take a look inside the chassis and just see how it has been put together.

With the Portadyne set you have nothing to worry about. You cannot see any connecting wires at all, as they are all beneath the pressed-steel chassis. The frame aerial has been fitted to a frame of its own which

is in turn bolted to the main receiver chassis, so there is no possibility of this coming adrift.

You will not be able to look at the underside of the chassis, but believe us when we tell you that it really has been carefully laid out.

IN A NUTSHELL

Makers: Portadyne Radio.

Model: P.A.6.

Price: £15 4s. 6d.

Valve Specification: High-frequency stage (Mullard V24), followed by a combined detector-oscillator (Mazda AC/Sz/Pen), with a single intermediate-frequency stage (Mullard VP4) and double-diode-triode second detector (Mullard TDD4). The output valve is the steep-slope pentode (Mazda AC/2/pen), with a full-wave rectifier (Mullard IW3).

Type: Self-contained long-range portable.

Power Supply: A.C. mains internal power pack.

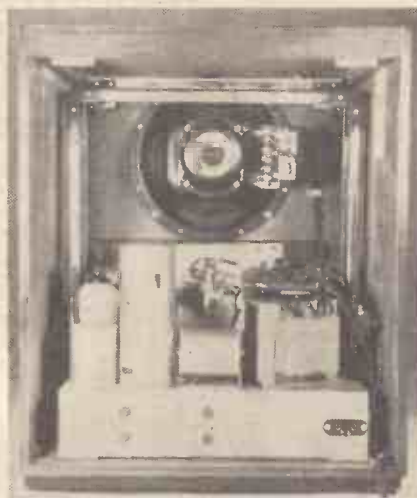
Remarks: A useful type of transportable receiver that can be used wherever there is a power point giving an A.C. supply.

eight stations were always on tap which, considering the aerial, was very good indeed. For flat dwellers that is a great point.

On the average, during the evening, about forty stations could always be received at good strength. Except for a little background noise on one or two very distant stations, one cannot realise that the set is a portable.

Let us tell you something about the construction of the receiver, for this is a point about which the Portadyne people are justly proud.

First of all, there are six valves, including a full-wave valve rectifier. The first is a high-frequency amplifier, which accounts for the good range. A combined detector-oscillator follows, which is a variable-mu pentode band-pass coupled to the single intermediate-frequency stage—again using a pentode.



Typically neat chassis construction is a feature of the Portadyne portable under review. This back view shows the all-metal nature of the "works"

ON YOUR WAVELENGTH

Continued from page 397

It Can't Work—But it Does!

Do you, I wonder, remember the battle royal that took place amongst wireless experts when the Stenode principle was first announced? Almost to a man they upped and said that it couldn't possibly work.

I recall a discussion I had with the head of one of our most famous manufacturing firms who called in the aid of the higher mathematics on the back of an old envelope to demonstrate its utter impossibility. "Your mathematics may be all right," I said; "but all I can tell you is that it does work, and you can come to my house and hear it."

He came, but remained sceptical. He had to admit that it did work, but he was not at all convinced that it wasn't just a single freak set.

Mathematics Can Deceive Even Great Scientists

PERHAPS the most gorgeous instance of the way in which practice can upset theory is that of the Cambridge professor who spent months of his spare time in working out the mathematics of golf. One result of his researches was clear proof that, no matter how hard you hit it, a golf ball could never be driven more than 250 yards.

At lunch he discussed his wonderful discovery with his son, and afterwards the pair went out to the links. The son teed up his ball and promptly drove it a good deal further than the higher mathematics allowed.

And that's just what Dr. Robinson did when he produced his Stenode.

Value of Invention

WHILE most people agree that invention has, so far, been an asset to industry, there are some who think that the production of new labour-saving devices can be overdone—and that it is already becoming a serious threat to skilled labour.

Sir James Jeans put his finger on this point, in his recent address to the British Association, when he said that what we really wanted was a better balance between the kind of invention which merely "saved labour" and that which, like radio, created new industries and so provided more work.

He added that the economic worth of Edison to the world had been estimated at £3,000,000,000. This is certainly an enormous figure, but I believe, in the long run, the value of the thermionic valve will run it pretty close.

Electrical Fireworks!

HAVING already produced "static" electricity at the fantastic pressure of ten million volts, the G.E.C. engineers are now playing with currents of the order of 250,000 amperes. Their main object is to produce "artificial" lightning-discharges, so as to study the effects at close quarters. They certainly have some curious results to report.

For instance, when the discharge is passed through a thick copper conductor, the latter is completely vaporised, leaving nothing behind but smoke and a bad smell.

An iron conductor similarly disappears, with the addition of a loud bang owing no doubt to its greater resistance. Flat-copper strips, in parallel, are used to feed the current to the arcing point, and after the discharge are found to be so crumpled by the action of the current as to be practically circular in cross-section. Big lumps of concrete placed in the path of the discharge are shattered into small pieces, whilst metal bodies disappear in a cloud of sparks.

Altogether, not the sort of apparatus to take any liberties with.

ALL-BRITAIN THREE LUCERNE S.G.3.

PILOT AUTHOR KIT EXACT TO SPECIFICATION

The Pilot Kit SERVICE was founded in 1919.

See the PILOT on the carton. It's a real guarantee.

SEND US YOUR ENQUIRIES FOR EVERYTHING RADIO

Miscellaneous Components, Parts, Kits, Finished Receivers or Accessories for Cash or C.O.D. or H.P. on our system of Easy Payments. Send us a list of your wants. We will quote you by return. C.O.D. orders value over 10/- sent carriage and post charges paid (GREAT BRITAIN ONLY). OVERSEAS CUSTOMERS CAN SEND TO US WITH CONFIDENCE. We employ a special export staff and save all delay. We pay half carriage—packed free. Send full value plus sufficient for half carriage. Any surplus refunded immediately. Hire Purchase Terms are NOT available to Irish and Overseas customers.

ALL-BRITAIN THREE KIT "A" Author's Kit of First Specified Parts, less Valves, Cabinet and Speaker. Cash or C.O.D. Carriage Paid £3/19/6 **7/3** Balance in 11 monthly payments of 7/3.

KIT "B" As for Kit "A" but with set of 3 specified Valves less Cabinet and Speaker. Cash or C.O.D. Carriage Paid £5/2/0. Or 12 monthly payments of 10/3.

KIT "CT" As for Kit "A" but with Valves and Peto-Scott All-Britain 3 Table Cabinet less Speaker. Cash or C.O.D. Carriage Paid £6/9/8. Or 12 monthly payments of 11/2.

KIT "CC" as for Kit "A" but with valves and Peto-Scott All-Britain 3 Console Table Cabinet with Baffle Assembly, less Speaker. Cash C.O.D. Carr. Pd. £6/18/0. Or 12 monthly pymts of 12/6.

If W.B. Stentorian Speaker required add £1 12 6 to Cash Prices or 3/- to each monthly payment.

EXCLUSIVELY SPECIFIED PETO-SCOTT Walnut CABINETS

Exclusively specified for the All-Britain Three. Beautiful Walnut finish and contrasting mahassar veneer, Console Table Model with loudspeaker compartment. Overall height, 17 1/2 in. If speaker baffle board assembly required, 3/6 extra. Carriage and Packing, 2/6 extra. **22/6** Table Model, 17 6. Carriage and Packing, 2/6 extra.

