

TEN SHORT-WAVE FEATURES :: NEW THREE-IN-ONE VALVE

Amateur Wireless

3d
Every
Wednesday

and Radiovision

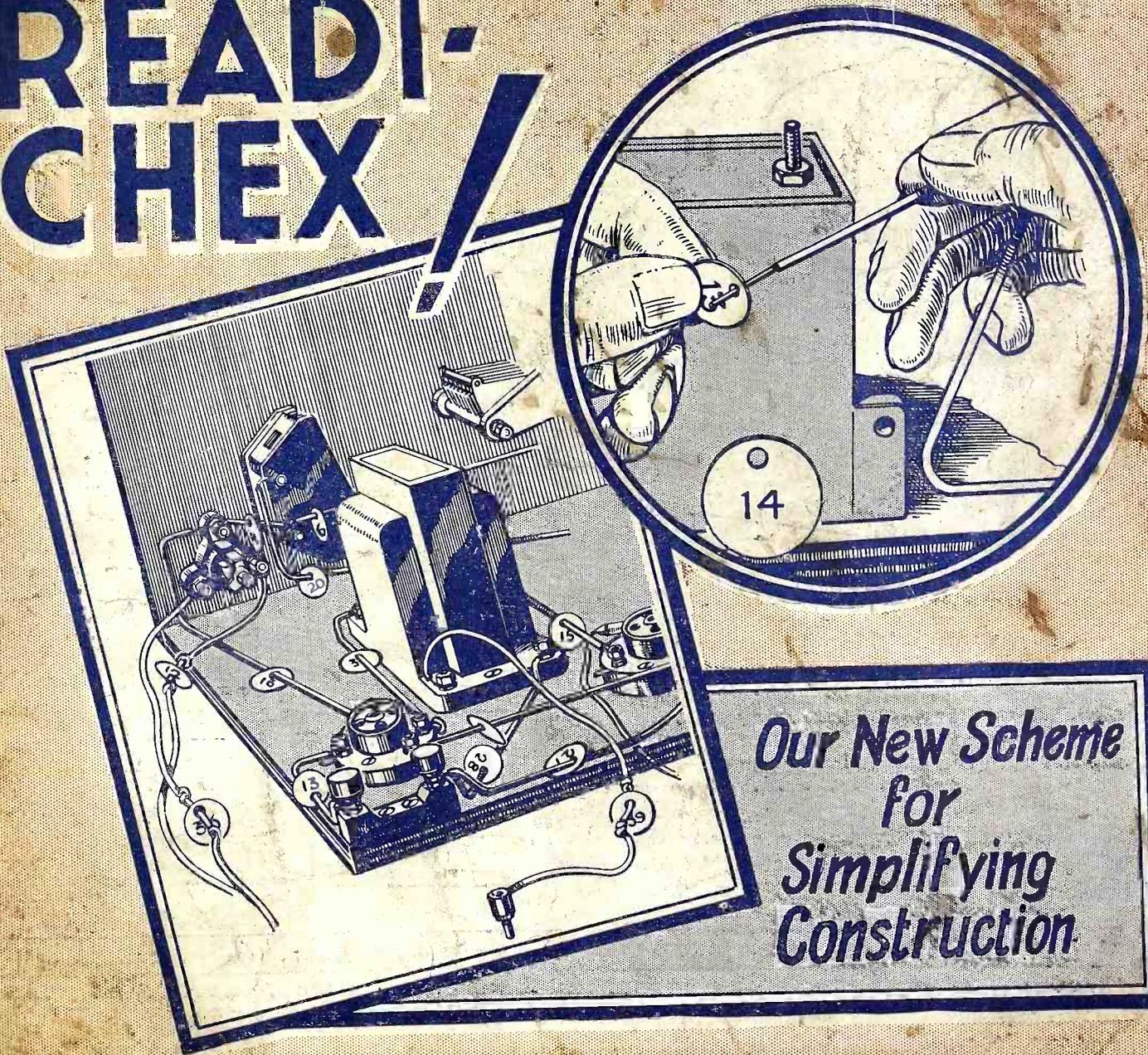
**DIRECTION-FINDING
FOR AMATEURS**

**"LET US SEE!" Says
PERCY HARRIS**

**MORE LETTERS on
REAL QUALITY**

**RADIO DOWN
LONDON RIVER**

READI- CHEX



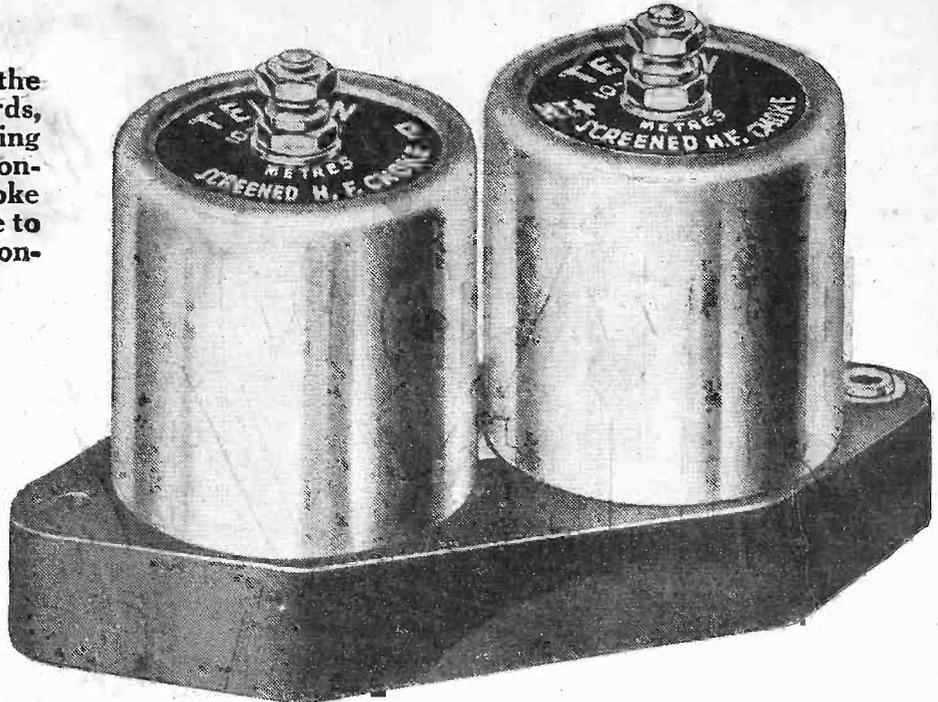
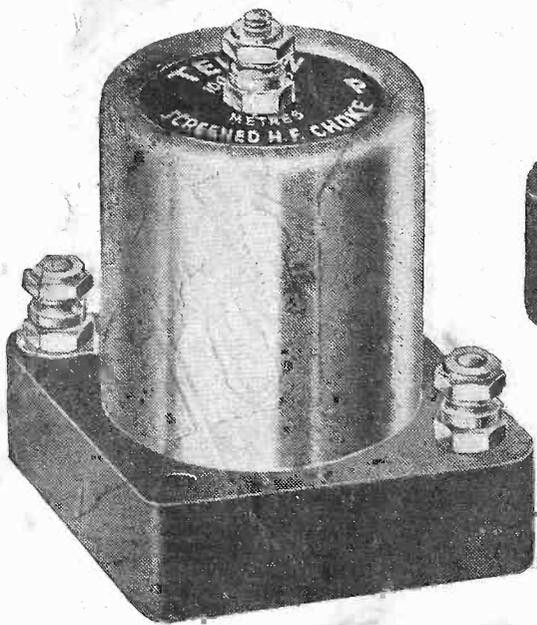
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TELSEN

provides the

BEST *H.F. Choke* FOR EVERY PURPOSE

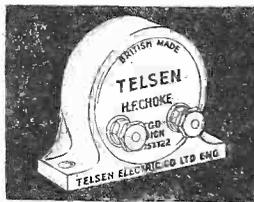
STEADILY developed to the highest mechanical standards, and rigorously tested for lasting efficiency at every stage of construction, each Telsen H.F. Choke is the finest of its type possible to produce at the lowest price consistent with quality.



TELSEN SCREENED H.F. CHOKES

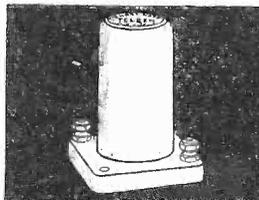
provide consistently high efficiency over the entire wave band for which they are intended. The metal screen, which is connected to an earthing terminal, entirely prevents interaction with other components. Small and compact.

- STANDARD Screened H.F. Choke (100-2,000 metres) - - - - - **3/6**
- SHORTWAVE Screened H.F. Choke (10-100 metres) - - - - - **3/6**
- ALL-WAVE Screened H.F. Choke (10-2,000 metres) - - - - - **5/6**



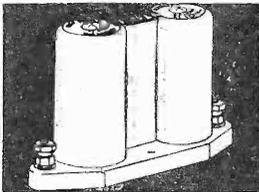
TELSEN STANDARD H.F. CHOKES

Particularly suitable for reaction circuits. Very low self-capacity with high inductance. Occupies **2/6** minimum space.



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TELSEN FOR EVERYTHING IN RADIO

Announcement of THE TELSEN ELECTRIC COMPANY LIMITED, ASTON, BIRMINGHAM

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News and Gossip of the Week

Lawn-tennis Radio

STARTING on June 25 is the All England Lawn Tennis Tournament at Wimbledon, into which B.B.C. commentators will break at frequent intervals.

You may expect to hear exciting excerpts of play in progress any time between 2 and 4.30 p.m. from Daventry and the medium-wave Nationals.

Exhaustive Arrangements

DAVENTRY'S Children's Hour may even be interrupted up to 5.30 for these tennis commentaries, while on the medium waves efforts will be made to butt into the programmes right up to the News Bulletins at six o'clock.

End of 24 Hours?

BACK to Old Father Time! The B.B.C. is reverting to ordinary timing in its publications from June 15 onwards.

To save its face just a little, the B.B.C. will continue to bracket 24-hour time with its normal ack and pip emma figures.

But the end of the B.B.C.'s fantastic experiment with time is in sight—public apathy and press antagonism have wrought their deadly work.

Selsdon Gets Busy

NO grass is likely to grow under the feet of the Television Eight who are advising the P.M.G.

For already they have been snooping round No. 16 Portland Place, looking in at the 30-line Baird images as sent out twice a week from London National.

Plenty to See!

THIS Selsdon Committee is up and doing. Its members have plenty to see if they look at the several rival television systems now claiming attention.

It is a terrific responsibility to have to discriminate against laboratories that have spent so much on television research. Perhaps there won't be any such exclusion—perhaps they will all get a run for their money on the ultra-shorts.

Flotsam Back Again

BETTER known to listeners as Flotsam, B. C. Hilliam will be heard over the air again on June 15—without Jetsam.

The occasion is "Happy Hikers"—an all-singing, all-hiking "tour" through Warwickshire.

Other stars in this unusual

programme will include Thorpe Bates and Hughes Macklin.

Sponsors' Competition

AT an international newspaper convention starting on June 10, the question of "space" competition by radio sponsors abroad will be raised.

In this part of the world newspapers have always been fully alive to the danger of radio advertising sapping their revenue.

Now that such stations as Luxembourg are taking so many British advertisers, the newspaper interests are again growing restive.

Beware of Cables!

AS we lightly tripped around the corridors of Broadcasting House this week we were warned very severely to look out for cables!

No, the engineers were not re-wiring their three-valve sets. Just a part of the complicated arrangements involved in taking film "shots" of various parts of the building.

John Grierson is getting along with the famous B.B.C. film, it seems. But we shan't see it at the "flicks" until nearly the end of the year—if then.

Would-be Stars?

TAKE no notice of the rumour that the alluring bebies of secretaries and typists at the "Big House" are going along to their hairdressers twice a week on the offchance of being "shot" during the film.

Yet, i' faith, some of them are pretty good lookers—and might even get by the searchingly cold eyes of the talkie Czars.

Once-over at Droitwich

SO well is the work of the new Droitwich station advanced that Noel Ashbridge and his assistant popped up from "B.H." the other day to see the apparatus under test.

Apparently a closed-circuit test is not yet possible—but all is going according to plan.

Possibly it takes a little longer to "check the blueprints before inserting the valves" than with our sets, what?

Lisburn Under Way

SO long have the patient Northern Ireland folk waited for their new high-power station to replace Belfast that they can hardly believe actual work has started.

Anyway, the site has been



[L.N.A. photo

This new loud-speaker combines the duties of a flower-pot and a loud-speaker. It was shown at an exhibition in London recently

pegged out. Further delay is not likely, either to North Ireland Regional, North-Eastern or North Scottish Regional, since all three have been waiting to some extent on the design of a suitable building.

Pangbourne Disappoints

AFTER waiting for three nights—and not very warm nights, at that!—the O.B. engineers decided that the nightingales of Pangbourne were not coming up to scratch.

So they groped around the hedgerows and leafy lanes looking for new birds. They found them—and you probably heard them—some seven miles away from the original site.

Smart work by the Post Office linked up the newly-discovered point—and the birds then said it with trills over the B.B.C. network.

Only Three Talks!

FANCY that, now. Only three talks per week in the summer! Seems as though the B.B.C.

is becoming, well, almost human.

One of these will be the Saturday-night sports talk at 6.30 p.m., the other two being topical.

Queer Fading

JUST because the Midland Regional engineers changed over the feeder hut of their transmitter, listeners in Leicestershire and Nottingham suffered.

They found the station faded quite badly. Which shows that one cannot play around with feeder huts and get away with it.

It Looked Acrobatic!

GLANCING up at the roof of Broadcasting House with a crowd of astonished passers-by, we saw two workmen seemingly trifling with a sticky death.

While on their cleaning expedition, they were balanced see-saw fashion on a plank passed between the lattice work of one of the masts. Gave us quite a turn!

Then we went up above and saw that our fears were unfounded; the workmen were wearing perfectly good safety belts.

Radio Down London River

By T. F. HENN



Large Epoch moving-coil loud-speakers in the lounge of the Thames steamer, Royal Eagle, provide music for dancing on the homeward journey from Ramsgate to London



A record of "Daisy and Gert" amusing some of the passengers on the after-deck

dining saloon is louder than can be called comfortable.

He then showed me the gadgets on the motorboard of the amplifier. There were two Marconi pick-ups and two Garrard gramophone motors, the pick-ups being controlled by a switch and fader arrangement. A microphone above the amplifier was also controlled by the same method.

"In the case of emergency," he told me, "passengers would be given instructions from the bridge and the captain's directions would be heard throughout the length and breadth of the ship."

"Thank goodness we have had no occasion to do this; but, as you can



Loud-speakers in the dining saloons have built-in volume controls so that lunch-time music is only a background and not an entertainment

see, gear of this sort would play an important part in getting passengers up on to the decks if a real emergency arose."

By that time we were approaching Southend Pier, and he asked to be excused to make an announcement.

"Will passengers going ashore at Southend please get their luggage from the cloakrooms and get ready to go ashore from the lower deck. Now we will have a programme of light music in the lounge; there will be no music on deck." I left our friend at that and went on deck to enjoy the sea breezes, while the loungers enjoyed their 30 watts of light music.

I HAD always imagined the lower reaches of the Thames to be most depressing. However, circumstances decreed that I should travel to Ramsgate and back one Sunday; there was no getting out of the journey and I had to miss the usual Sunday-morning sitting with my short-waver.