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TELSEN S.G.3 KIT, less valves. Cash or C.O.D. Carriage Paid, £1/19/6. **2/6** only
Balance in 8 monthly payments of 5/-.
If valves required, add £1/11/8 to Cash Price; H.P., 6/- Deposit and 11 monthly payments of 6/6.

COSSOR 352. Three-valve battery. Complete kit with all components, valves, cabinet and moving-coil speaker. Cash or C.O.D. Carriage Paid, £5/19/0. **10/-** only
Balance in 12 monthly payments of 10/-.

W.B. STENTORIAN SENIOR PERMANENT MAGNET M.C. SPEAKER. For Power, Pentode and Class B. Cash or C.O.D. Carriage Paid, £2/2/0. Send only 2/6. **2/6** only
Balance in 11 monthly payments of 4/-.

W.B. STENTORIAN STANDARD PERMANENT-MAGNET M.C. SPEAKER. For Power, Pentode and Class B. Cash or C.O.D. Carriage Paid, £1/12/6. Send only 2/6. **2/6** only
Balance in 11 monthly payments of 3/-.

GRAHAM FARISH RAIDER 3. Complete kit for building, including specified valves, B.R.G. cabinet and W.B. Stentorian Baby speaker. Cash or C.O.D. Carriage Paid, £7/6/6. **13/6** only
Balance in 11 monthly payments of 13/6.

COSSOR 357. Four-valve (including rectifier), A.C. mains. Complete kit includes valves, cabinet and mains-enraged moving-coil speaker. Cash or C.O.D. Carriage Paid, £7/19/0. **12/6** only
Balance in 12 monthly payments of 13/6.

ATLAS C.A.25, for A.C. mains, Class B and Q.P.P. Four tappings: 60/80, 90/90, 120, 130 volt, 25 m.a. Cash or C.O.D. Carriage Paid, £2/19/6. **5/-** only
Balance in 11 monthly payments of 5/6.

ANY ITEM SUPPLIED SEPARATELY—ORDERS OVER 10/-. SENT C.O.D. CARRIAGE AND POST CHARGES PAID

LUCERNE S.G.3

BUILD IT YOURSELF

FREE FULL-SIZE BLUEPRINT and ASSEMBLY INSTRUCTIONS with every KIT

Independently tuned circuits; Slow-motion tuning; Electrostatically screened Super Coils.

DESIGNED BY PETO-SCOTT. SPECIALISTS IN KITS OF PARTS FOR HOME CONSTRUCTORS SINCE 1919.

EFFICIENCY—The Peto-Scott Lucerne S.G.3. stands unparalleled among modern Kit sets for selectivity, range, volume and tone under even the most difficult reception conditions.

SIMPLICITY—The operation of the Lucerne S.G.3. is simplicity itself, the capture and separation of stations a matter of ease to the least radio-minded. Equally simple is the assembly of the Kit, requiring no experience and a few everyday tools.

ECONOMY—Outstanding value for money and extremely low running costs make the Lucerne S.G.3 a most economical investment for those desiring a home-assembled set with which to enjoy radio programmes to the full under the existing conditions of the ether.

BEAUTIFUL CABINETS—Two beautiful walnut cabinets (a Console Table Model as illustrated and a Table Model) are available—for the Lucerne S.G.3 at the constructor's choice.



KIT "A" 39/6

Comprising complete kit of parts including ready drilled, hand french polished Walnut panel and Mela-plex Baseboard, less valves, cabinet and speaker. Cash or C.O.D. Carriage Paid 39/6. **2/6** only
Yours for 2/6 and 11 monthly payments of 3/9.

KIT "B" As Kit "A" but with set of 3 B.V.A. Valves S.G., Detector and Super Power, less Cabinet and Speaker. Cash or C.O.D. Carriage Paid. £42/0. **5/-** and 11 monthly payments of 6/6.

KIT "CT" As Kit "A" but with valves and Peto-Scott Walnut Table Cabinet less Speaker. Cash or C.O.D. Carriage Paid £42/0. **5/-** and 11 monthly payments of 7/6.

KIT "CC" As Kit "A" but with valves and Peto-Scott Walnut Console Table Cabinet as illustrated, less Speaker, Cash or C.O.D. Carriage Paid. £47/0. **5/-** and 11 monthly payments of 8/3.

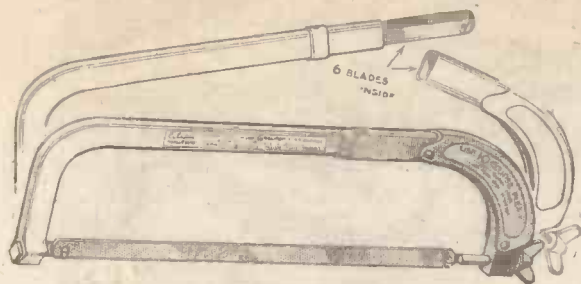
If Peto-Scott Permanent Magnet Moving Coil Speaker Type 51 required add 18/6 to cash prices or add 1/9 to deposit and each monthly payment.

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Buy by Post—its Quicker—CASH—C.O.D.—EASIWAY

For Your Workshop



Neill hacksaw, a very useful tool for the amateur constructor

ONE of the most useful tools in any amateur radio workshop is the hacksaw. It has many uses in the making of wireless sets, such as for cutting off lengths of metal, bolts, and all the odds and ends that go to make up the home-constructed radio set.

We have been using in our own workshop for the past few weeks a very good example of the best type of hacksaw—made by James Neill & Co. (Sheffield) Ltd., price 5s.

The hacksaw is sold complete with six blades, two each of 18, 22, and 32 teeth per inch. For general work we usually use the 18-teeth blade such as for most of the odd jobs that come along.

For hard steel or brass the 22-teeth blade is preferable, and for cutting easily through metal tubing the 32-teeth blade has to be used.

The hacksaw is a very unusual design, actually, because the handle is part of the blade-supporting frame—enabling you to use the tool with one hand while you hold the job with the other. In the older types of hacksaw the handle projected from the end of the frame and gave very little control. The handle also acts as a blade magazine.

At the handle end of the tool there is an adjusting screw, which enables you to obtain a difference of 1½ in. length of blade.

We might mention that the tool can be used—and indeed is so used—for cutting ebonite as well as metal. With ordinary usage a blade ought to last about three months

—that is the length of time we usually reckon in our workshop—where a great deal of work is done, you may be sure.

This hacksaw is just one of a large range of tools made by James Neill—many of which are applicable to amateur use.

The new range of Sifam meters will be welcomed by most home constructors as it includes many new types at prices within the reach of all. In the past it has usually been an expensive matter to obtain a meter having a reasonable degree of accuracy, thus preventing many an amateur from securing an instrument so essential to every radio experiment.

With the introduction of the new models it is possible to obtain low-priced meters having a guaranteed accuracy within 5 per cent. The magnetic-controlled types come under this heading, and these can be supplied in protecting cases with terminals at the back or flat back pattern with terminals in the front.

The moving-coil instruments have been entirely re-designed in order to give a longer scale, maximum damping, and greater accuracy. Most of the models are fitted in bakelite cases with useful zero-adjusting screws.



A typical Sifam meter, one of a very good and inexpensive range



“I’d stake my reputation on that valve”

Fit “Radio Record” — The quality valve. You will be amazed at the difference in your reception

If you are troubled with whistling, crackling, howling, etc., the “Radio Record” D.L.2. (battery-operated) really non-microphonic Detector Valve will eliminate these interferences.

Complete Range of 2-volt & A.C. Mains Valves

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| BATTERY HEATED VALVES | INDIRECTLY HEATED A.C. VALVES |
| D.L.2. Special non-microphonic Detector. | AC/HL. A.C. Detector and Triode Amplifier. |
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| L.2. Low Frequency Amplifier. | AC/VS. A.C. Variable Mu. |
| LP.2. Low Consumption small power | AC/PT. A.C. Polytrode. |
| P.2. Power (suitable in 2nd L.F. stage). | AC/P. A.C. Power. |
| S.P.2. Super Power. | RECTIFYING VALVE |
| P.T.2. Poly electrode output. | FW.350. Full Wave Rectifier (output 300 volts, 80 milliamperes). |
| S.2. Screen-grid H.F. Amplifier and Det. | |

Prices from Obtainable from all Wireless Dealers or any of Currys' Branches.

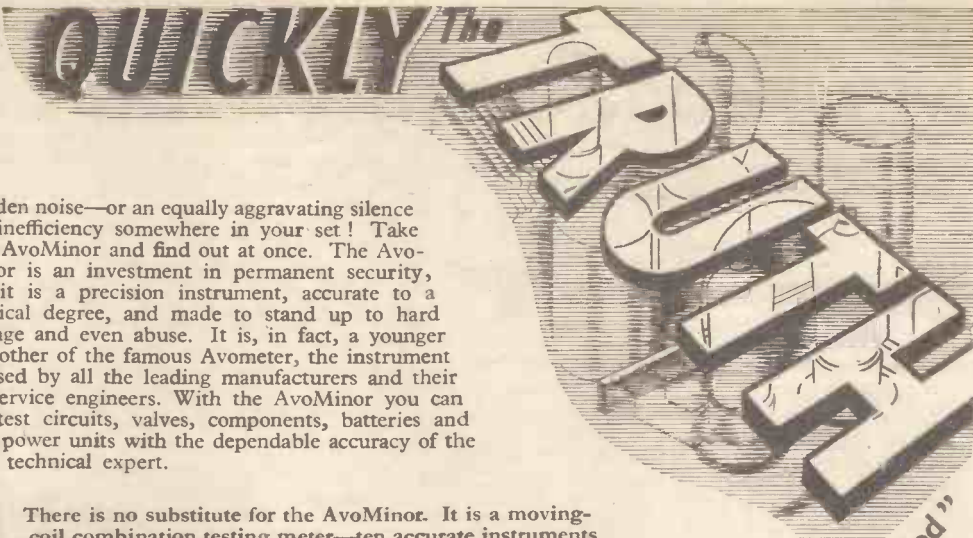
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NICORE FLAT-GANG UNIT
SPECIALLY DESIGNED
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58-61 Fetter Lane, London, E.C.4.
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Please enrol me as a member of the Constructor Crusaders. I enclose postal order for 1s. to cover postage on four free blueprints and office expenses (and also an extra 1s. for buttonhole badge).* It is understood that I shall be entitled to free technical advice on any matters concerning the four free blueprint sets. My name and address are:

October 13, 1934

Value of Postal Order Enclosed	For office use only.			
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Criticisms by WHITAKER-WILSON

My Broadcasting Diary

Sunday

MY rectifier definitely gone off rectifying. As I cannot rectify the trouble, I must consider it a wrecktifier and leave it at that.

Monday

BORROWED a set. I never heard Stiles-Allen to better advantage than in to-night's Wagner Prom. She is one of the few sopranos we have who can stand up to Wagner. That closing scene from *Götterdämmerung* takes some sustaining.

The *Siegfried Idyll* charming. Nice and oily. No rough spots anywhere. Wagner's the stuff for broadcasting!

The Wireless Singers sing as well as ever but they gave a dull programme.

Tuesday

HEARD a good deal, one way or another to-night. I began with *The Snow Maiden* from Sadler's Wells. They do things very well there these days. An hour occasionally of them should be welcome to many listeners.

I heard the first half-hour and then went into the Prom. just in time to catch Szigeti and the Mendelssohn violin concerto. Thought it all a bit dull, yet was completely held by him in the cadenzas. A wonderful player.

After that I had a breather for a few minutes. Then Harold Ramsay and his Rhythm Symphony. A very enjoyable programme because there was so much that appealed to me as being original in it. Personally, I think he is on the right lines. He breaks away from the eternal dance-tune rhythm.

Leslie Baily's *Scrap-book* for 1930, easily the best he has pasted up thus far. Charles Brewer produced it perfectly for him. Not too many effects or indistinguishable noises.

These Scrap-books are to be encouraged,

because they remind us of so much we have forgotten. It is all very well to lean back in your chair and say "Of course! I remember that." But did you remember it before the show started?

Tetrazzini, Sherlock Holmes, Crippen, Pelissier—and all the rest of them! Definitely good entertainment. When one has said that one has said everything.

Wednesday

SQUARING THE CIRCLE proved to be a good farce. Moreover a good satire at communism. Coming from Russia it was surprisingly outspoken. Occasionally translations of this nature are good in the broadcasting sense, because the atmosphere is so different from anything we write over here. Val Gielgud extracted every ounce out of it, but he usually does.

Thursday

I CAME across a quintet new to me. *The Charles Ernest Quintet*. Definitely good. Played a nice programme of light music.

I heard the first of *Songs from the Films*—the successor to *Songs from the Shows*. Very successful in production. In actual music, decidedly inferior to the "Shows."

Too much use of modern syncopation and style in general. Consequently it gave me the feeling I was not listening to anything in particular.

I seem to have heard so much of that sort of stuff both broadcast and on records. The Carlyle Cousins sang delightfully, as usual, so did Anona Winn.

Entertainment Hour! No; *Entertainment Hour?* is better. See the difference? Well, that sort of difference ought not to exist. Wrongly made up altogether. Just one

DAVENTRY SAYS GOOD-BYE!

MANY an old hand must have shed a metaphorical tear last Saturday night—October 6—when Daventry 5XX closed down for ever. It has had a wonderful nine years, hasn't it?

Right back to the early days of broadcasting Daventry has stood out as the pre-eminent B.B.C. broadcaster—heard and welcomed in the out-of-the-way corners of the British Isles—as well as over most of Europe.

Through Daventry, with its 30 kilowatts and wavelength of 1,500 metres—at one time it was a little higher, actually—European listeners have tuned-in nightly to our dance music.

The old plant will be dismantled and most of it "junked"—it is really now very old-fashioned. But the 50-ft. masts will remain, a living monument to a great broadcaster. Living, because they will support aerials of the ever-growing Empire-service transmissions from Daventry.

syncopation after another. Peggy Cochrane played a tune a minute—I didn't time her, but that is what the gentleman said she was going to do. Tunes too much alike.