In due course I arrived on board the *Royal Eagle* at Tower Pier, found a nice sheltered corner, settled down for a trip down the Thames to Southend, across the sandbanks to Margate, and round the North Foreland to Ramsgate.

On Our Left—Wapping Steps!

Soon after the ship had left the pier, I was startled by a huge loud-speaker announcing that on our left was Wapping Steps. The quality and power seemed exceptional, so I roused up from my corner and went off to investigate.

In a little cabin on the ship's "sun deck" I found the cause of all the noise. Neatly fitted on a large piece of Sorbo rubber was one of the most compact public-address amplifiers I have ever seen. It was like a huge radio-gramophone without any loud-speaker fret on the front.

You know how wireless fans get over introductions. I made myself at home with the operator by complimenting him on the fine results he was getting, and asking for information.

He was a very obliging sort of fellow. Every little detail of the gear was explained; far too much, in fact, to bother you with here. He started off by saying that over 1,000 volts high tension is required for the two output valves and the ship's supply is only 100 volts D.C. This roused my interest thoroughly.

Hefty Rotary Converter

We left the wireless cabin and went down below to the engine-room, where he showed me a hefty rotary converter which provided 240 volts for the first amplifying stage and some 1,500 volts for the power stage.

On deck he pulled out the front of the amplifier and exposed the works. It was a two-stage amplifier, resistance-capacity coupled with two Ediswan ES75 power triodes in the output stage.

"You must have some fine loud-speakers to get that volume and fine quality," I remarked.

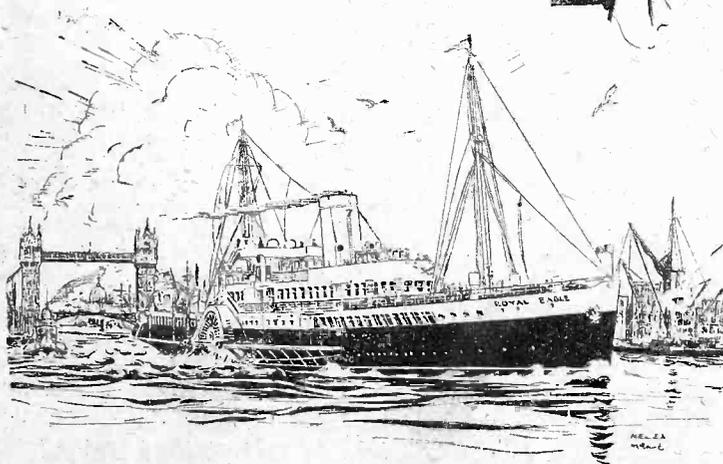
"Well, come and tell me what you think of these," he said, and marched me off round the decks to where the loud-speakers were fixed. At the end of the "sun deck" in a commodious box was a big Epoch super-cinema energised moving-coil loud-speaker. The fret was backed by oilskin to keep salt water out—and in bad weather a board is slipped in front to keep the ocean out!

There were eight of these loud-speakers, two on the top decks, two in the glass-enclosed promenade lounge, and four in the dining saloons down below.

In his little cabin, the wireless officer showed me a switchboard whereby he could switch off any one of the loud-speakers at will.

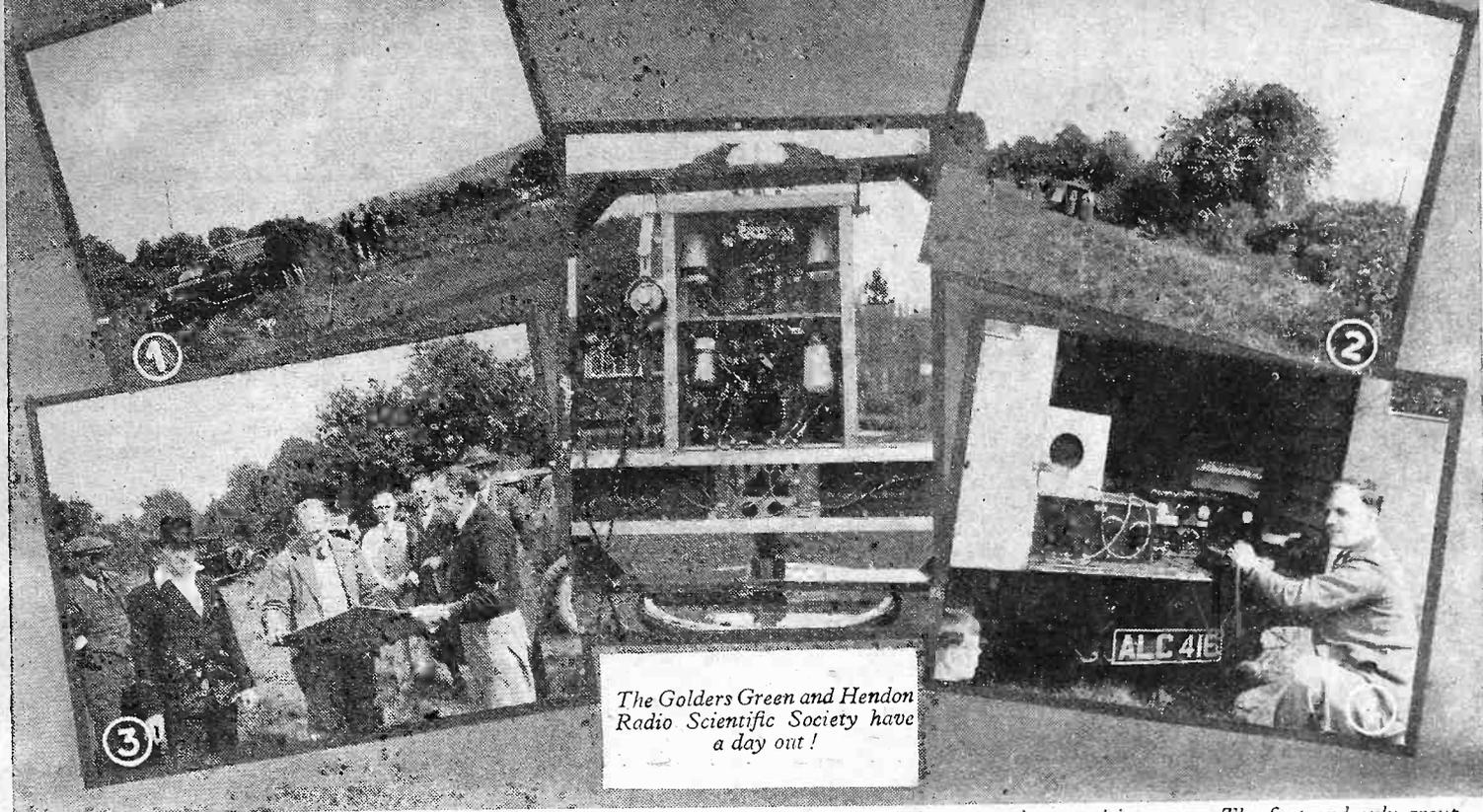
"You see, not everyone who comes aboard wishes to be entertained with music all day, so for certain periods some of the loud-speakers are shut off. All the loud-speakers below have a volume control on the baffle so that the stewards can cut down the volume to reasonable limits."

I agreed with him; 30-odd watts in a



An artist's impression of the General Steam Navigation Co.'s steamer, Royal Eagle, which plies between Tower Pier, London and Ramsgate during the summer months

Direction-finding for the Amateur



1.—First position of transmitter, which had to be located by the competitors. 2.—Hidden transmitter position. 3.—The first and only group to locate the transmitter (Southall Radio Society).— This group obtained third prize. 4.—Mr. Corfield (SCD) and the mobile transmitter

—and Fun with a Portable Set!

A PORTABLE set lends itself to many experiments, and probably one of the most interesting is position-finding. Compared with modern commercial direction-finding apparatus, a "portable" may seem a crude affair, but if carefully handled it can be made to demonstrate the main principles and to produce results far above its modest appearance.

Map and a Good Compass

The only accessories needed are a map and a good magnetic compass. The experiment is based on the directional properties of a frame aerial being used to obtain compass bearings on two or more broadcasting stations, and the method is roughly the same as that employed by the continental air services, which is briefly as follows:—

If a pilot flying towards London runs into a patch of bad weather and thinks it advisable to check his progress, he calls Croydon aerodrome and asks for his position. The ground operator takes a compass bearing of the 'plane's direction with his direction-finding receiver, and plots this on a large-scale map by means of a string-line.

A second bearing is obtained from another direction-finding station at Pulham in Norfolk, and when this is also plotted it is found that the two string-lines intersect. The point of intersection, of course, gives the position of the 'plane on the map, and this information is then passed to the pilot.

It is obvious that a single bearing, say from Croydon, would only show the direction of the 'plane, whereas the second bearing enables an exact location to be made. From this we get the data on which the experiment is based—that given the compass bearings from two known points upon an unknown point, the position of the unknown point can be estimated.

It is not a difficult matter to adapt this principle to a portable set so that its operator can work out roughly his position anywhere in the British Isles. As already mentioned, the idea is to use the directional properties of a frame aerial (the unknown point), to obtain compass bearings on two broadcasting stations (the known points).

Plotting these bearings on a map with

pencil lines will give the position of the portable.

The first procedure in taking bearings is to set up the portable and to tune-in and identify two broadcasting stations, fairly widely separated geographically. Now it is well known that with a frame aerial, maximum signal strength is obtained only when the edges of the frame are parallel to an imaginary line drawn from the transmitter. In other words, when one edge points directly towards the station and the other away from it.

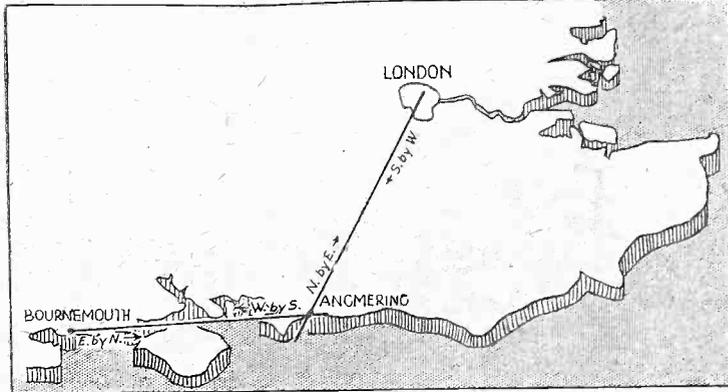
Taking a Directional Bearing

Having tuned-in a station to maximum strength, therefore, it is a simple matter to place a compass on top of the frame and, using one edge as a pointer, to take a directional bearing.

Of course, there is nothing to indicate which edge of the frame is pointing towards the transmitter, but if this is not known by a general sense of direction, then it can be worked out later by trial and error.

It is advisable to use headphones when searching, and to keep the volume low side, otherwise it is difficult to judge the point of maximum signal strength. Naturally this is very important, as a small compass error may make a difference of miles to the final result.

For the same reason a check on the "maximum-point" reading should be made by means of the "minimum-point" method.



Map showing how your correct radio bearings can be taken with a simple frame-aerial type of portable set

Kebtex Four-valver

taste, is fitted through the right-hand side of the cabinet.

This is the first receiver that we have ever tested with the tuning dial calibrated with a number of the more reliable American medium-wave stations, in addition to the normal European medium- and long-wave stations. To anyone who has not tested the receiver, this American calibration may seem to be a trifle unnecessary. We were inclined to believe that the manufacturers were being too optimistic, but after we had reviewed the capabilities of the receiver we were obliged to change our opinion.

The circuit is conventional, which perhaps accounts for the exceptional sensitivity, for we have in the past noted that the more simple circuits often give better sensitivity and certainly are more reliable. The first valve is a variable- μ screen-grid high-frequency amplifier, which is coupled to a steep slope triode detector. Transformer coupling is employed between this valve and the multi-grid output valve which gives over $2\frac{1}{2}$ watts.

Quality is decidedly above the average. There is not an obvious reason for this, but when we looked into the matter we discovered that the intervalve transformer was of massive dimensions and had a very high primary inductance. That was a good beginning. Then the output valve was supplied with a generous high-tension voltage which, combined with the fact that it was carefully matched to a large moving-coil loud-speaker, ensured that there was no loss of quality in this stage.

All of the smaller components are mounted beneath the metal chassis so that the general appearance is very clean and workmanlike. The only important components that can be seen are the tuning condensers, iron-cored tuning coils, which incidentally are highly selective, and the voltage-dropping resistance.

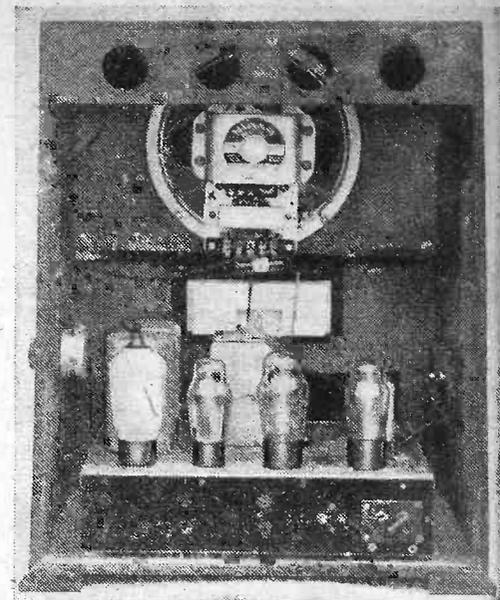
On test, the receiver more than justified the claims of the manufacturers. The tuning dial is of unique design and it is so accurately calibrated in station names that it is a very simple matter to identify the numerous foreign stations received, including those of American origin.

Our original tests were made in broad daylight in the heart of the city on a short aerial of 25 ft. total length. Even under such adverse conditions we were able to hear twenty continental stations at good strength. With such an aerial the selectivity was better than it

would be normally and averaged about 9 to 10 kilocycles.

Our second tests were made with an aerial having a total length of 80 ft. and without an earth connection as specified by the manufacturers. At a distance of 40 miles from London, we were able to obtain approximately 12 to 14 kilocycles selectivity without any juggling, although with careful adjustment of the reaction and volume controls this selectivity could be very considerably improved.

After dark no difficulty was experienced in



The Kebtex receiver follows conventional lines, but there are controls at the sides

logging the bulk of the stations calibrated on the tuning scale—some sixty in all, which speaks very well for the design of the high-frequency stage.

Those readers who listen to such low wavelength stations as Fécamp need not have any fear about the set's tuning range, for Fécamp was tuned in with about 8 degrees to spare.

One evening during a late test we were able to pick up no fewer than seven American medium-wave transmitters, including WIOD, WCAU, KDKA, and WTIC.

Let Us See!

Continued from preceding page

yourself forcibly at the present time you may find yourself landed with beautifully illustrated lectures on astronomy when a programme of dancing would be more to your taste; the perfectly depicted features of some nonentity who has used political influence to get in front of the television when you would like to see a theatrical performance; and a total absence of certain kinds of picture entertainment because they do not happen to commend themselves to a group of comfortably circumstanced elderly people who happen to be running the television service at the time.

If you think that the present B.B.C. type of administration, which gives you the kind of programmes you now hear, is the kind of organisation to give you satisfactory pictures, then you will get that kind of organisation and you will get that kind of picture. If, on the other hand, as I suspect, you think that at least half of the entertainment value of television will be lost under such administration, write and say so. Let us hear all about your

views! But don't be lulled into a false sense of security just because a committee is now sitting on the subject and don't assume that because they are sitting they must necessarily produce a scheme which will please you and satisfy the whole public. Remember, too, that two members of the committee are B.B.C. officials, anyway.