Austen Croom-Johnson's lot of tunes all too much alike.

I like Val and Ernie Stanton's style of patter, but they must take care all the lines are funny. One or two weren't. They made some exceedingly unpleasant noises on instrument of no repute, I thought, but on the whole they were good.

A general review of the music of this so-called Entertainment Hour: spineless and effeminate; nothing manly about it.

So I turned into the Prom. for a spot of Beethoven. Nothing effeminate about him!

Myra Hess gave a broad, dignified rendering of the C Minor Piano Concerto that sent the Promsters into a perfect shriek at the end.

I think the Orchestra has stood up to the season splendidly. Usually about this time, they begin to sag. Honestly, I think Sir Henry is fuller of beans than ever this year. He's the man who puts the pep into the Proms.

Saturday

I LIKED Bern Ecks to-night. Formerly I thought his satire too hard and bitter. He has altered all that, and yet has still kept his originality. His melodramatic sketch was very amusing.

Elsie and Doris Waters well up to their customary high standard. Reliable people, they never let us down. Doris's song *Whiskers* was one of the best things I have heard her do.

Julian Rose, describing Abie's adventures as a boxer, well worth hearing a second time. It was my second time. Julian's is another distinctive type of broadcast. He displayed good technique to-night in causing laughter after every single line. It takes doing in these days when we cannot be made to laugh so readily as our fathers.

This is hardly the column in which to review books but I think I can break away from tradition for once, especially as the contents of the book in question have recently been broadcast.

"Our Bill," by Frederick Grisewood, is now in book form at the modest figure of half a crown. I have rarely read anything of the kind with greater pleasure. Every line sounds genuine.

Freddie does not assume an accent when broadcasting stories about the Cotswold character he has created. He simply relapses into a dialect with which he has grown up. He has often done it to me, and always speaks it when he returns to his native village.

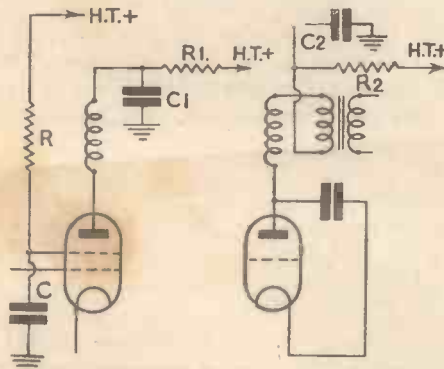
The fact comes out in the book. It is genuine. The touch of realism one so rarely gets. Do read it. You will be delighted.

A.W. Reference Sheet—No. 2

Decoupling: How to Choose Right Values

OWING to some parts of a circuit being common to all valves, it is possible for interaction to take place between them and produce instability and motor-boating. To overcome this it is usual to decouple the parts of the circuit likely to cause the trouble.

Decoupling is simply a means whereby



C = 0.1 MFD
C1 = 1 MFD
C2 = 1-2 MFD
R = 25,000 Ω
R1 = 20,000 Ω
R2 = 15,000 Ω

Two circuits showing how decoupling is applied: left shows the system in a high-frequency stage, and right at the detector stage with transformer coupling.

any stray high-frequency currents are diverted back to earth out of harm's way. The usual method employed consists of a resistance and a condenser the value of each depending upon the part of the circuit to which it is being applied.

The diagrams show two applications, and it should be noted that all high-tension positive leads are decoupled as this source of supply, being common to all anodes, forms the chief cause of the trouble.

In some circuits more elaborate precautions are taken. For example, grid circuits need attention in some sets while in most mains sets the bias circuit is decoupled.

The value of the resistance depends on the voltage available and the current required by the valve. It must be remembered that for every milliampere passing, 1,000 ohms will cause a drop of 1 volt, so allowance must be made for this. The higher the value can be kept, consistent with the valve's requirements, the more effective the decoupling.

The size of the condenser really depends upon the resistance and the part of the circuit in which it is being used but, a general rule is, for high-frequency circuits a .1 to 1-microfarad, while for low-frequency and output circuits a 1- to 2-microfarad. It should be noted that the decoupling in the high-tension battery or eliminator leads can be arranged outside the set if space prevents internal fitting.

Leaves from a Short-wave Log

By J. GODCHAUX ABRAHAMS

LAST week has been entered in my diary as "good all round," which observation applies to long, medium, short and ultra-short waves. Atmospheric, for the time being, have been fairly lenient, and only on one evening did they affect certain portions of the 40/50-metre band.

With the shortening of the days we must revise our ideas as to most suitable times for listening. As an instance, stations picked up on channels between 16 and 18 metres odd are fairly good from 1300-1800 G.M.T. when emanating from the West, say, U.S.A.; on the other hand, when broadcast from the European side they start fading out before noon. The 25/30-metre band, which includes such stations as KDKA, W2XE, and W1XAL, may be relied upon between 1600 and 2000, and the 40/50-metre channels between 2000 and 0200, or even later.

Rocky Point Wavelengths

As there appears to be some doubt regarding the individual duties of the Rocky Point (New York) stations in respect to programme exchanges with Europe, the following short list of the principal channels used may prove useful:

With *Great Britain*, WKC (22.28 metres); WEX (22.30 metres); WQH (15.89 metres); WKN (15.91 metres); WEG (40.46 metres); WAD (65.93 metres).

With *Italy and Vatican*, WFX (15.80 metres); WEB (20.31 metres); WES (31.75 metres); WIZ (43.07 metres).

With *France*, WQB (16.72 metres); WHR (22.35 metres); WQO (44.61 metres); WIR (66.08 metres).

With *Germany*, WTT (15.84 metres); WQV (20.27 metres); WCG (28.90 metres); WEC (33.59 metres); WEM (40.54 metres); WDK (57.88 metres); WDG (66.15 metres).

With *Switzerland*, WQX (14.87 metres); WIK (21.53 metres); WCG (28.90 metres).

With *Holland*, WIL (16.76 metres); WQP (21.58 metres); WDQ (56.98 metres).

With *U.S.S.R.*, WQE (15.86 metres); WPE (19.04 metres); WEL (33.52 metres); WDN (65.86 metres).

With *Sweden*, WQC (16.80 metres); WQU (21.65 metres); WET (31.68 metres).

With *Norway and Denmark*, WAJ (22.26 metres); WKL (33.56 metres); WQN (57.03 metres).

With *Poland*, WQC (16.80 metres); WQU (21.65 metres); WET (31.68 metres). With *Czecho-Slovakia*, WEC (33.59 metres); WDK (57.88 metres).

With *Spain and Portugal*, WQT (21.6 metres). Relays from South America, if taken by Rocky Point, are usually carried out by WEA (28.28 metres) from Argentine Republic, or WEF (31.61 metres); WDS (15.87 metres); WEF (31.61 metres); and WQB (16.72 metres) from Brazil. WKP (43.17 metres) and WDC (20.29 metres) from Venezuela.

From League of Nations

On a recent date I happened to pick up WCG, Rocky Point, making an arrangement for a relay by WEM from the League of Nations, Geneva, via HBP, Prangins. As date and time were given, the information was noted in my diary.