NEXT WEEK!

Literally thousands sent for the blueprints of the Penta-quester when it was produced as a battery model. Now the A.C.-mains version is ready—and the AMATEUR WIRELESS Technical Staff will give full working details next week. All the advantages of the original Penta-questa plus mains power and quality—and the consumption is only 40 watts!

Front view of the Kebtex Proscenium Four, a straight A.C./D.C. set

WHEN a high-grade cabinet manufacturer decides to go into radio, one can at least expect that the external appearance of the receiver will be distinctly above the average. The Kebtex Company, who are well known to the trade for their cabinet work, have just introduced the Kebtex Proscenium Four, which is a receiver suitable for A.C. or D.C. mains. From our tests we are quite satisfied that the receiver does in every way do justice to the exceptionally fine walnut cabinet used.

There can be no doubt that the cabinet is the product of an artist. It is of beautifully grained walnut with a cellulose finish, which is permanent, and the effect is distinctly better than the average french polishing to which we have become accustomed.

The name Proscenium has been well chosen, although until one actually sees the receiver the reason for it is not too obvious. Actually the loud-speaker fret takes the form of a theatre stage. It has been slightly recessed and is very realistic, as it gives the appearance of depth.

Although the receiver is entirely self-contained, it is far from being bulky. The overall height is $19\frac{1}{2}$ in. with a width of $14\frac{1}{2}$ in. and a depth of $9\frac{1}{2}$ in.

IN A NUTSHELL

Makers: Kebtex Radio, Ltd.
Model: Proscenium Universal Four.

Price: £11 11s.

Valve Combination: Screen-grid high-frequency stage (Tungsram SE2018), triode detector (Tungsram R2018), multi-grid output valve (Tungsram PP2018), and half-wave valve rectifier (Tungsram PV4018).

Power Supply: A.C. or D.C. mains of any voltage between 110 and 260 volts, any frequency A.C.

Type: Table model in walnut.

Remarks: A really fine straight receiver with a cabinet of what we consider is exceptionally good finish.

All controls are quite conventional. In the centre is the main tuner, while beneath it from left to right are the reaction condenser, volume control (which varies the gain in the high-frequency stage), and on the extreme right a combined wavechange and gramophone switch. The on-off switch is an entirely separate component, fitted through the left-hand side of the cabinet.

The tone control, enabling the user to vary the pitch of reproduction to suit individual

On Your Wavelength!

No More Twenty-four Hours?

IT seems more than likely that the B.B.C. will shortly abandon its use of the twenty-four-hour clock, for this has certainly not gone down well with listeners. So far, something over a thousand letters have been received on the subject, and the majority of them voice protests of varying strength.

One little thought occurs to me. We are told that large use is made of the twenty-four-hour system by foreign countries. It is—for railway timetables—but do you find it used for the wireless programme times in Continental newspapers?

For Television Receivers

A PART from its other merits, the cathode-ray tube is conveniently "elastic" in the sense that it can easily be adapted to handle either high—or low—definition television. For instance, the only part of the set affected in changing over from 180- to 30-line transmission is the resistance-capacity unit in the timing circuit.

The ordinary fluorescent screen is, in fact, particularly good for receiving low-definition pictures, because the "afterglow"—which tends to blur high-definition reproduction—helps to fill the gap between one "slow" picture and the next. Of course, with really high-grade screens, the light response is instantaneous, so that there is no perceptible after-glow, though such screens are expensive and difficult to produce.

Suicidal Set Prices

A FRIEND of mine who has just returned from a visit to Australia wants to know why the British manufacturers do not make an effort to popularise receivers over there.

After looking at some of the cheaper sets on sale in England, he says that the answer is rather obvious. In an endeavour to reduce the retail prices, the workmanship has deteriorated to such an extent that English sets cannot be compared with American sets at a similar price.

He goes on to say that the prices current over here are suicidal in view of the comparatively limited sales, and unless English manufacturers are prepared to export so as to increase sales they will never be in a stabilised position.

There is certainly a lot in what he says, for from personal experiences I can tell some pretty tales of sets delivered with the wrong types of valves, wires missing, and knobs that have slipped off the spindles through bad workmanship.

Still Our Numbers Grow

TURNING over the pages of a bound volume of a wireless paper for ten years ago, I am amused to find the statement that wireless must almost have reached its saturation point and that no great increase in the number of wireless licences could be looked for in coming years!

Well, at the end of 1924 the total number of licences was 1,140,119. And in ten years it has gone up more than five-fold, for we now muster some six and a quarter millions in the ranks of licence holders, and each month sees quite a substantial increase.

Rather less than half the homes of these

By Thermion

islands are still without their wireless sets, and I think we have still got another million or two to go before we think about saturation points.

That Ideal Set

FRIEND E. H. Robinson has had a tilt at me in last week's "A.W." over the ideal set. What he says makes it rather plain that probably there "ain't no sech thing!" One man's meat is another man's poison.

His ideal brings in the two London stations only at full loud-speaker strength. And that wouldn't do for me—nor probably for you.

A couple of years ago I designed a set purely and simply for bringing in the local stations with the best possible quality. I thought I should use it a whole lot. Actually I don't! I have found since then that, despite what E. H. R. says, you can get just as good quality on the locals from a set that will bring in a score or more of foreigners on the loud-speaker.

And I do want foreigners. There are such magnificent programmes on the air from Continental stations, that it seems a thousand pities not to be able to pick them up at will.

What of S.A.V.C.?

WHAT is E. H. R.'s objection to self-adjusting volume control? Even if he wants only the London-stations, I should have thought that in the place where he lives, some forty miles from Brookman's Park, he would find the London National fading quite a bit at times. S.A.V.C. can have no possible ill effect on the quality, but it does act like a charm in steadying down a wobbling transmission.

Only the night before these notes were written I was listening to a very fine programme with an S.A.V.C. set. The volume was perfectly steady and the transmission was a joy to listen to.

As an experiment, I switched over to a set without S.A.V.C. The difference was simply amazing. Rather quick fading was in progress, and signal strength was waxing and waning in such a way that you could not possibly listen to the programme with any pleasure.

And, by the way, if E. H. R. won't have S.A.V.C., why does he suggest a double-diode-triode as detector?



Pye photo

On a super-het coming over! By the rapt expression on the face of this fan a very favourite dance number has just been caught!

Good Servicing Here!

IN past weeks I have had occasion to refer to one or two instances of bad or unsatisfactory servicing of receiving sets under guarantees. Let me now turn to the other side of the medal and award a pat on the back where it is due.

The firm of Ekco have always made a point of giving especially good service to their customers. Recently I had a couple of complaints from customers who weren't quite satisfied. I sent them on and received by return a letter thanking me for bringing these matters to the notice of the company.

Within a week I had the news that both of my correspondents had had a special visit from a service engineer who had put their apparatus absolutely right without a penny being charged.

That's the stuff to give 'em!

A Battery Big 'Un

IN a day or two I shall have the Philco 8-valve all-wave battery set down for a trial run. I am much looking forward to using it, for it is the counterpart of the famous eleven-valve A.C. mains all-waver. As you know, I have always contended that the battery set could be a real good thing, and I hold that so long as you use good fat batteries it needn't be frightfully expensive to run, no matter if it does contain a big family of valves.

There are many joys about using an all-waver, not the least of which is the ease with which you can go over from waveband to waveband by merely touching a switch.

It is extraordinary how lazy we human beings are in some ways. But one thing that



H.M.V. photo

Is this prize cow listening to one of the B.B.C.'s talks to farmers? Or is she just licking off the tasty finish of the attractive-looking cabinet? It was an idyllic scene at Oxford, anyway!

goes entirely against the grain is the simple, though annoying, business of having to change coils of the plug-in variety when you want to change your waveband.

For short-wave reception there is nothing to touch the superhet with S.A.V.C.—You have got the punch, and fading—that bugbear of short-wave reception—ceases to be a nuisance.



Another schoolboy howler!

Big Wireless Factory

CONGRATULATIONS to the Cossor people on undertaking the building of their fifth and latest factory in London. When finished it will contain 60,000 square feet of floor space and work will be available for over a thousand hands.

I can't quite remember when I used my first Cossor valve, but it must be the best part of a dozen years ago. Do you remember the old "tin-hat" pattern? It was a bright emitter, which got its name from the fact that its plate was shaped rather like the steel millinery that was in vogue during the Great War.

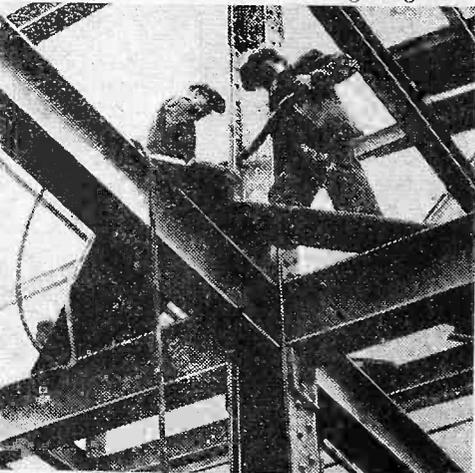
Then, shortly after the coming of the dull-emitter, Cossors were, I believe, the first people to use the principle of locked electrodes in the construction of their tubes.

We all owe a big debt to the firm of Cossor, for they have been pioneers in many ways. It was they, wasn't it, who gave us the first class-B valve?

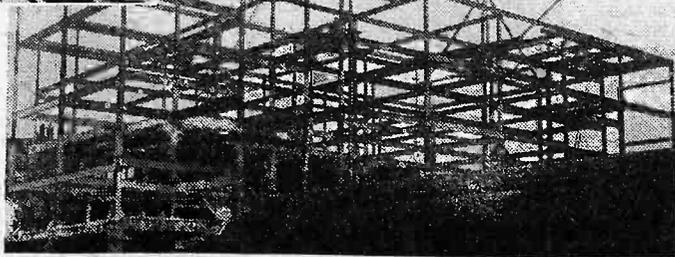
For some time they have been turning their attention to television problems, and I believe that they have got some good things up their sleeve.

Programmes Over the Mains

SOME time ago, if you remember, I mentioned that a new system for sending wireless programmes over the lighting mains



Radio marches on! Two striking views of the new Cossor factory now going up at Highbury. The height will be 75 ft. for the five storeys, for which 500 tons of British steel are needed. 60,000 sq. ft. of floor space will be available for over 1,000 workers.



had been invented. Recently a most interesting demonstration of the system was given in Liverpool.

Its great point is that not a single extra wire is needed. The receiver, or selector as it is called, plugs straight into the mains. Three alternative programmes are relayed simultaneously over the mains and all that you have to do is to pick your fancy as you turn a switch to position one, two, or three.

It's a good idea and it seems to work very well. But if I know anything of the wireless enthusiast, he won't want to be tied down to three programmes and to be left without any knobs to twiddle!

Radio's Big Problems

WHAT, in your view, are the biggest problems still to be tackled in wireless sets? You can most easily find the answers if you think about your own set for a moment and try to discover its shortcomings—provided, of course, that you will admit that it has any!

I'd say that the biggest of all problems at the moment is that of wave-change switching. The average switch has two bad faults. The first is that as you go over from medium to long waves or vice versa there is a sickening thud from the loud-speaker.

And the second? Ask any service man his views about wave-change switches and you will find that they are responsible for about 70 per cent. of the trouble that occurs in receiving sets.

Wave-change switching and the elimination of second channels in superhets are far and away the biggest problems that still await solution.

Now then, you inventors!

Fitting Extra Loud-speakers

WITH a large house and only one radio set, it is a good idea to wire up the more useful rooms by means of a single wire so that extra loud-speakers can be used when required. The wiring is very simple, and if a little care is taken the quality and volume from the parent set need not be impaired.

First, the output stage must be converted to choke feed. That means the high tension to the last valve only must be supplied through a low-frequency choke. Then connect one side of a 2-microfarad fixed condenser to the anode of the power valve. Obtain enough single wire to reach the first room, join one end of it to the remaining side of the fixed condenser, and the other end to one side of a 2-pin plug, which should be fixed to the wall of the first room.

If you only want one to use a single extra loud-speaker, just earth the blank side of the 2-pin plug as directly as you can. On the other hand, several other units can be wired up in the same way. Join the second or earth side of the first plug to one side of the second plug, wherever it may be, simply earthing the second side of the second plug. A switch of the make-and-break toggle type is then connected directly across the terminals of each loud-speaker to act as a cut-out.

At least half a dozen units can usually be wired up in this way and, as it is very unlikely that they will all be in use at the same time, no difference will be noticed at the receiving set end.

Radio Passports

ELECTRICAL AND MUSICAL INDUSTRIES—that great concern which includes His Master's Voice, Columbia, and Marconi-phonograph—are providing their service engineers with neat little identity cards, each containing a photograph of its owner.

This is a jolly good idea, for thefts of wireless apparatus by spoof service men are by no means infrequent.

A chappie calls at the door, announcing that he is from the XYZ company and that he has come to give absolutely free service to the receiving set. Sometimes it works. He is admitted and for a time tinkers with the set. Then he announces that he must take it away with him for an hour or two—and that's the last you see of that set.

The passport system puts an end to this kind of thing, and it is to be hoped that other makers will adopt it.

Musical Valves

THERE is a distinct touch of genius in the idea of "taming" a back-coupled valve and converting the usual output of squeaks and howls into orderly music, as Theremin did when he first played his "magic box" before an astonished public.

Since then quite a variety of electronic music-makers have been produced on more or less the same lines, though in some cases the ordinary valve has been replaced by one of the Thyatron type—which is equally sensitive to control, but is capable of delivering a greater volume of sound.

A recent development, based on a somewhat different principle, takes the form of a piano in which the ordinary sounding strings or wires are replaced by small metal strips, the largest of which is only a few inches long. The notes produced by striking the keys are practically inaudible until they are passed through low-frequency amplifiers, which magnify them up to any desired strength.

The beauty of the arrangement lies in the flexibility of the volume control. In fact, by using a pair of headphones, a student can practise the piano to his heart's content without being heard by anyone except himself.

Tip for D.C. Mains Users

ARE any of you having trouble with the valves "going phut" in D.C. mains sets? If so, here is a tip for you.

A neighbour of mine made a four-valve table-model D.C. super some months ago. In three months no fewer than four output valves gave up the ghost. He checked up all the applied voltages, anode currents, and so on, only to find everything correct.

He then went to the valve makers for help. The suggestion made by them was that the temperature was too great inside the cabinet, causing the valves to go soft.

The cabinet was certainly on the small side, as the set had been converted from a battery three to a mains four and, in addition, the voltage-dropping resistance gave off a lot of heat.

So the set was taken out of the cabinet, and I don't know whether the last valve was de-gassed at a higher temperature or whether the vacuum was better, but the fact remains that he has not had any further trouble with loss of quality through valves going soft.

I should be interested to hear from any readers who may have suffered in this way—and from anyone who has by chance tried out my suggestion as a remedy.

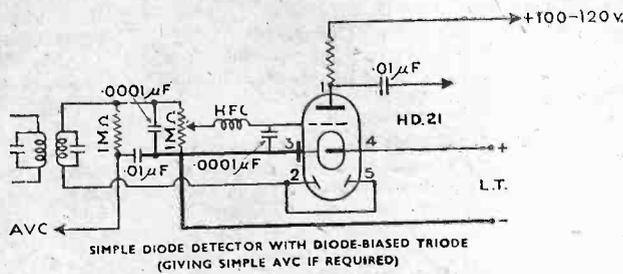
A New 3-in-1 Valve

NO longer need the much-neglected battery set user look with envious eyes at the introduction of new mains valves, for to-day the makers are bringing out many new types for battery filaments.

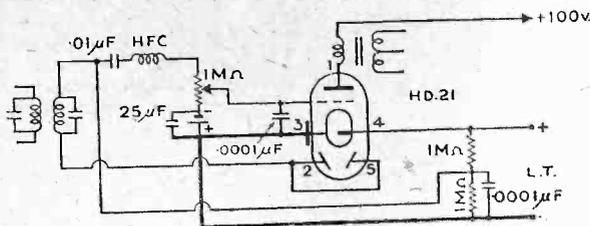
Take the new Osram HD21, for example. Here is a red-hot valve for the keen fan who is anxious to obtain distortionless detection, with or without the added boon of self-adjusting volume control—commonly known as "A.V.C."

Or, rather, we should say, take the HD21 in either the Osram or Marconi ranges—for both are represented, of course. The valve is made by the Marconi Osram Valve Co., Ltd., and marketed by the Marconiphone Co., Ltd., as a Marconi HD21 and by the General Electric Co., Ltd., as the Osram HD21.

It is a very interesting battery



SIMPLE DIODE DETECTOR WITH DIODE-BIASED TRIODE (GIVING SIMPLE AVC IF REQUIRED)



SIMPLE DIODE DETECTOR WITH BATTERY-BIASED TRIODE (DIODE BIASED TO V_r POSITIVE)

Fig. 1.—Two good circuits the makers recommend for the new HD21 battery double-diode-triode valve

Type HD21 is the latest addition to the Osram and Marconi battery valves. It is a double-diode-triode valve, with the diode and triode elements on two separate filament limbs. The valve is for diode detection followed by triode amplification, the second diode providing self-adjusting volume control if desired.



HD21 valve can be used as a simple diode detector with low-frequency amplification in sets using one or more efficient stages of high-frequency amplification. Or, of course, the valve is highly useful in super-hets, where its function as distortionless detector with provision for self-adjusting volume control is shown to the fullest possible advantage.

For delayed systems of self-adjusting volume control the two diodes have to be used separately, of course, and a small additional bias battery is needed for the second diode.

Transformer or Resistance Coupling

HD21 can be used with transformer coupling to load an output pentode valve, such as the PT2 or the QP21 class-B valve, or with resistance-capacity coupling can be used after the HD21 to connect it to the driver valve of a class-B output stage. For this latter the makers stress the need for good anode decoupling arrangements.

From the Fig. 2 diagram you will see that the connections to the HD21 are made by means of a standard 5-pin base. The actual connections are as follows:

Pin 1, anode; pin 2, diode nearest end of filament connected to pin 3; pin 3, filament and metallising where supplied; pin 4, filament and diode shield; pin 5, diode nearest end of filament connected to pin 4; top cap, triode control grid.

The present stock of HD21 is, naturally, limited, but by the time you read this supplies should be available to the amateur. The price is 9s.

From the makers' suggested circuits given with this article, you will be able to gather at a glance some of the applications of the new valve, which we consider is a notable addition to the extensive battery ranges of the Osram and Marconi groups.

It is a valve that at present has only a limited application among amateurs, but there is no doubt it ought to have an appreciable influence on set design in the future. There is no reason why the amateur should not experiment with the valve, especially in modern types of super-het, and from the circuits the keen fan ought to be able to make a start.

Doubtless in due course we shall produce a design embodying the double-diode-triode, which presents quite interesting possibilities in providing delayed automatic volume control in battery supers.

This type of valve does much to put the battery set on a par with mains sets—and we expect manufacturers will take advantage of it in future designs, too.

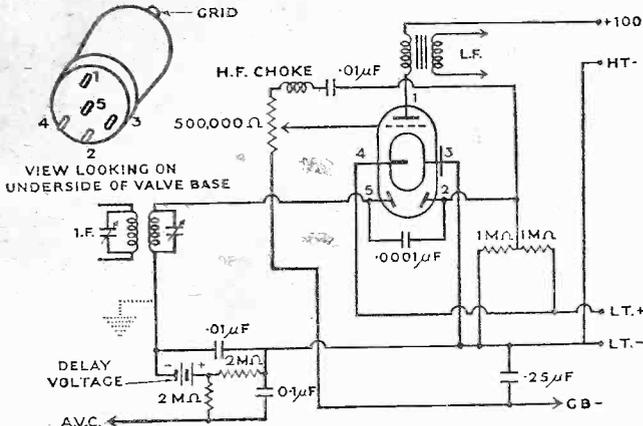


Fig. 2.—Here a small additional bias battery is needed for obtaining delayed self-adjusting volume control

valve, a combination or three-in-one valve—actually a double-diode-triode.

Perhaps the most startling point about the valve, quite apart from its several applications in modern super-hets, is the unique construction of the electrode system.

The valve is built up around two separate 2-volt, 1-ampere filaments, these being connected in parallel and worked from the usual 2-volt accumulator.

One filament "limb" forms the basis of the triode, a three-electrode valve of the HL class—more detailed figures in a moment. The other limb has the two diode anodes mounted around it, the whole of this limb being enclosed by a large earthed screen.

Peculiar Construction

You may, perhaps, wonder why all this peculiar construction is necessary. For a start—and perhaps this is one of the most important reasons—it enables the makers to use a standard HL2 construction for the triode portion, with all the ensuing advantages of a good amplification factor. Furthermore, it improves the efficiency of the diode sections. And then it provides a simple way of obtaining not merely self-adjusting volume

control, but delayed S.A.V.C. as well.

By this construction, also, the diodes can be very easily screened from the triode portion. This is very essential when we are dealing with modern S.A.V.C. systems.

We may remind you that the HL2 characteristics, as obtained from the triode portion of the new HD21 double-diode-triode, are as follows:

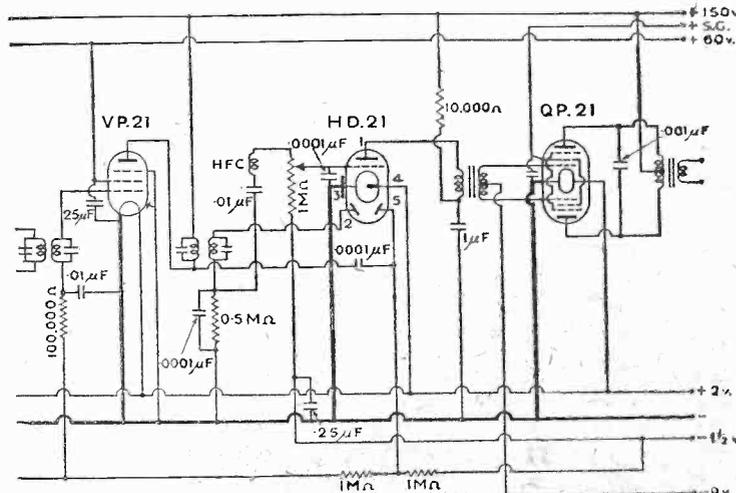
Amplification factor, 27.

Impedance, 18,000 ohms.

Mutual Conductance, 1.5 milliamperes per volt.

So much for the triode section, whose moderately high amplification factor simplifies the pre-detector circuit in which it might be used.

With all multiple valves using diodes, it is very important to ensure a low capacity between the diodes and the amplifying elements—in this case the triode section. The HD21 is safe on this score, owing to the adoption of the special metal shield for the diodes and separate filament. Moreover, the design of the grid support and its connections also ensures the lowest possible diode-grid capacity.



How the new HD21 double-diode-triode can be used with a QP21 class-B output stage in a three-valve combination

Your Short-wave Log

By J. GODCHAUX ABRAHAMS

WITH the advent of summer, alterations are being made in the schedules of some of the short-wave broadcasting stations, and, in addition, as is customary at this period of the year, alternative channels may be tested, with the result that in some instances a change in wavelength may have to be registered.

Listeners who, at odd times, may have captured transmissions from VK2ME, Sydney, may care to learn that Melbourne is testing out a new 20-kilowatt, namely, VK3MR, working on 31 metres (9,670 kilocycles). Although a regular time table has not yet been compiled, broadcasts have been heard between 1130 and 1200, B.S.T. on weekdays.

Recalling Costa Rica

Some of the older hands may recall T14NRH, of Heredia, Costa Rica. For some time no news of this station was forthcoming, and it was presumed—quite correctly, as it happens—that it had closed down. Its owner has moved to Granada, Nicaragua, and, under the call sign YNCRD, has resumed his transmissions on 7,170 kilocycles (41.84 metres), almost on the channel used by HJ4ABB, of Manizales (Colombia). The best time for a search on any day is between B.S.T. 2000 and 2100.

Another South American which has altered its time schedule is YV3BC, Caracas (Venezuela) well heard in the British Isles. It should be noted that the transmissions are now as follows: Daily from B.S.T. 1540-1810 and from 2140-0310; on Sundays from 1425-1510; from 1825-2040, and from 2340 until 0240 (Monday). The wavelength remains at 48.78 metres (6,150 kilocycles).

From inquiries received, and also from paragraphs published in the Press, I gather that some confusion seems to exist regarding the Moscow channel of 50 metres, and what is supposed to be an harmonic on 25 metres. The latter is no harmonic, but a definite wavelength on which special transmissions are given and which differ from the better-known 50-metre broadcast.

English Talks From Moscow

For your guidance, the English talks from Moscow are given at B.S.T. 2100 on Sundays, Mondays, Wednesdays and Fridays, on 50 metres, and on 25 metres from 1100-1200 and from 2000-2100. The 50-metre transmission is S.B. on 1,724 metres.

So far, the weekly Columbia broadcasts to the Byrd Antarctic Expedition have been carried out since November last on every Saturday night E.S.T. (Sunday morning B.S.T.). Beginning May 30, they are now made on Wednesdays and can be picked up through the WABC, New York, relays between 0300-0330 B.S.T. (Thursday).

For the month of June, slight changes have been made in the times of the Zeesen (Germany) short-wavers. DJB starts up at B.S.T. 0635 and carries on until 0830, followed by DJA from 1245-1700. DJD and DJC broadcast simultaneously to Africa between 1830-2200. At 2300 DJA is brought into action with programmes destined to South America and closes down at 0215.

For North American listeners DJB has a special transmission

from 1345-1700 followed by DJD from 2300-0015, DJC from 0045, to which is added DJD at 0245. These stations sign off at 0430.

LCL, Jeloy, during the past fortnight has been trying out various channels for the relay of the Oslo radio entertainments; it now appears to have settled down, at least temporarily, on 31.41 metres (9,550 kilocycles), just above DJA, Zeesen, and on most nights provides an excellent signal.

From letters received I gather there is some doubt in the minds of readers regarding the United States and Canadian short-wavers and the networks to which they belong. It is useful to make a list of these transmitters with a clear note in regard to the transmissions you may hear through them.

Bear in mind that there are the two important competing broadcasting associations in the U.S.A., the N.B.C. (National Broadcasting Company) and C.B.S. (Columbia Broadcasting System); the former possesses two main networks, namely, Red and Blue, of which

respectively WEAF, New York and WJZ, Boundbrook, are the principal or key stations.

In the case of the short-wavers, therefore, it will be seen that they relay programmes from their individual "mother" stations, comprised in one of these networks, and through them at different periods of the day broadcasts from the key studio.

If, in consequence, you wish to hear N.B.C. transmissions from New York (WEAF, Red Network), you have the option of tuning in W2XAD and W2XAF, relaying WGY, Schenectady; W1XAL working for WEEI, Boston, or W9XAA, which is fed through WCFL, Chicago.

From the Blue Network

If radio entertainments from the Blue Network are desired you have an even larger choice; W8XK, Saxonburg (KDKA); W3XL and W3XAL, Boundbrook (WJZ); W1XAZ, Millis, as relay of WBZ, Boston; W9XF, taking WENR, Chicago, and W8XAL (WLW, Cincinnati).

The short-wave relays of the Columbia Broadcasting System are not so numerous, but, on the other hand, they are very reliable and well received on this side of the Atlantic. Programmes from WABC, New York, may be picked up through W2XE, Wayne (New Jersey), and W3XAU is a good "catch" for entertainments from WCAU, Philadelphia.

With the Amateurs

By KENNETH JOWERS

IT is rather interesting when one is collating the reports received from different parts of the country to note how from time to time comparatively unknown stations come in for short periods and are then not heard of any more. Quite a number of these listeners have been hearing the Swiss station HB9AQ whose 40-metre phone transmissions have been very well received. This station usually comes over at R9 with quality like the local B.B.C. station.

Another station is EA1BB of Spain, and is on the 20-metre band every evening after dark at 2100 calling W phone stations.

Another station that requires reception reports is W1AJD, of Massachusetts, and the girl operator would welcome any reports from English or European listeners.

It seems as a general rule that the 20-metre

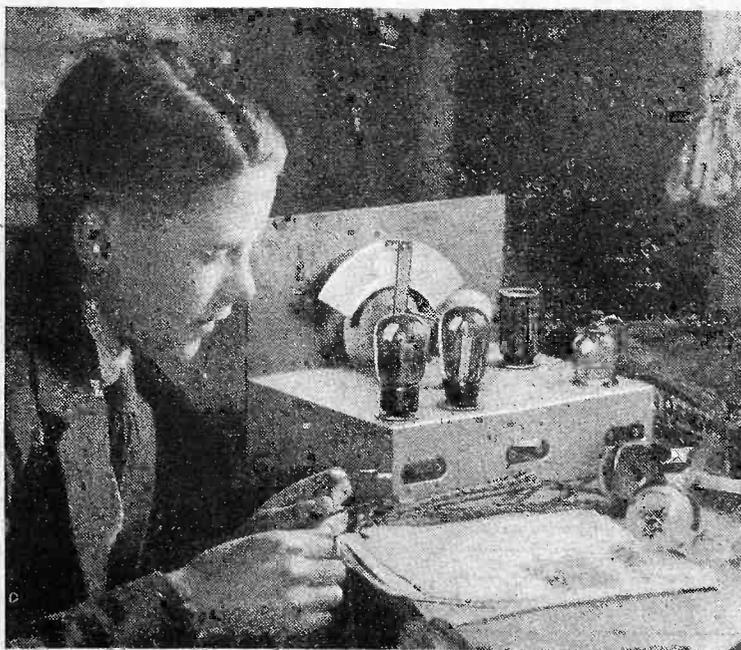
band is really well worth searching, for the following stations have been heard in almost every part of the country. W2KI, W2CMT, W8SSA, W9BGI, W9BHT, W3ZJ, W1BVL, W4GW, W8DKK, W3NK, W8CPC, W9RD, all of U.S.A. VE2CA and VE2BG of Canada, CM2WZ of Cuba, K4SA of Porto Rico, F8VP, F8PI and F8SY of France, ON4AU of Belgium and numberless Dutch stations.

I have always felt quite sure that this summer would show a big revival in 5-metre working. I have already received quite a number of schedules from London transmitters, but here is one from Cheshire. G6OM tells me that G6GL of West Kirby, G6DO of Birkenhead, and G6GM of Heswall, will be operating on a regular schedule on a wavelength of 5 metres. They will be using I.C.W. and telephony on Mondays, Wednesdays, and Fridays, from 2230 to 2330 and on Sunday from 1100 till 1230.