T.C.C. ALL-BRITISH CONDENSERS DOWN! PRICES

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TYPE No.	MINIMUM CAPACITY MFDS	MAXIMUM WORKING VOLTAGE	OLD PRICE	NEW PRICE
501	50	12 D.C.	s. d. 3 0	s. d. 2 6
"	250	"	4 6	4 0
"	500	"	7 0	6 0
"	1000	"	10 0	8 6
"	2000	"	15 0	12 6
"	2000 + 2000	"	27 6	24 0
511	25	25 D.C.	3 0	2 6
"	2000	"	27 6	24 0
521	10	50 D.C.	3 0	2 6
"	50	"	4 6	4 0
"	100	"	7 0	6 0
"	200	"	10 0	8 9
"	500	"	20 0	15 0
541	15	100 D.C.	4 6	4 0
"	30	"	7 0	6 0
"	60	"	10 0	8 9
"	250	"	22 6	22 6
561	2	200 D.C.	3 0	2 6
"	4	"	4 6	4 0
"	8	"	7 0	4 6
"	15	"	10 0	5 0
"	30	"	20 0	10 0

NON-INDUCTIVE PAPER TUBULAR TYPES

TYPE No.	CAPACITY MFDS.	OLD PRICE	NEW PRICE
300	.0001 to .01	s. d. 1 3	s. d. 1 0
250	.015 to .04	1 4	1 0
"	.05	1 4	1 3
"	.1	1 4	1 4
"	.15	1 6	1 6
"	.2	1 9	1 9
"	.25	1 9	1 9
"	.5	2 0	2 0

-And some

NEW TYPES

These types were originally designed for the set manufacturers and have been extensively used by them, with their special ease-of-wiring characteristics, etc. they are now available to the home constructor.

DRY ELECTROLYTICS — TUBULAR

CAPACITY MFDS.	WORKING VOLTAGE	PRICE	
		TYPE "AT"	TYPE "C"
2	200 D.C.	s. d. 2 3	s. d. 2 6
10	50 D.C.	2 3	2 6
20	50 D.C.	2 9	3 0
25	25 D.C.	2 3	2 6
50	12 D.C.	2 3	2 6

Type "AT" with soldering tags. Type "C" one bolt chassis fixing.

AQUEOUS ELECTROLYTICS

TYPE NO.	CAPACITY MFDS.	MAXIMUM WORKING VOLTAGE	PRICE
805	8	500 D.C.	s. d. 7 0
802	16	440 D.C.	7 0

In aluminium cans — one bolt fixing.

DRY ELECTROLYTICS

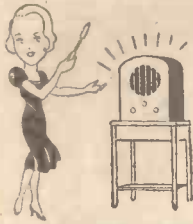
TYPE NO.	CAPACITY MFDS.	MAXIMUM WORKING VOLTS	PEAK VOLTS	PRICE
502	4	450	500	s. d. 4 0
502	8	450	500	5 0
902	4	500	550	5 0

In aluminium cans — one bolt fixing.

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OVERALL

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This Race for Power

TWO major stars have appeared on the radio horizon, Beromünster and Cologne. Work on the conversion of the Swiss station has been so quickly carried out that it has blossomed out as a 100-kilowatt somewhat earlier than was expected. The end portion of the medium waveband now brings us in sequence powerful signals from Stuttgart, Athlone, Beromünster and Budapest, and you will find it one of the best sections of your condenser scale.

With the reopening of the German-Swiss station there is every likelihood that the relays at Berne and Basle will be closed down.

Langenberg with 100 Kilowatts

Langenberg, taking the Cologne programmes, has been on the air with a power of 100 kilowatts since September 15, and, having been equipped with a new 528-ft. single aerial tower, shows considerable improvement.

Another station which, although it has not in any way been altered, could be heard nightly, was Riga on 514.6 metres; it was easily separated from Vienna and Stuttgart. Unfortunately, this is just the channel which the Grenoble P.T.T. transmitter has elected to invade. Closed for repairs since September 10, the Frenchman has arbitrarily lodged himself on this wavelength, and you may now hear a "het" whistle on Vienna.

In respect to the erection of super-power transmitters in Europe, the race continues. Rome is not satisfied with the mere 50 kilowatts of Santa Palomba (420.8 metres), and is taking immediate steps to increase its output to 120 kilowatts; at the same time, in order to secure an alternative programme, a second station of equal power is to replace Rome (2).

In addition, as a tribute to Marconi's birth-place, Bologna has been chosen as the site of a new 50-kilowatt. Bolzano also, which has been neglected, is to be endowed with 10-kilowatt plant and will then definitely join the Northern Italian group of studios.

Poland follows suit by planning a 120-kilowatt station at Cracow, which would permit her to close down Katowice, and is hurrying forward the construction of the Torun 24-kilowatt station; it may be working in December on the channel used by Cracow.

With the Continental Stations

From Latvia comes the news that the Kuldiga transmitter which was to use the wavelength of 271.7 metres, now taken up by its sister Madona, will be launched on the ether in the spring; it may work on 238.5 metres.

From Estonia we may also expect developments as the Tallinn, Dorpat, and Tartu stations have been taken over by the State, which now intends to reorganise and develop the broadcasting system.

In Austria changes are also imminent, as the old Rosenhügel station is to be dismantled and re-erected at Linz; the power of Klagenfurt is to be increased without delay; the plant now used at Linz is to be installed in the North-west Tyrol, and the new Dornbirn transmitter, "slap up against the frontier," is to begin testing this month.

Budapest (2), which has been working on 227.1 metres, is to take over the old 18-kilowatt station previously used for the main programmes.

Talking of Hungary recalls an interesting incident which occurred recently. An SOS was sent out in Magyar, English, German, French and Dutch; it was an appeal to medical men of all European nations. A member of a Budapest family returning from a trip in Asia Minor suddenly developed a mysterious disease which could not be diagnosed by the Hungarian Faculty of Medicine. Hence the SOS.

Hundreds of Telegrams

Hundreds of telegrams and letters from Europe and the Near and Far East poured into the studio as a result of the appeal. I should like to add that the patient was cured, but information to this effect, so far, is still lacking.

Lastly, two special items of news. Lyons-Tramoyes and Toulouse-Muret, both 120-kilowatt stations to be operated by the French State, are expected to start their initial tests in the course of a week or so. Also, make a note in your log to follow the Radio Strasbourg published programmes; towards the end of the month this studio proposes to place a microphone in the Wittenheim Colliery (Alsace) at a depth of some 2,000 ft. Beromünster will also relay the running commentary.

Five-metre Glider Tests

FOLLOWING the recent article by Cecil Lusty on the Golders Green Radio Society's five-metre field day, we have received an interesting letter from D. Walters about the glider messages reported to have been picked up that day by Mr. Confield.

"It happens," says Mr. Walters, "that I was the operator of the transmitter G5CV that was communicating with the glider in flight. Mr. Lusty goes on to say that he later learned that Mr. G. E. Collins was operating the transmitter.

"May I please point out the actual facts, which are rather important in view of the fact that this was making radio history—being the first time that radio has been used in British gliding.