G6GL and G6OM are working duplex so that they should be quite easy to pick up, so that for those readers who are preparing for television, these transmissions should be a great help, for they will be able to tune up their sets and at the same time will be of assistance to these three amateurs in their experiments.

I had rather an amusing experience last evening. W2AOG had been trying to get in touch with me without any luck, so he gave a message to the English station G2AX, who passed it on to me by telephone. He took back the reply and gave W2GOG the information he wanted, so that the whole business was done in twenty-four hours, resulting in a considerable saving in time.

Eric Cooper, better known as BRS1327, sends me an interesting



Trying out the Eddystone Kilodyne Four, a most efficient short-waver supplied in kit form for constructors

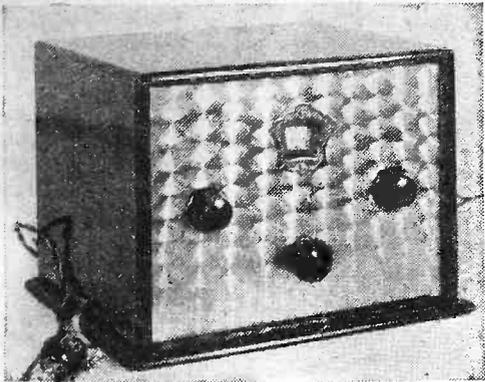
letter about his experiences on the short waves. He uses a Kolster-Brandes six-valve super-het with a short-wave adaptor with which he obtains very consistent results from all over the world.

One of his best stations is the American W3ZX of Collingwood, New Jersey.

Short Waves with a Converter

YET another item has been added to the Peto-Scott catalogue of short-wave apparatus—and a very welcome addition it is. The Peto-Scott Company, who have specialised in short waves for many years, have recently redesigned their short-wave converter so that it incorporates all of the latest ideas.

The new unit is intended primarily for use in receivers without a high-frequency stage. It is supplied with a plug-in socket so that all



The revised Peto-Scott short-wave converter; this can be used with any ordinary broadcast set to put you in touch with the short-waves

one has to do is to remove the detector valve, replace it by the socket, and to put the valve into the adaptor. This arrangement holds good whether the receiver is battery or A.C. mains operated.

There are only three controls in the unit—the left-hand knob for reaction; in the centre a master tuner; and on the right-hand side a series aerial condenser, the use of which will overcome any dead spots there might be.

This short-wave adaptor covers all wavelengths between 16 and 52 metres without coil changing, so all of the important broadcast stations such as Boundbrook, Pittsburg, Sydney, Zeesen, Cape Town, and Johannesburg can be covered.

Versatile Unit

This versatile unit can also be used as a super-het converter, when the broadcast set embodies one or more high-frequency stages. When used with such a receiver one has the equivalent of a five- or six-valve short-wave super-het, so that stations from all over the world can be tuned-in without any difficulty. At the price of 45s., it is a very valuable addition to a standard broadcast set.

Suitable Valves for the Short-wave World-beater

Make	Screen-grid High-frequency	Detector	Low-frequency	Power
Cossor ...	210SPT*	210Det*	210LF*	220PA*
Dario ...	—	TB172	TB172	TB122
Hivac ...	—	D210	L210	P220
Lissen ...	—	L2	L2	LP2
Marconi ...	VP21	L210	L21	LP2
Mazda ...	—	HL2	L2	P220
Mullard ...	SP2	PM2DX	PM1LF	PM2A
Osram ...	VP21	M210	L21	MP2
Triotron ...	—	SD2	SD2	F235
Tungsram ...	—	LD210	LD210	P215
302 ...	—	L2	L2	P2

*Valves used during AMATEUR WIRELESS tests.

More World-beating!

By NELLY CORRY (G2YL)

AFTER a two-days' trial of the AMATEUR WIRELESS Short-wave World-beater, I must say that for compactness, ease of operation, and general liveliness it has most short-wave sets I have come across beaten to a frazzle!

Conditions were bad for DX reception during the test period and U.S.A. broadcasters were much below their usual strength, while the "locals"—such as Daventry, Paris, Zeesen, and Rome—came roaring in at all hours of the day. In spite of this, signals were logged from all parts of the globe, including Pittsburg, Shanghai, Sydney, California, Canary Isles, Buenos Aires, and Tokio.

I found the signal-to-noise ratio was higher than one would have expected from a four-valver, and the background noise when in oscillation was quite reasonable. The ganged condenser, slow-motion drive, and large tuning scale are a great advance on the average short-wave receiver, and make tuning an easy matter.

The dial setting of any particular station, though dependent on the position of the series aerial condenser, is not affected by an alteration in aerial length, and I found that results on a 20-ft. wire indoors were not appreciably worse than on an efficient outdoor aerial.

In conclusion, it says much for this receiver that whereas in the usual way I confine my listening to the amateur bands, I spent several hours dial-twiddling and found that the more I handled the set the more I liked it. I certainly recommend the AMATEUR WIRELESS World-beater to anyone who wants to build a really efficient short-wave receiver.

DIAL READINGS WITH THE SHORT-WAVE WORLD-BEATER

Dial	Stations
Red-spot Coils	
*5-10	40-metre Amateur Band.
13	HAS2 Szekesfehervar. Hungary.
19	ORP Ruyssede. Belgium.
30	DDX Berlin-Tempelhof.
32	OXY Skamlebaek. Denmark. Broadcast stn. 49.5 m.
33	DJC Zeesen. Germany. Broadcast-stn. 49.83 m.
*124-130	80-metre amateur band.
Yellow-spot Coils	
32	I2RO Rome. Italy. Broadcast stn. 25.4 metres.
60	EAQ Aranjuez. Spain. 30 metres.
71	VK2ME Sydney. Australia. 31.28 metres.



Nelly Corry, a well-known amateur transmitter, operates her station G2YL

Dial	Stations
71 1/2	W2UAF Schenectady. U.S.A. 31.48 metres.
72	GSB Daventry. 31.55 metres
*132-139	40-metre Amateur Band.
Blue-spot Coils	
35	LQC Buenos Aires.
41	IRW Rome.
46	PCS Kootwijk. Holland.
59	GSG Daventry. 16.86 metres.
60	PHI Huizen. Holland. 16.88 metres.
61	XGM Shanghai. China.
77	WKQ New Brunswick. U.S.A.
83	RKB Moscow.
91	FYA Paris. Radio Coloniale. 19.68 metres.
92	W8XK Pittsburg. U.S.A. 19.72 metres.
92	DJB Zeesen. Germany. 19.73 metres.
100	JAC Tokio. Japan.
101	HBJ Berne. Switzerland.
103	PCT Kootwijk. Holland.
*105-109	20-metre Amateur Band.
115	EAK San Lorenzo. Canary Isles. 14,820 kilocycles.
130	OXR Skamlebaek. Denmark.
155	I2RO Rome. 25.4 metres.

* Approximate.
(Broadcasting stations appear in italic.)

From an Old Hand

To the Editor, AMATEUR WIRELESS.

YOU will be interested to know that I have built your Short-wave World-beater, and have every reason to congratulate you on publishing such a fine circuit. I have been a keen amateur for the past twelve to fourteen years, and have made a few sets in my time, but I can honestly say I have not come up against one to equal your set.

On all wavebands—10, 20, 40, 80, and 160—the set behaved splendidly; reaction was the notable feature, being so smooth. Another asset is the absence of background noises one usually gets on the higher frequency. I fully intend to advise this receiver to all the old R.S.G.B. friends.

A little alteration I have made in the original

plan is to include a .0005 microfarad J.B. pre-set as a trimmer on one of the sides of the tuning condenser; this is a great help as the coils may not be matched.

If you care to publish this report, please do so coupled with my advice that any person who is interested in the short waves will do themselves a good turn by building the Short-wave World-beater.

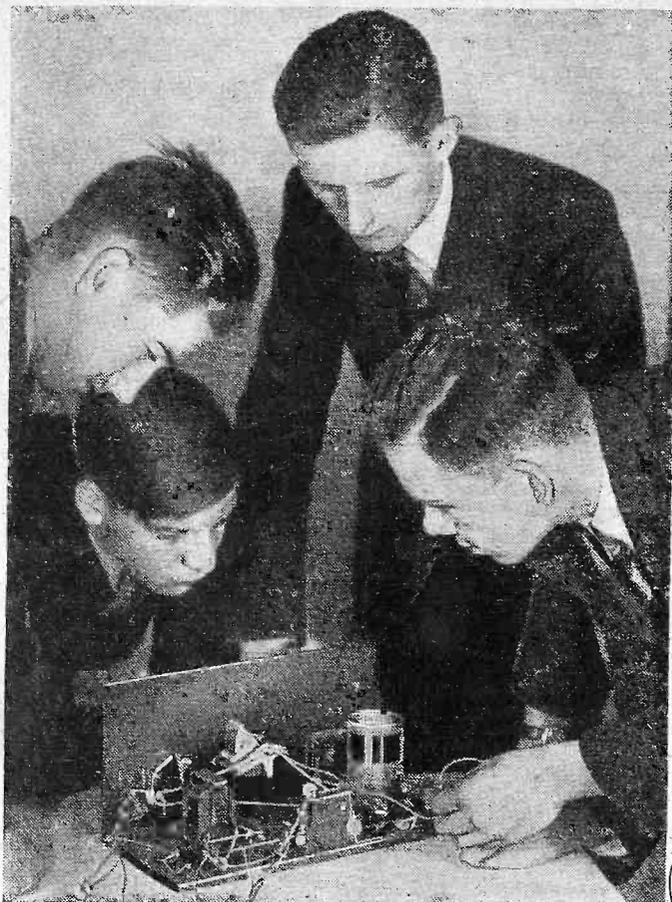
Wishing AMATEUR WIRELESS continued success.

W. T. COOPER.
(Radio BRS29).

P.S.—Anyone who lives near my address who would like to hear the above receiver is welcome if they care to make me a call.
Walthamstow, E.17.

READICHEX for Wir

Our New Scheme for Simplifying C



Enthusiastic constructors inspecting a Lucerne Straight Three with Readichex incorporated in the wiring. Full constructional details of this set were published last week

EVER since the publication of the first issue on June 10, 1922, the aim of AMATEUR WIRELESS has been to impart to readers constructional information and knowledge in an easily understandable way.

To quote but one instance of this, I would refer readers to our Blueprint Service. Those of you who, in the past, have made use of our blueprints will readily admit that nothing could be simpler to follow and to ensure accuracy when constructing a receiver.

In spite of this, however, we have always been on the lookout for any new departures or improvements which would effect any simplification of the initial constructional work for the amateur.

Some years ago we adopted the scheme of numbering each connecting wire on our blueprints. Thus, by wiring up according to the sequence of numbering, constructors could not very well make a mistake.

Total Number of Connections

More recently we have made a special point of noting in a conspicuous position on each blueprint the number of the last wire to be put on to complete the receiver. Now we come to our latest development.

It consists of using a series of small ivory discs stamped with numbers to correspond with those marked upon our blueprints, each having a hole to facilitate attaching the discs to the leads which are wired into the receiver.

In order to give these discs an appropriate

and distinctive name we have coined the word Readichex—ready checks.

The advantages to be gained by the use of these Readichex discs may not be altogether apparent at first. But if I explain how I propose they should be used, the reader may develop his own system from what he gathers by reading the following notes:

Assuming that the constructor has all his component parts fitted to his baseboard and panel (or

chassis) and is ready to start wiring up, he first arranges his blueprint by the side of his receiver-to-be, and then begins a search for connecting wire No. 1. Having accomplished this and wired up connection No. 1, he turns his attention to connection No. 2, and so on.

A Little Disconcerting

A little disconcerting, is it not? Alternating between a search on the blueprint for a wire number and then turning your attention to the blueprint and a little practical interluda.

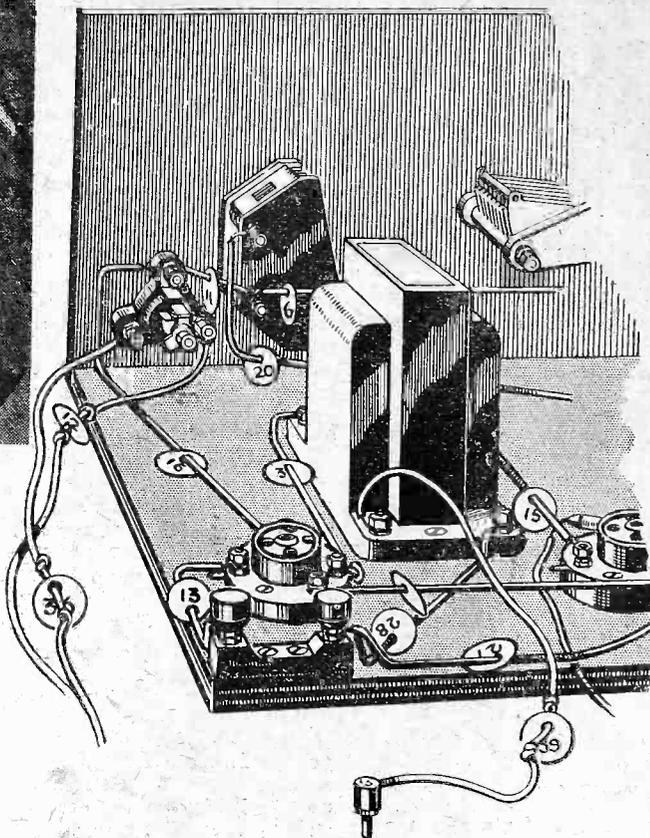
If the search could be carried out before starting the wiring, and the various numbered connections be marked with an additional and perhaps larger indicating number, how much easier would the task of wiring become! Many constructors would be able to memorise the positions of a large proportion of the numbered connections and so save time in the actual wiring up.

This is possible with a set of Readichex. Furthermore, if the constructor will take the numbered disc off the blueprint and slip it on the appropriate wire as it is fitted into the receiver, he will know that when all of the Readichex have been used up the receiver is completely wired.

Not only do these numbered discs save time when wiring up a receiver, they save trouble when one is interrupted during the course of construction.

Any interruption, whether of a few moments' duration or not, is sufficient to take one's mind off the task in hand and usually calls for a search to discover where the work was ended before the interruption came.

Here is where Readichex come into play. One may generally recall the last wire that was put into the receiver and, when the number of this



An artist's impression of Readichex used for wiring the Lucerne Straight Three described fully last week

COMPONENTS NEEDED FOR THE LUCERNE ST

BASEBOARD

- 1—Peto Scott, 14 in. by 7 in.

COIL

- 1—Lucerne type Grid, with reaction, as described in "A.W." dated January 27.

CONDENSERS, FIXED

- 3—T.M.C. Hydra, type tubular, values: .0003- (2), .01-microfarad (or Telsen, T.C.C.).
- 1—Telsen, type 500-volt test, value: 1-microfarad (or T.M.C., Hydra, Dubilier).

CONDENSERS, VARIABLE

- 1—British Radiogram .0005-microfarad, air dielectric, with slow-motion drive.
- 1—Telsen .0005-microfarad, type W193.
- 1—Telsen .0003-microfarad, type W354.

HOLDERS, VALVE

- 3—Telsen four-pin, type W224.

RESISTANCES, FIXED

- 4—Siemens Schukert, type SS $\frac{1}{2}$ -watt, values: 25,000-, 50,000-ohm, 1-, 2-megohm.