"A midget 5-metre receiver and batteries were installed in Mr. Collin's glider and previously adjusted accurately to the wave-length

of my transmitter, which was situated in a car. It was so arranged that Mr. Collins had no need to work any controls—merely listening to the messages in the headphones.

"An aerial only 3-feet long coiled round the receiver was used in the glider, and throughout the flight reception was 100 per cent. intelligible and easily followed in the glider.

"The transmitter, which has already been used for experiments in power planes, operated with an input of about 2½ watts from 15c volts dry battery and consisted of the popular push-pull oscillator with two pentodes in parallel for modulating. You will see from this description that no transmission was carried in the glider. The request to wave a handkerchief was made by me to Mr. G. Jessop (whose receiver was used in the test) before the glider left the ground."

Broadcast Wavelengths

This week we give details of the principal short-wavers and the European long-wave stations. Next week we shall publish a list of medium-wave transmitters

Principal Short-wavers

Metres	Kilo-cycles	Station and Call sign	Country
16.86	17,790	Daventry (GSG)	Great Britain
16.87	17,780	Bound Brook (W3XAL)N	United States
16.88	17,770	Eindhoven (PHI)	Holland
16.89	17,760	Zeesen (DJE)	Germany
19.47	15,410	Riobamba (PRADO)	Ecuador
19.56	15,340	Schenectady (W2XAD)	United States
19.64	15,270	Wayne (N.I.) (W2 & E)	United States
19.67	15,250	Boston (WIXAL)	United States
19.68	15,243	Paris (Colonial) (FYA)	France
19.72	15,210	East Pittsburgh (W8XK)	United States
19.73	15,200	Zeesen (DJB)	Germany
19.82	15,140	Daventry (GSF)	Great Britain
19.84	15,122	Vatican (HVJ)	Italy
23.39	12,825	Rabat (CNR)	Morocco
24.83	12,082	Lisbon (CTICT)	Portugal
25.00	12,000	Moscow (RNE)	U.S.S.R.
25.25	11,880	Paris (FYA)	France
25.27	11,870	E. Pittsburgh (W8XK)	United States
25.29	11,860	Daventry (GSE)	Great Britain
25.40	11,810	Rome (2RO)	Italy
25.45	11,790	Boston (WIXAL)	United States
25.51	11,760	Zeesen (DJD)	Germany
25.53	11,750	Daventry (GSD)	Great Britain
25.63	11,705	Paris (Colonial)	France
26.83	11,181	Funchal (CT3AC)	Madeira
28.98	10,350	Monte Grande (LSX)	Argent. Republic
29.04	10,330	Ruysselede (ORK)	Belgium
30.43	9,860	Madrid (EAO)	Spain
31.25	9,600	Lisbon (CTIAA)	Portugal
31.28	9,590	Philadelphia (W3XAU)	United States
31.28	9,590	Sydney (VK2ME)	New South Wales
31.3	9,585	Daventry (GSC)	Great Britain
31.35	9,570	Boston (WIXAZ)	United States
31.36	9,565	Bombay (VUB)	India
31.38	9,560	Zeesen (DJA)	Germany
31.45	9,540	Jeloy (LKJ)	Norway
31.48	9,530	Schenectady (W2XAF)	United States
31.55	9,510	Daventry (GSB)	Great Britain
31.55	9,510	Caracas (YV3BC)	Venezuela
36.65	8,186	Rio de Janeiro (PRA3)	Brazil
37.33	8,035	Rabat (CNR)	Morocco
38.48	7,797	Radio Nations (HBP)	Switzerland
43.86	6,840	Budapest (HAT2)	Hungary
45.38	6,610	Moscow (RW72)	U.S.S.R.
46.53	6,447	Barranquilla (HJABB)	Colombia
48.86	6,140	Pittsburgh (W8XK)	United States
49.02	6,120	Wayne (W2XE)	United States
49.08	6,112	Caracas (YVIBC)	Venezuela
49.18	6,110	Chicago (W9XF)	United States
49.18	6,110	Bound Brook (W3XAL)	United States
49.22	6,095	Bowmanville (VE9GW)	Canada
49.34	6,080	La Paz (CPS)	Bolivia
49.5	6,065	Nairobi (VO7LO)	Kenya Colony
49.48	6,060	Byberry (W3XAU)	United States
49.48	6,060	Mason (W8XAL)	United States
49.5	6,060	Skamlebaek (OXY)	Denmark
49.59	6,050	Daventry (GSA)	Great Britain
49.67	6,040	Boston (WIXAL)	United States
49.83	6,020	Zeesen (DJC)	Germany
49.92	6,010	Havana (COC)	Cuba
49.96	6,005	Montreal (VE9DR)	Canada
50.0	6,000	Moscow (RNR)	U.S.S.R.
50.26	5,969	Vatican (HVJ)	Italy
50.42	5,950	Medellin (HJ4ABE)	Colombia

Long-wave Stations

Metres	Kilo-cycles	Station and Call sign	Country	Power (Kw.)
1,107	271	Moscow (RCZ)	U.S.S.R.	100
1,142	262	Madona	Latvia	20
1,186	254	Oslo	Norway	60
1,209.6	248	Scheveningen Haven	Holland	5
1,224	245	Leningrad	U.S.S.R.	100
1,250	240	Vienna (Exp)	Austria	3
1,263	238	Kaunaborg	Denmark	60
1,293	232	Kharkov	U.S.S.R.	35
1,304	230	Radio Luxembourg	Grand Duchy	100
1,312.9	229	Ankara	Turkey	7
1,345	223	Warsaw	Poland	120
1,388.9	216	Motala	Sweden	30
1,395	215	Eiffel Tower (Paris)	France	8
1,442	208	Reykjavik	Iceland	16
1,442	208	Minsk	U.S.S.R.	35
1,500	200	Droitwich	Great Britain	150
1,571	191	Deutschlandsender	Germany	60
1,612	186	Istanbul	Turkey	5
1,648	182	Radio Paris	France	80
1,724	174	Moscow (I)	U.S.S.R.	500
1,807.2	166	Lahti	Finland	40
1,875	160	Kootwijk (Huizen prog.)	Holland	50
1,886.7	159	Brasov	Roumania	20
1,935	155	Kaunas	Lithuania	7

Next Week:

CRUSADER CIRCUITS FOR YOU TO TRY

By J. H. Reyner, B.Sc., A.M.I.E.E.



Every Radio requirement, however extravagant or modest, is supplied by us on the most convenient terms and with the utmost expedition and courtesy. We maintain a service upon which increasing numbers rely. We deal with you direct and all transactions are strictly private. Your orders and inquiries will be valued. Quotations by return of post. Price List Free.

We recommend the following items as outstanding in their class.

RECEIVERS (Battery)

15/- New Mullard MB3. Complete receiver, including moving-coil speaker valves and all batteries in beautiful cabinet. Remarkable selectivity and quality of reproduction. Very low H.T. consumption. In our opinion the finest battery receiver available at present. Almost equal to a superhet in regard to selectivity with better tone. Cash Price, £8/8/-, or 15/- with order and 11 monthly payments of 15/-.

10/- NEW COSSOR MODEL 350. Complete receiver, including valves, loud-speaker in fine cabinet. This is an excellent low-priced instrument which we can recommend. Batteries extra, but these may be included with the order. Cash price (less batteries), £5/12/6, or 10/- with order and 11 monthly payments of 10/4.

MANUFACTURERS' KITS.

9/- Graham Farish Mystic Q Kit with valves, cabinet and W.B. Stentorian Baby speaker. Cash Price, £5/4/6, or 9/- with order and 11 monthly payments of 9/9.

10/- Graham Farish Raider Kit with valves. Cash Price, £5/6/8, or 10/- with order and 11 monthly payments of 9/8.

5/6 Graham Farish Raider, less valves. Cash Price, £3/5/2, or 5/6 with order and 11 monthly payments of 6/-.

NEW ATLAS T10/30 H.T. UNIT WITH TRICKLE CHARGER.

6/- Suitable for any battery-operated set, it provides three H.T. positive tapings—60/80 volts with minimum and maximum positions, 59/90 with minimum, medium and maximum positions, and 120/150 volts with positions for either 120 volts or 150 volts. A novel feature is the output panel, which gives a choice of either 10, 20 or 30 m/a., which, operated in conjunction with the power voltage tapings of 120 or 150 volts, enables you to obtain outputs of 10, 20 or 30 m/a. at 120 or 150 volts.

A further refinement is the low-tension accumulator trickle-charger, which is incorporated in the unit. This provides facilities for re-charging your 2-volt L.T. accumulator between periods of reception. The charging rate is .5 amps. For A.C. mains, 100/125 or 200/250 volts, 40/120 cycles. Incorporates Westinghouse metal rectifiers and is fully guaranteed for 12 months. Cash Price, 69/6, or 6/- with order and 11 monthly payments of 6/4.

MOVING COIL LOUD SPEAKER UNITS.

2/6 New W.B. Stentorian Senior Unit. This is undoubtedly the best of the latest moving-coil units. More volume for the same input and a further improvement in tone. Cash Price, £2/2/0, or 2/6 with order and 11 monthly payments of 4/-.

VALVES.

5/- Every type of valve replacement supplied on convenient terms. 3 Valves, 1 S.G., 1 Det. and 1 Power (Mullard, Cossor or Marconi). Cash Price, £1/5/0, or 5/- with order and 5 monthly payments of 4/7.

ALL CARRIAGE PAID.

All the new Sets supplied on the lowest terms. Please state requirements and we will be pleased to quote you.

Full Specification and illustrated list of any of the above will be sent with pleasure. To avoid delay, will customers kindly send first payment with order?

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As the publishers cannot accept responsibility for the bona fides of advertisers in this section, they have introduced a system of deposit which it is recommended should be adopted by readers when dealing with persons with whom they are unacquainted. It is here explained.

Intending purchasers should forward to the Publishers the amount of the purchase money of the article advertised. This will be acknowledged to both the Depositor and the Vendor, whose names and addresses must necessarily be given. The deposit is retained until advice is received of the completion of the purchase, or of the article having been returned to and accepted by the Vendor. In addition to the amount of the deposit, a Fee of 6d. for sums of £1 and under, and 1s. for amounts in excess of £1, to cover postage, etc., must be remitted at the same time. In cases of persons not resident within the United Kingdom, double fees are charged.

The amount of the Deposit and Fee must be remitted by Postal Order or Registered Letter (Cheques cannot be accepted), addressed to
"Amateur Wireless," Advertisement Department,
58/61 Fetter Lane, London, E.C.4.

CONSTRUCTORS of Coils, Transformers, and Chokes. Lists now ready.—Lumen Electric Co., 9 Scarisbrick Avenue, Litherland, Liverpool 21.

WANTED.—Good Modern Wireless Parts, Sets, Eliminators, Meters, Valves, Speakers, etc. Spot Cash waiting. Exchanges. Send or bring. We pay more than any other dealer. Open 9-8.—University Radio, 142 Drummond Street, Euston, N.W.1.

14/11 BATTERY CHARGERS. 1 amp. 2-6 v. Incorporating Westinghouse LT4 Rectifier. Guaranteed one year. Postage 9d. List free.—Arden Agency, Wollaston, Northants.

BATTERY DRUDGERY ABOLISHED, astounding results; particulars and Battery Log Book Free.—Instantbrite, Peebles Works, London, N.W.6.

WIRELESS INSTRUCTOR (voluntary) is required for group of unemployed men. Mondays and Wednesdays, 2.30 to 4.30 p.m.—Apply in writing to the Warden, Mary Ward Settlement, Tavistock Place, W.C.1.

REPAIRS TO MOVING-COIL SPEAKERS.—Cones and Coils fitted or rewound. Eliminators and Transformers quoted for. Loud-speakers, L.F. and Speech Transformers, 4/- each, post free. Trade invited. Satisfaction guaranteed. Prompt service.—Loud-speaker Repair Service, 5 Balham Grove, London, S.W.12. Battersea 4321.

BANKRUPT BARGAINS.—List free with 3v. diagram. Triotron valves 3/-; power 4/-. All ST kl's. Lissen 1934 2v. A.C. or D.C. mains listed £6/19/6, my price £3. Regentone eliminators W1A 32/6, W5A 40/-, Celestion PPM/W, MC 16/6. Iron cored dual coils screened 2/4, duals unscreened, 1/6. Burgoyne Class B 3v. complete, £4. Less batteries 65/-, transformers from 1/6. New Lotus double pentode universal set MC 44. ACE all mains Universal 4v. £7. Ditto, 6v. Super-het, £8/10/0. Large stock of components, good quality and keenest prices. Part exchange. Five years advertiser in A.W.—Butlin, 143B, Preston Road, Brighton. Preston 4030.

INFORMATION BUREAU

Will every querist please observe the following revised rules?

Please write concisely, giving essential particulars.

A fee of one shilling, postal order (not stamps), a stamped, addressed envelope and the coupon on this page must accompany all queries.

Not more than two questions should be sent at any time.

The designing of apparatus or receivers cannot be undertaken.

Slight modifications of a straightforward nature only can be made to blueprints. For more serious alterations the minimum charge is 2/6.

Blueprints supplied by us will be charged for in addition, but, of course, readers may send their own blueprints for alteration.

Modifications to proprietary receivers and designs published by contemporary journals cannot be undertaken. Readers' sets and components cannot be tested by us. Queries cannot be answered by telephone or personally. Readers ordering blueprints and requiring technical information in addition should address a separate letter to the Information Bureau and should see that their remittance covers the price of the Blueprint and the amount of the query fee.

We do not answer queries in cases where the fee is omitted.

Queries should be addressed to the Query Dept., "Amateur Wireless," 58/61 Fetter Lane, London, E.C.4.

Postcard Radio Literature

Here "Observer" reviews the latest booklets and folders issued by well-known manufacturers. If you want copies of any or all of them FREE OF CHARGE, just send a postcard giving the index numbers of the catalogues required (shown at the end of each paragraph) to "Postcard Radio Literature," AMATEUR WIRELESS, 58-61 Fetter Lane, E.C.4. "Observer" will see that you get all the literature you desire. Please write your name and address in block letters.