SUITABLE VALVES

Make	Detector (Metallised)	Low-frequency (Metallised)	Power
Cossor	210HL*	210Det.*	220P*
Dario	TB282	PB172	TB052
Hivac	H210	D210	PP220
Lissen	HL2	L2	LP2
Marconi	HL2	L210	LP2
Mazda	HL210	L2	P220
Mullard	PM1HL	PM2DX	PM2
Osram	HL2	L210	LP2
Triotron	HD2	SD2	E235
Tungstam	HR210	LD210	P215
362	HL2	L2	P2

* Valves used during "A.W." tests.

Wiring Your Set!

Instruction By L. A. CHAPMAN

been noted, its successor can readily be had by reference to the discs still remaining in the Readichex.

Readichex possess yet another big advantage and one that will be appreciated more by the methodical constructor than by the experienced and more impetuous set-builder. It embraces the preservation of the information gained in our blueprints.

As can be expected, blueprints become outdated, punctured, and torn during the construction and assembly of a receiver. It is often, in fact, they are of little or no use after the receiver has been completely wired and finally tested.

For Future Reference

As they have been splashed with acid from an accumulator they may be fit only for the scrap-heap. And yet their import may be preserved for future reference if the following procedure is adopted.

When the receiver has been completely assembled, it is usual, according to our continually repeated advice, to check up the wiring before putting the set on an actual reception.

This final checking can be put to double use in the following way: Obtain some double sheets of ruled foolscap paper and mark it out as shown by the accompanying diagram. Fill in the name of the set at the top of the paper and, beneath it, the name and date of publication and blue-print number.

Now rule a column, one inch wide, on the left-hand side of the paper and fill up this column with numbers corresponding with those covering the wiring-up numbers of the blueprint. Opposite each number is a fairly large space in which details of the actual connections for any particular wire may be written. This is the idea?

Your Own Version

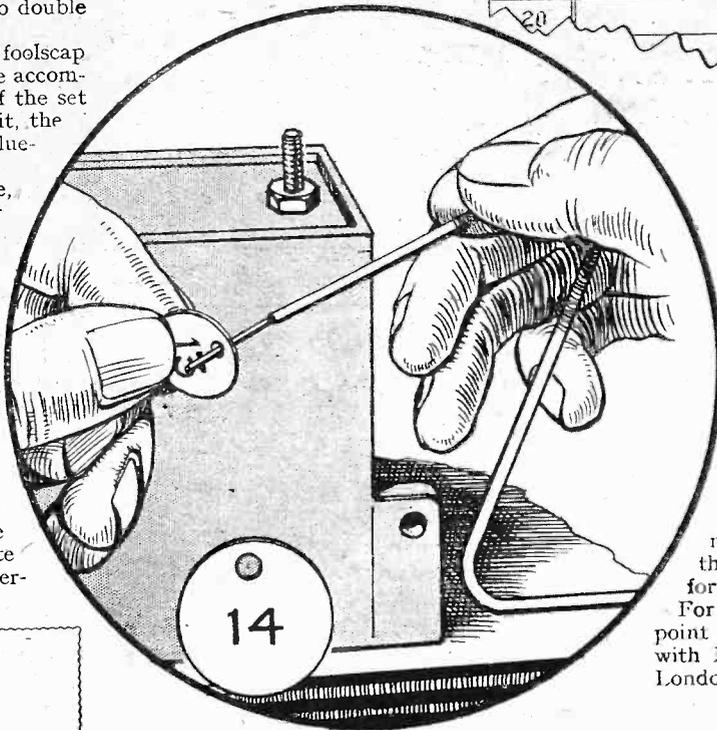
Now you will now check up your wiring according to the blueprint, and also according to your actual receiver, you will be able to write in your own version of what constitute the connections for your future reference.

If you will continue to do this for every wire connection number marked on the blueprint and duplicated in your set you will have compiled a wiring reference fully appreciated and understood by yourself—and you will also have concluded a double check of the wiring of your receiver.

Now, in the event of a wire becoming loose or disconnected at a later stage of the set's life, you have only to refer to your wiring compendium, and the Readichex still dangling from the particular wire, to determine the necessary correct connections.

I would advise that these foolscap sheets be "stitched" at the bend into a suitable binding cover or even clipped into a spring-back to facilitate their being preserved for future reference. Needless to say, the blueprint itself may likewise be preserved, if still worthy of

Set <i>Lucerne Straight Three</i>		
Published <i>AW June 9, 1934</i> Blueprint No. <i>AW 437</i>		
Wire No.	From	To
1	<i>Aerial terminal</i>	<i>to M.P. of Aerial Series Condens.</i>
2	<i>F.P. of latter</i>	<i>to terminal A of Coil.</i>
3	<i>S on coil</i>	<i>to Hart-range switch</i>
4	<i>Other side of latter</i>	<i>to terminal E of coil</i>
5	<i>Terminal E on coil</i>	<i>to M.P. of A.T.C.</i>
6	<i>M.P. of A.T.C.</i>	<i>to M.P. of Reaction Condens.</i>
7	<i>M.P. of R.C.</i>	<i>to 1st terminal of 3-Point Switch</i>
8	<i>From latter</i>	<i>to key of Power Valve.</i>
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		



How the constructor can draw up for himself a point-to-point wiring list for any set he builds up—very useful for future reference

How the Readichex tags are slipped on the connecting leads as they are fixed in position in the set

it, but there is no necessity for this when a list of the point-to-point connections has been compiled and the receiver has passed its initial tests.

As an example of what a wiring compendium may be when compiled I have filled in the connections for the first few wiring numbers of the Lucerne Straight Three. A reference to the half-scale layout and wiring guide as published in AMATEUR WIRELESS for June 9, will indicate that wire No. 1 joins the aerial terminal to the moving plates of the aerial series condenser. Therefore, the designation

in the compendium of "Aerial terminal to M.P. (moving plates) of aerial series condenser" is adequate. Continuing to wire No. 2, it will be seen that this connects the fixed plates of the aerial series condenser to terminal A on the aerial coil. Right, "F.P. of latter to terminal A on coil" is likewise sufficient to identify the connections for this particular wire. And so you go on.

Mistake-proof Method

Nothing at all difficult about it, you will agree, and yet a completely mistake-proof method of preserving the wiring connections of your receiver for future reference.

For the benefit of readers, I would like to point out that arrangements have been made with Money Hicks, Ltd., of Hackford Road, London, S.W.9, for the supply of these Readichex in sets of 50 for 1s. 6d., sets of 75 for 2s., and sets of 100 for 2s. 6d.

A series of battery-indicating tabs, in ivory, which slip on the flexible wires from the receiver to the battery, is also available from the firm in question. In addition to their usual battery markings these tabs have a white matt centre upon which may be written the exact voltage required for the particular wire to which they are attached.

Constructors may prefer these tabs to Readichex for external battery connections.

Finally, your views, comments, or suggestions for any improvements or variations in the use of these Readichex will be welcomed, for we realise that one man's difficulties can be another man's paradise.

HT THREE

COMPONENTS
 Panel for panel, 14 in. by 7 in.
 Connecting wire and sleeving.
 Thin flex.
 Felsen terminal blocks.
 Set of Readichex tags

ACCESSORIES
 Felsen two-point shorting, type W107.
 Felsen three-point shorting, type W108.

TRANSFORMER, LOW-FREQUENCY
 As described in "A.W." dated February 10.

BATTERIES
 Drydex 120-volt high-tension (or Lissen, Fuller).
 Drydex 9-volt grid-bias (or Lissen, Fuller).
 Oxide 2-volt accumulator (or Lissen, Block).

DIAPHRAGM-SPEAKER
 Ormond, type Junior.

TELEVISION and the CINEMA

How Large Pictures Can Be Obtained

By H. CORBISHLEY

ALL ordinary systems of television at the present time impose certain limitations on the size of the picture, and the consequence is that it is unsuitable for viewing by a large audience.

For example, with the simple disc apparatus

elapsed between the taking of the film and the projection and even if it was most desirable to speed the process up the time entailed would be a matter of hours.

This, it is contended by some, is not of consequence for it is argued that a transmission

of an event taking place during the day could be projected in the evening much in the same way that records are made of current events and broadcast at a later time.

It must be conceded, however, that this is not true television; even if the time interval can be reduced to a matter of a few seconds it is not, strictly speaking, television. In the first apparatus of this type ordinary film was used, but it was found that for a programme of any considerable length of time the process was costly, so a system was developed which used the film at both transmitter and receiver over and over again.

How this is accomplished is shown by the diagrams and it will be seen that at the transmitting end, after the film has been scanned the sensitive coating is removed when it is dried, re-emulsioned, again dried and then passed through the camera and developed and fixed, when the process is repeated.

Receiving Arrangements

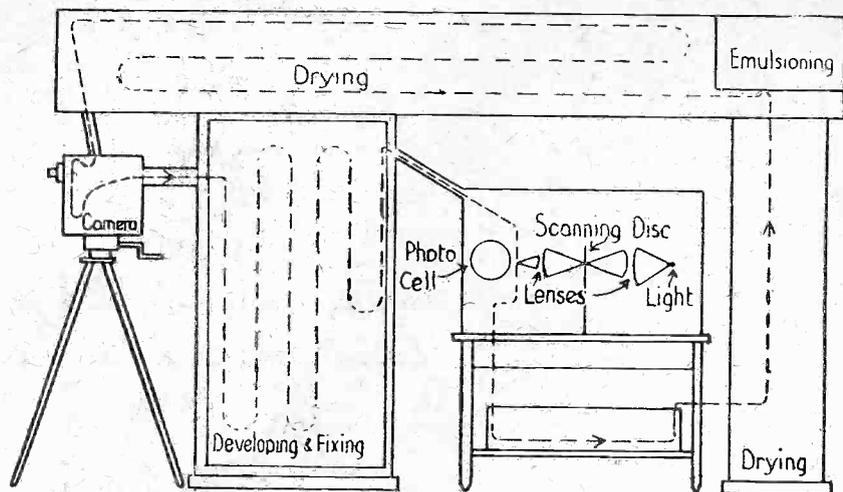
A similar series of events takes place in the receiver, but here, instead of the film passing through the camera, it is passed in front of the scanning apparatus where the transmitted image is impressed upon it and, after developing and fixing, it is passed through the projector in the ordinary way.

Removal of the emulsion and re-emulsion is then carried out and the film is again ready to be passed in front of the scanner.

It will be clear that apparatus of this kind opens up possibilities for large-scale television; though the actual apparatus is costly, the system, by reason of the fact that the film is used over and over again, is not particularly expensive so far as maintenance is concerned.

Most of the technical difficulties have been overcome and it would appear to be the only practicable method of large screen projection which is likely to be available for some time to come in view of the present possibilities of television.

Obviously, it is apparatus of a type which is



A schematic diagram of an intermediate film transmitter. The path of the film is indicated by the dotted lines

It is difficult for more than four people to see the picture at the same time; the mirror drum will permit of an audience of about ten to fifteen, and even at the latest Baird demonstration, at which a picture was shown measuring approximately 16 in. square, it was evident that for an audience to see the pictures in comfort it would necessarily be limited to a matter of a hundred or so persons.

The whole problem is wrapped up in the difficulty of modulating a sufficient value of light or, alternatively, producing a modulated light of sufficient intensity to cover a large screen and at the present time no solution of these difficulties has been found.

There is, however, another angle from which the problem can be tackled, though this brings it outside of the sphere of pure television.

It is obvious that if we have a small picture it will be quite possible to transfer this to a film and then project this upon a screen in the ordinary way, and the size of the projected picture need only be governed by the amount of detail that is present; excessive enlargement would, of course, reveal that detail was missing unless the audience were a considerable distance away when the object of enlargement would be defeated.

The Intermediate Film System

A good example of this procedure was shown at a recent demonstration of the Cossor velocity-modulation system. Ordinarily, the reception is upon the screen of a cathode-ray tube which is about 7 in. in diameter and obviously a picture of this size would be useless for showing to an audience of four or five hundred persons. In order to overcome the difficulty a film was made of the picture as received on the cathode-ray tube and this was projected in the ordinary way so that the picture on the screen was a replica of that received.

In this case it is probable that several days

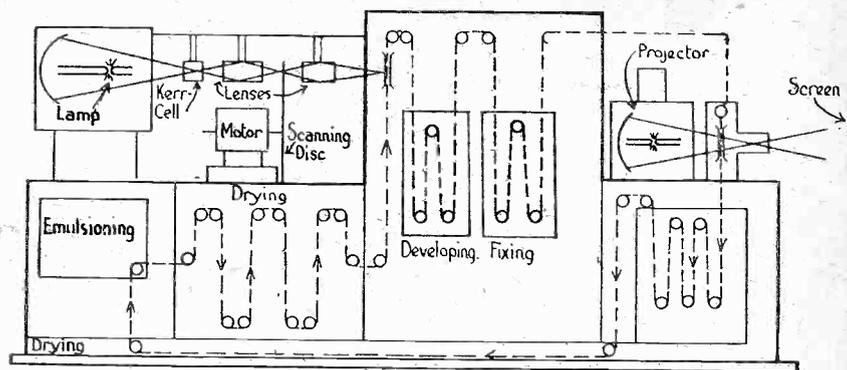
elapsing between the taking of the film and the projection and even if it was most desirable to speed the process up the time entailed would be a matter of hours.

The system is as follows: in the first instance

a film of the scene to be transmitted is taken and the developing and fixing of this film takes place immediately by passing it direct into special tanks. From these it passes in front of the scanning device and the picture is transmitted in the ordinary way.

At the receiving end the modulated light is used to produce another film which again is immediately developed and fixed and then projected and, as stated before, the time interval between the taking of the original film and final projection is a matter of seconds.

HOW THE TELEVISION TRANSMISSIONS ARE MADE IS FULLY EXPLAINED BY EUSTACE ROBB, B.B.C. Television Production Director, IN THE JUNE ISSUE OF "TELEVISION" monthly, 1/-



An endless film is used at the receiver also, the picture being impressed upon it as it passes in front of the scanner

quite outside the sphere of home reception, but it seems evident that television must develop along two separate lines—one for the home and the other for large audiences, and this system provides a practical solution of the first.

Television Society for Cheshire

A TELEVISION society has been formed for Cheshire and south-west Lancashire.

If suitable arrangements can be made it is proposed to put out a 30-line transmission.

Readers who are interested should write to the Secretary, c/o Jensen & Base, 223 Seaview Road, Wallasey, Cheshire.

Short-wave Commercial Stations

Here are some additional Commercial Stations working on the short waves; most of them can be received without difficulty

Metre	Frequency	Call	Station	Observations
9.82	30,604	IAG	Golfo Aranci (Sardinia).	Works with Fiumincino (Italy).
10.062	29,817	IAF	Fiumincino (Italy).	
14.18	21,150	HAS4	Szekesfehervar (Hungary).	
14.97	20,040	OPL	Leopoldville (Congo)...	Works with Brussels.
15.19	19,750	ORA	Ruyssedele (Belgium)	Works with Congo.
15.44	19,430	ORH	Elizabethville (Congo).	Works with Belgium.
15.5	19,355	PMA	Bandoeng (Java).	
15.88	18,800	ZSS	Klipheuvel (South Africa)	Works with London.
17.16	17,480	VWY	Poona (India)...	Works with Great Britain.
17.38	17,261	DAF	Norddeich (Germany)	Works with ships.
17.56	17,080	GBC	Rugby (Great Britain)	Works with ships.
21.44	—	GBA	Rugby (Great Britain).	
21.71	13,811	SUZ	Abu Zabal (Egypt)	Works with London.
21.92	13,685	HAS2	Szekesfehervar (Hungary).	
23.45	12,795	IAC	Coltano (Italy)	Works with ships.
23.47	12,780	GBC	Rugby (Great Britain)	Works with ships.
23.54	12,745	DAF	Norddeich (Germany)	Works with ships.
24.34	12,325	DAF	Norddeich (Germany)	Works with ships.
24.75	12,120	—	Algiers (North Africa)	Works with Ste. Assise.
25.19	11,910	SUW	Abu Zabal (Egypt)	Works with Europe.
28.28	10,610	WEA	Rocky Point (N.Y.)	Relays to Europe.
29.13	10,330	LSL2	Monte Grande (Buenos Aires).	
29.16	10,290	DIQ	Königswusterhausen (Germany)	Tests with U.S.A., relays programmes.
29.84	10,055	SUV	Abu Zabal (Egypt)	Works with London and Berlin.
30.33	9,890	LSN2	Monte Grande (Buenos Aires)	Works with U.S.A. and Europe.
30.4	9,870	WON	Lawrenceville (N.J.)...	Works with Great Britain, also relays U.S.A. programmes.
30.93	9,700	LQA	Monte Grande (Buenos Aires)	Works with Berlin.
31.08	9,650	DGU	Nauen (Germany)	Works with Abu Zabal.
32.15	9,330	CGA4	Drummondville (Canada)	Works with Great Britain.
33.708	8,900	ZSB	Klipheuvel (South Africa)	Works with Bridgewater (Great Britain).
34.56	8,680	—	Rugby (Great Britain)	Works with ships.
35.23	8,515	IAC	Coltano (Italy)	Works with ships.
35.42	8,470	DAF	Norddeich (Germany)	Works with ships.
35.8	8,380	IAC	Coltano (Italy)	Works with ships.
44.05	6,810	JNL	Nagoya (Japan)	Works with Berlin.
44.41	6,755	WOA	Lawrenceville (N.J.)	Works with Great Britain.
45.11	6,650	IAC	Coltano (Italy)	Works with liners.
57.03	5,260	WQN	Rocky Point (N.Y.)	Relays N.B.C. programmes occasionally.
60.3	4,975	GBC	Rugby (Great Britain)	Works with liners.
68.18	4,400	DAF	Norddeich (Germany)	Works with ships.
68.88	4,355	IAC	Coltano (Italy)	Works with ships.
69.44	4,320	GDB	Rugby (Great Britain)	Tests.



A chap by the name of Hewitt
Got better results - & he knew it.



But he confessed, "Well I'm
blessed, being able to test



Means cash for the way
you can do it!"



£1 A WEEK for a YEAR
10/- a Week for a Year
£10 CASH and 25 other Prizes

If you can enjoy cash as well as good radio, here is your chance to win the first by the ease with which you can get the second. Ask your radio dealer for particulars of the Free AvoMinor Competition. Just your normal interest in set performance can bring you a valuable prize enjoyably won.

All radio dealers have free entry forms and full particulars, but if you have any difficulty, write direct.

THE AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO., LTD., Winder House, Douglas Street, London, S.W.1

What Do You See in Radio?

"JUST what is contained in a radio set?" is a question that few listeners ever trouble to ask themselves. But the answer is given in a letter published in *The Cassow Courier*, and here it is:—

"I see Entertainment, Enjoyment, Comfort, Joy, Instruction, and Profit. I wonder if it is possible to work out the cash value of one day's work from an average radio set? One wakes up in the morning to the strains of music arranged expressly to assist us in doing our daily dozen.

Cheaper than a Doctor!

"It's impossible to compute the cash value of that; one never knows till the doctor has to be called in, and a wireless set is much cheaper than a doctor.

"A little later comes the morning service. This is not a subject to be treated flippantly, so I will say with due reverence and earnestness that the value of this half-hour to many thousands of listeners is beyond rubies.

"Next comes, say, a cooking talk to the ladies, and who can say what benefits have

accrued from that or what cash values to place upon it?

"Then there is a music lesson or languages, or an instructional talk on gardening, any or each of which would cost a considerable amount of money to procure in any other way.

"There are the purely entertaining items, such as concerts, plays, dance bands, and vaudevilles, most of which would cost anything from 1s. to 5s. if one wished to enjoy them in any other way than 'on the air.'

"Can anyone possibly say what is the cash value of the S.O.S. messages to the persons concerned?

"These, then, are only a few of the things that I see in a modern wireless set, and I say quite definitely that one could not purchase one-tenth of these privileges for 5s. per day, and yet they are all at one's beck and call and controlled by the switch of a wireless set.

"Now, here's the point. *Five shillings per day is over £90 per year*, and a wireless set costing under £20 and giving value at the rate of £90 per year is the world's best investment."

International Abbreviations

Every keen short-wave amateur should acquaint himself with what is known as the "Q" code. These abbreviations are often used by amateur transmitters, especially when signalling is done by the morse code.

Abbreviations	Meaning
QRA	What is the name of your station?
QRB	At what approximate distance are you from my station?
QRG	Will you indicate to me my exact frequency in kilocycles?
QRH	What is your exact frequency?
QRI	Is my tone bad?
QRJ	Are you receiving me badly?
QRK	Are my signals weak?
QRL	Are you receiving me well?
QRM	Are my signals good?
QRN	Are you busy?
QRO	Are you being interfered with?
QRP	Are you troubled by atmospherics?
QRQ	Must I increase power?
QRR	Must I decrease power?
QRS	Must I advise . . . that you are calling him?
QSA	What is the strength of my signals?
QSB	Does the strength of my signals vary?
QSC	Do my signals disappear entirely at intervals?
QSE	Are my signals distinct?
QSL	Can you give me acknowledgment of receipt?
QSM	Have you received any acknowledgment of receipt?
QSN	Can you receive me now?
QSO	Must I continue to listen?
QTR	Can you communicate with . . . directly (or through . . .)?
QTT	What is the exact time?
QTU	What are the hours during which your station is open?

Audibility Code

In defining the strength of a received signal it is very useful to be able to refer to a recognised standard—which the "R" code undoubtedly provides. This takes you from the faintest signals right up to signals of full loud-speaker strength.

R1	Faint signals; just readable.
R2	Weak signals; barely readable.
R3	Weak signals; but can be copied.
R4	Fair signals; easily readable.
R5	Moderately strong signals.
R6	Good signals.
R7	Good strong signals, that come through QRM and QRN.
R8	Very strong signals; heard several feet from the phones.
R9	Extremely strong signals.

Three New Circuits—

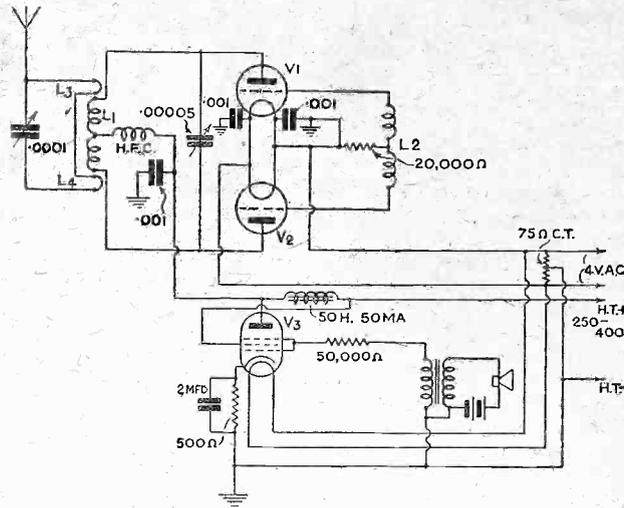


Fig. 3. Speech transmitter for 5-metre working

EVER since L. O'Heffernan (G5BY) raised the 5-metre transmission record to over 200 miles from the top of Snowdon to a point near Hoddesdon in Hertfordshire, there has been increasing interest in 5-metre transmission and reception.

Even though the average range of these very short waves is only 15 to 20 miles, the extreme simplicity of the apparatus required for either transmitting or receiving more than overcomes the snag of limited range.

It must be remembered that wavelengths of under 10 metres do not behave in the same way as the normal short or long waves, in as much as they are quasi-optical or similar to light beams. This means that unless you can actually see the transmitting station there is very little possibility of the transmission being picked up.

Contact at 300 Miles

When we say "see" perhaps it is rather misleading, for should the transmitting station be 200 or 300 miles away from a receiving station, provided there are not any hills or towns in between, there is every possibility of contact between the two being made.

As an example of this, a regular commercial telephone service is in operation in America between two isolated towns some 250 miles apart. As both towns are some hundreds of feet above sea level, the intervening towns and hills do not affect reception in any way.

In this country, at the present time, there is a considerable number of amateur transmitters who have a regular schedule, so that there will be no shortage of transmissions on which a 5-metre receiver can be tested. In addition, the television transmissions from the Crystal Palace offer a special opportunity

for ultra short-wave enthusiasts to find out for themselves whether or not they are in the service area of the television programmes which are being sent out daily.

We have had reports from readers as far south as Brighton who can pick up these television transmissions on simple two- and three-valve sets. Of course, a super-regenerative receiver is not suitable for receiving good television pictures as the quality is not of a sufficiently high standard, but the construction and use of such a receiver will give the operator plenty of opportunity to investigate the little idiosyncracies of these ultra-short waves.

When the time comes for the B.B.C. and other bodies to broadcast ultra-short wave television, those who have had previous experience will be in an advantageous position.

Although there are three types of receivers that can be used only one type is really worth considering. The super-het, although it is without question the most efficient ultra-short wave receiver, is not to be advised at this stage, as the transmitting stations are not too stable.

The simple oscillating detector, although it does work in a way, gives a very low percentage of amplification so that it is not worth considering. This leaves us with a super-regenerative circuit and, of course, variations on this arrangement.

Simple to Operate

This type of circuit gives enormous amplification, and is quite simple to operate. The arrangement is not very well known, and until the introduction of ultra-short waves was not as popular as the super-het.

It consists of a conventional detector circuit which has been adjusted so that it is nearly oscillating. If we apply a small voltage to the grid of the valve—such as would be obtained from a weak station—the circuit would go into complete oscillation because of the sudden voltage surge.

What actually happens is that the anode current of the nearly-oscillating detector valve changes very considerably as compared with the small change in voltage applied to the grid. In other words the arrangement is a sensitive type of trigger relay.

Such a circuit would not be capable of reproducing signals, for once the receiver began oscillating it would remain in this state when the original voltage was removed from the grid, because the effective resistance of the circuit is negative. To overcome this defect (so that the resistance could be varied) a special quenching arrangement was designed.

HARKEN SHORT-WAVE CONVERTERS

are made by experts for the discriminating amateur

Special Features:

High-efficiency coils.	dust-core tuned I.F. transformer output to match up to any receiver.
Heptode valves.	
Litz wound, iron-	

Convert your receiver into an All-wave Superhet, at the lowest possible cost.
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As the quenching circuit causes an audible whistle, the frequency of the quenching coils must be raised to an almost inaudible frequency. The greater the difference between the frequency of the quenching coils and the frequency of the station which is received, the greater will be the amplification.

Fig. 1 shows the necessary connections for a single-valve combined detector and quencher. It is fundamentally a conventional detector, with a grid coil L1 and a reaction coil L2, plus the quenching coils L3 and L4; L1 and L2 consist of three turns of 12-gauge wire, 1/2 in. in diameter with a space of 1 in. between each turn.

These coils can be wound on a fountain pen or a similar type of former. Owing to the thick gauge of the wire they will keep completely rigid without any means of fixing. Quencher coils L3 and L4 consist of 500 turns each of No. 38 gauge enamelled covered wire, slab wound on a 1-in. diameter former.

As the construction of these coils is likely to try the patience of some of our readers, we may say they can be bought from Strattons for 4s. 6d.

The high-frequency choke is worth home constructing, as it only consists of 75 turns of No. 36 enamelled wire, wound solenoid fashion on a 1/2-in. former.

Except that the voltage applied is rather critical, the circuit functions in a very satisfactory manner. The range is not outstanding, but stations twenty-five miles away can be picked up without trouble.

The valve used is also very important. It must be of low impedance, round about 2,000 to 3,000 ohms. We found the most suitable valve for the purpose was the Tungstram LP220, which has an impedance of 2,600 ohms.

A more ambitious circuit (shown in Fig. 2) is a three-valve super-regenerative receiver with a separate quencher and detector valve and an additional low-frequency amplifying stage. With this circuit there is a variable voltage applied to the detector valve, while, as the quenching is also a separate function, the background noise which is rather high in the single valve receiver is decreased to a negligible quantity.

Coupled with this is the fact that the pentode output does give loud-speaker volume, while

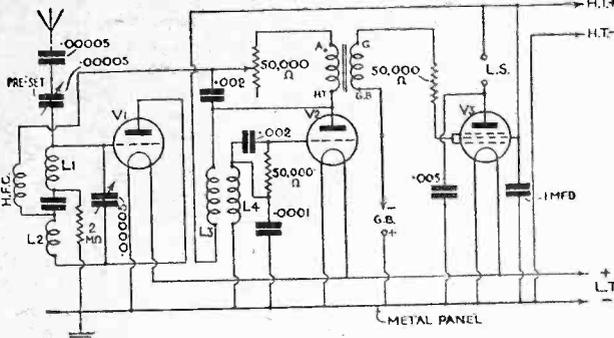


Fig. 2. More elaborate super-regenerative circuit with a separate quencher and detector valve

the receiver has quite a wide range. In theory the range limit is four or five hundred miles.

The coils L1 and L2 are the same as for a single-valve receiver, while L3 should be a 600 turns of 38 s.w.g. enamel wire and L4, 500 turns of 38 s.w.g. enamel, both wound slab fashion on a 1-in. former.

As with a one-valve receiver, the valves used are of primary importance, and here again Tungstram valves appear to be of the correct characteristics; V1, the detector valve, should have an impedance of between 10,000 and 15,000 ohms. The LD210 an impedance of 14,000 ohms will do very well indeed.

The quencher valve V2 should be of lower impedance, and the LP220 with an impedance of 23,00 ohms will be found to be the most suitable. We also tried a Cossor 215P with equally good results. The output valve should be a pentode, such as the Tungstram PP220 or the Cossor 220HPT.

Simplest Arrangement

As we mentioned before, a 5-metre speech transmitter is the simplest arrangement we can imagine. Fig. 3 rather proves the point. Here we have a complete transmitter, consisting of a single pentode valve as a speech amplifier, with the microphone transformer coupled to its grid circuit and two triode valves in push-pull which feed directly into the aerial.

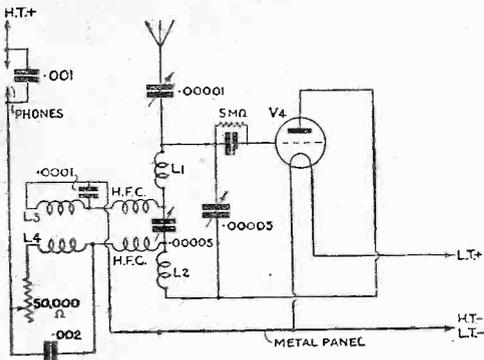


Fig. 1. Simple super-regenerative detector circuit using home-made coils

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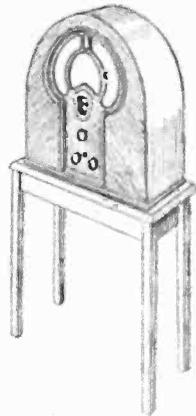


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More Letters on REAL QUALITY

NOEL BONAVIA-HUNT Replies to his Critic

BELOW we publish a further letter from James Moir, Grad.I.E.E., with reference to Noel Bonavia-Hunt's real-quality series. Mr. Moir now produces a detailed criticism of the article entitled "Coupling the First and Second Low-frequency Valves" (pages 465-466, AMATEUR WIRELESS, May 5).