Blue Spot Speakers

If you are considering a new, or an additional, loud-speaker of the permanent-magnet moving-coil type, you should secure a copy of the new folder issued by The British Blue Spot Co., Ltd. This gives details and illustrations of all their various types, together with their pick-up and remote volume control. Multi-ratio input transformers are fitted to all models, while the special dust protection device is now a standard fitting. The prices range from 35s. for the Star Junior to £11 11s. for the large and powerful Super Dual. 202

Heyberd Mains Components

MAINS units, transformers, chokes, and battery chargers are a few of the items described on one of the leaflets we have just received from F. C. Heyberd & Co. One is always concerned with reliability when dealing with mains equipment, therefore the following specification is worthy of note. All Heyberd mains transformers are fully guaranteed for twelve months and are constructed of selected steel and finest quality wire. The voltage regulation is extremely good, while the temperature rise is negligible when delivering maximum output. The other leaflet deals with mains transformers suitable for the operation of small electric models from the mains. As the leaflets contain full specifications for all the products, they form useful reference sheets. 203

Formo Products

A NEAT little folder showing the new Formo lines is now available. This deals chiefly with variable condensers, iron-cored coils, and the new Mystic drive, which is the name given to the rather unique slow-motion control. The feature of this is that the handsome bakelite escutcheon plate requires no special panel cut out, thus simplifying fitting. 204

Graham Farish Components

A MOST extensive range of components are listed in the 1935 folder just received. The items are so numerous that every requirement of the constructor seems to be catered for. If you are in need of a new switch, high-frequency choke, valve holder, four-, five-, seven-, or nine-pin type, or a Q.P.P. transformer, to mention only a very few of the lines, you will find all of them mentioned on the folder. 205

Smith's Radio Accumulators

A MOST comprehensive list of accumulators for both low-tension and high-tension supply is yours in exchange for a postcard. The makers have described each type in a most detailed manner, so that one is able to determine the exact specification at a glance. The jelly-acid type is dealt with as being most suitable for portables, owing to it being impossible to spill any acid, while the option of a wide range of glass or celluloid containers for low-tension cells is given.

On the high-tension side, 10- and 60-volt units are shown, and it should be noted that the 10-volt unit can be supplied with tappings at every 2 volts. 206

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METERS: We carry large stocks of Meters, all ranges. Special Charging CZ 3-0-3 amps. 5/- Pole Testers, 2/6, 0-20 volts, 5/-, 0-50 volts, 5/-, 0-100 volts, 5/6, 0-200 volts, 6/-, all A.C. or D.C. Dixonmeter, the 50-range tester, 55/- Moving-coil 1st grade meter movements for own tester, 5/- Mains Transformer, for Hells, Models, Lamps, etc., 3-8 volts, 230 volts double, 3/6 110 volts single, 2/6, post 6d.

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for ELIMINATION OF INTERFERENCE
in RADIO RECEPTION

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2. Supply Mains.
3. External.

Atmospheric troubles are usually static, and cannot be eliminated by means of condensers.

In the case of No. 2, trouble may be experienced through the interference being conveyed over the Supply Authorities' distribution system.

In the case of No. 3, external interference, this is caused by direct radiation and originates in electric motors, vacuum cleaners, and any other electrical apparatus in which sparking takes place during operation—for example, violet-ray apparatus, or even when switching on or off any kind of electrical plant.

In attempting to overcome such interference it is necessary to try the application of the remedy at the source.

In many cases the use of condensers alone is sufficient to minimise very largely, and often entirely suppress, the interference.

The Condensers employed must be suitably designed for the working conditions, and should have a 5-ampere fuse inserted between the mains and the condensers.

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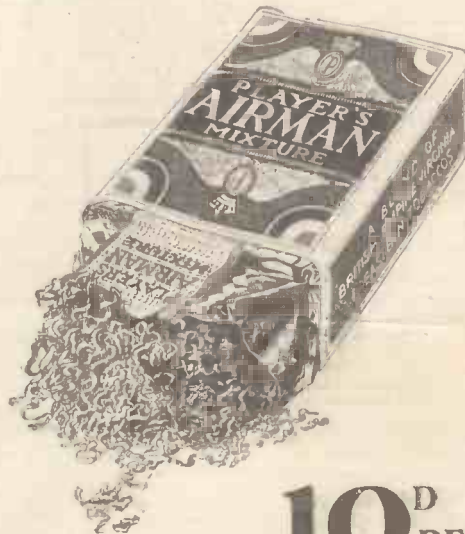
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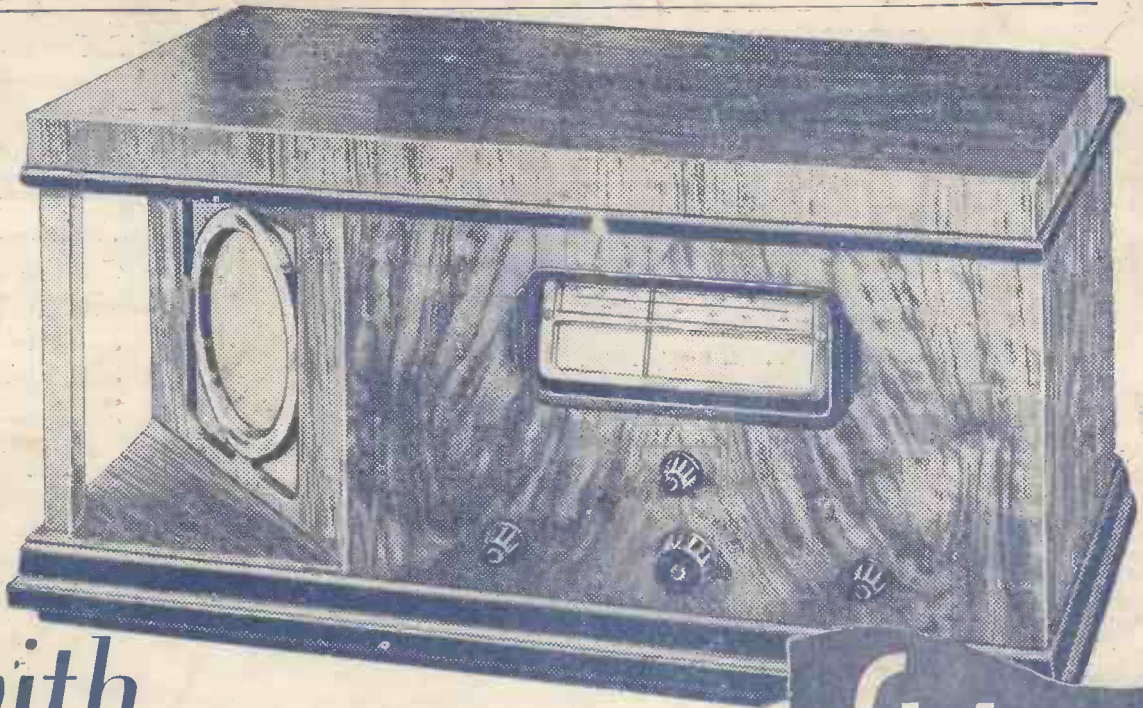
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