We have cut his letter into sections and interpolated Noel Bonavia-Hunt's comments at the appropriate places. These comments appear in italic type:

To the Editor, AMATEUR WIRELESS.

I WOULD like to congratulate you on publishing my letter (No. 1089) on the real-quality series. Such a broadminded attitude is unexpected. Mr. Bonavia-Hunt prefers to make no comment, but this may be

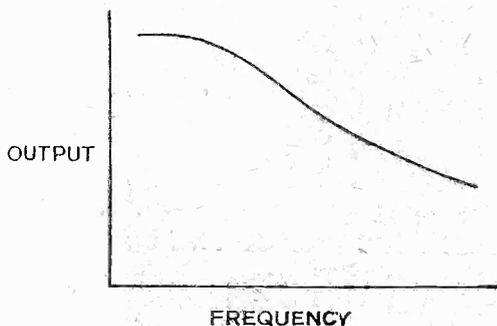


Fig. 1.—General shape of frequency characteristic.

due to the fact that I made no particular criticism. I intend to correct this by taking one article, No. 8, and pointing out all the "tripe" it contains:

1.—The first point is his method of checking "real quality" using a pair of headphones. "Real quality" and headphones are a thing apart. Reference to any standard work showing characteristics of headphones will confirm this.

I definitely stated that the frequency response of headphones is defective. But "quality" is none the less "pleasing" from the point of view of listening so long as the listener bears in mind the limit of response at each end of the musical spectrum.

See Capt. Echevley's article on page 280 of "Popular Wireless," May 26, where he asks the question, "Why is it that the quality of the headphone is so pleasing?" He then gives the response curve of headphones and labels it, "This is best."

He also says: "The art of reproduction is a question for the intelligence, not for the technician who can only think in technical terms." I personally think this is going too far, but there is good sense in what he says. Anyway, I do NOT "check" quality with headphones, and never stated that I do.

2.—The next mistake is one which Mr. Bonavia-Hunt consistently repeats. He apparently thinks that a low anode resistance makes the bass response suffer. This is absolutely wrong. A low anode resistance gives 100 per cent. response at any audio frequency.

How can anyone with common sense suppose that a 100 per cent. bass response is anything like adequate for low-volume reception in a small room? What loud-speaker gives 100 per cent. response at all frequencies? It is obvious that some compensation in the bass is necessary in order to get straight-line

aural reception. Has not this point been the basis of the complete series of articles? What on earth is the use of a straight-line amplifier?

3.—The scheme of using two sets of resistances in series for high and low notes is further evidence of a lack of knowledge of the principles involved. Reference to "pockets of wave-oscillation" or wave-pockets is also entirely without meaning.

The idea of shunting a portion of the anode resistance to cut down the high-note response is good; it has been used for many years, but Mr. Bonavia-Hunt's explanation is entirely wrong. The frequency characteristic is not as described by him, but is of the general shape shown in my Fig. 1. This circuit works because of the decrease of anode impedance with increase of frequency.

Reference to "formant bands," etc., is imagination on the part of Mr. Hunt. His reference to "important discovery," "momentous discovery," etc., is mere word-play. I would suggest that any reader desiring to try this circuit remove the two fixed resistances. This will give the same results and save 2s.

This criticism is typical of the radio engineer who works out the frequency-response characteristic curve of an amplifier on the basis of one single frequency at a time. This, to the musical expert, is absurd and is no true test of the efficiency of an amplifier to reproduce a musical item.

The curve Mr. Moir gives in his Fig. 1 is merely the response curve of a single frequency test. An entirely different curve would result if a large number of frequencies were impressed on the grid of the amplifying valve simultaneously.

I do not shunt the upper portion of the anode resistance to cut down high-note response; I adopt the shunted and unshunted portions in series in order to sort out the upper frequencies from the lower when massed combinations of notes are simultaneously amplified.

This is a subject about which the radio engineer cannot—qua engineer—know anything, since it is outside his province. Only an acoustician or a musician can advise the radio engineer on such a matter. The latter does not even know the technical terminology of the subject.

4.—His rule for obtaining the impedance of the valve by reference to the coupling impedance is without any foundation.

Mr. Moir talks as if the impedance of the valve were the only factor to consider. The relation of the amplification factor to the impedance is of vital importance in this connection.

5.—His suggestion that the external impedance is 28,500 ohms is also wrong, but this point is much too deep for Mr. Bonavia-Hunt to note.

I did not use the expression "external impedance," but external "resistance." The D.C. resistance is obviously 28,500 ohms, as I stated. The A.C. impedance was not given. I am sufficiently endowed with grey matter to know that the 25,000-ohm fixed resistance, being in parallel with the potentiometer, reduces the A.C. impedance.

6.—The final points covering the use of a resistance as a grid leak are also entirely wrong. The time constant of the circuit cannot be determined by reference to the resistance

alone. Resistances of several megohms would be quite in order if the grid condenser was suitable.

Of course, I am aware of the formula, T—CR. Was the Professor bound to explain the time constant formula? As a matter of fact Mr. Moir is wrong in assuming that the time constant of a megohm or more multiplied by a very small condenser is "in order." It may or it may not be.

No single stage can be designed without due attention being paid to the effect of other stages. But, of course, he knows this as well as I.

7.—His reference to transients only demonstrates that he is not aware of the requirements for good transient response. If any reader still believes that Mr. Bonavia-Hunt's articles are worth the paper they are written on I'll be pleased to take any one of them and show that "tripe" is an apt description.

I do not regard this statement as criticism. The only reference I made to transients was that the amplifier was quite capable of dealing with them.

8.—As a final point I might add that the letters M.A. after Mr. Bonavia-Hunt's name are no more evidence of his qualifications to deal with "high quality" than the letters F.R.H.S. (Fellow of the Royal Horticultural Society).

I am not aware that I have ever advanced my M.A. degree as a qualification. I note that Mr. R. W. Hattows, a frequent contributor to the wireless press, has the M.A. degree printed after his name. Surely this is entirely a matter for editors? I happen to know more than one holder of the A.M.I.E.E. diploma who claims very little knowledge of radio.

This letter is rather long, but I did not want to take single statements and contradict them without reference to the complete article.

JAMES MOIR, Grad.I.E.E.

Rugby.

[2010

Further Comments

A GREAT SUCCESS

To the Editor, AMATEUR WIRELESS

IT is to be hoped that Mr. Moir is feeling better now and that he is regretting his ill-mannered letter published in your issue of May 26.

It might be of interest to this gentleman, as well as your readers, to know that the writer is now using one of Mr. Bonavia-Hunt's amplifiers which was published recently in *Wireless Magazine* and it has proved a great success.

The quality of reproduction from a musical point of view far surpasses any straight-line amplifier which the writer has heard.

Although Mr. Bonavia-Hunt's explanations may not be found in Mr. Moir's copy-book, if the latter gentleman will arise from his armchair of criticism and take the trouble to carry out some experiments on the lines suggested by Mr. Bonavia-Hunt, he will no doubt profit thereby.

As far as the writer is aware, this is the first time that an amplifier has been described in the popular press which has a characteristic designed to compensate for the natural shortcomings of present-day loud-speakers.

Continued on page 624

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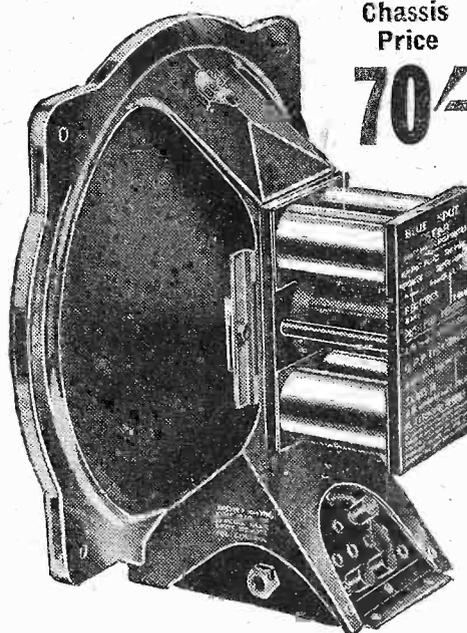
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More Discussions on Real Quality

Continued from page 622

In passing, I should be obliged to know why it is that a sound-on-film engineer considers that he knows so much about high-quality reproduction.

Have any of your readers yet heard a talkie installation which gives anything like an approach to high-quality reproduction? Perhaps Mr. Moir will let us know where there is one of his installations working in London so that we may go along to hear it.

Beyond being a satisfied reader of Mr. Bonavia-Hunt's articles, I have no connection whatsoever with that gentleman.

SPENCER L. ALLWORTH.

Purley, Surrey.

[2011]

PRACTICAL TRIAL

HAVING just read the letter of Mr. J. Moir's published. I just couldn't let it pass by without some comment. Perhaps if Mr. Moir tried a few of the circuits of Mr. Bonavia-Hunt's he would alter his opinion.

Take the Westector, for instance. The circuit Mr. Bonavia-Hunt uses for reaction purposes is more or less the same as the original one when the Westector first came on the market.

But take Mr. Bonavia-Hunt's circuit of the transformer-coupled Westector and there you have a real good, distortionless arrangement, and as near to real quality as anyone will get for a little while.

It is the ideal detector circuit. I know, because I have tried it out sometime last year, when Mr. Bonavia-Hunt gave some of his talks on quality in *Wireless Magazine*.

Now take the coupling between the first and second low-frequency stages—that is R.C.C. pure and simple, with just a few alterations in component values.

Now the next stage; that type of coupling has been used by me for months. The component values are not the same, I will admit, but the circuit is there.

As for Mr. Moir's saying that Mr. Bonavia-Hunt develops theories of his own—of course he does. He wouldn't be much of a designer if he didn't and, besides, I like a man who thinks for himself. I detest copyists.

I will admit we have to copy a lot sometimes, but when you can use your own brains, do so.

Please don't think I am in any way connected with Mr. Bonavia-Hunt. I am not. I don't even know what he looks like, but I don't like to see a person who speaks his own mind run down.

H. REID-CARR.

Wellingborough.

[2012]

SOUND-FILM STANDARD

I HAVE read with disgust the letter of your correspondent, James Moir, with reference to the above, and I cannot see any reason for him to be so rude.

I notice your correspondent signs himself Grad.I.E.E. Firstly: What has this degree to do with radio? I thought this belonged to the heavy electrical engineer! Secondly: I do not know how old your correspondent is, but should surmise quite a youngster in radio.

He also says he is a designer with one of the leading sound film companies, and if he is going to base his criticism on this type of equipment; perhaps this may be why he cannot appreciate quality, as I have already given up going to the pictures for this reason.

Regarding the design of Noel Bonavia-Hunt's equipment, I have not had the pleasure of hearing this, but should think your correspondent might have asked to hear this before passing his rude remarks.

I have only been tempted to write this letter for the reason that I do not like to see anybody write in this strain and call it criticism. It is only ignorance.

It is your paper success.

R. WALDE EMERSON.

Wood, N.W.8.

[2013]

Readers' Views on This and That

Listeners' Letters

FRAME AERIALS

To the Editor, AMATEUR WIRELESS

I THOROUGHLY endorse R. Adam's letter (No. 1093) re frame aerials. I am sure, as he says, the larger majority prefer a compact aerial to an unsightly outdoor erection, not to mention the ease with which a frame aerial can be kept in good condition as compared with the overhaul of an outdoor wire.

I own a Super 60 receiver, as published in *Wireless Magazine* for March, 1931, which I intend to keep in the hope that you will produce a frame-aerial super-het as good as the original, but employing some form of second-channel suppressor to cure the only trouble existing in a very fine receiver.

May I conclude by offering my appreciation of a very fine weekly paper which I hope will long continue to reign.

D. G. COLEMAN.

Stamford.

[1100]

UNSKILLED DEALERS

IN supporting Thermion's comments on the menace of the unskilled dealer, may I point out the good work which has been done by the Wireless League in this connection?

The League are appointing a chain of dealers throughout the country and to date about 320 such traders have been registered. Every approved dealer has been examined in the theory of broadcast reception, and in his ability to service receivers. He has also to have in his possession sufficient test apparatus to put his knowledge into practice, and the means of effecting satisfactory service repairs.

My committee are very careful in their selection, and I can claim conscientiously that every approved dealer is one of the best men in his neighbourhood. Every trader is supplied with a Wireless League diploma signed by Prof. A. M. Low and other eminent technicians, and an official sign is displayed outside the premises.

Every lay member of the League can obtain the names and addresses of approved traders on application. May I point out in passing that those listeners who join the League now as Associates, the subscription for which is only 2s. per annum, will not be required to pay again till September, 1935, so that three months' membership is free.

Full particulars of the free handbook, free insurance, etc., may be obtained on application to me at the head offices of the Wireless League, at 12 Grosvenor Crescent, London, S.W.1.

ALFRED T. FLEMING, M.I.W.T.
General Secretary.

London, S.W.2.

[1101]

SHORT WAVES

MAY I congratulate AMATEUR WIRELESS heartily upon its devotion of a few pages to the short-wave enthusiast. I have patiently waited for this, and now I hope you will let us have really accurate news of the amateur, broadcasting, and telephony stations week by week.

I suggest that readers be allowed to send in reports of all DX, and these reports should be printed according to their value to other readers in each issue. Why not deal with amateur transmitting, and give circuits of oscillators, modulators, and deal with portable transceivers?

Come on "A.W." you gave the lead with the Superheterodyne, why not do the same with the short waves? Boost this interesting side of radio and give to all the pleasure of world-wide reception.

FRANCIS A. BEASE.

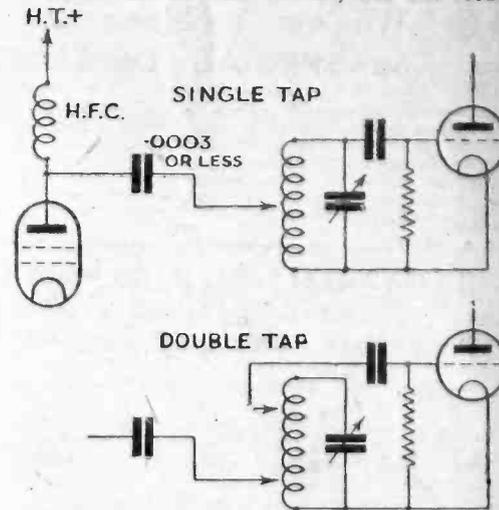
Halstead, Essex.

[1102]

TUNED-GRID VERSUS TRANSFORMER COUPLING

I BELIEVE that I was one of the first to adopt the former type of high-frequency coupling, while my brother Noel was experimenting on the low-frequency side. Both transformer and tuned-anode methods gave poor results owing to the high impedance of the screen-grid valve.

In the case of the transformer, a 1:1 ratio obviated this to some extent; but the result



High-frequency circuits discussed by W. Bonavia-Hunt in letter No. 1103

was extremely flat tuning. There seemed to me to be only one way out of the difficulty, and that was to use a high-frequency choke* with a coupling condenser of low value and tap the tuned-grid coil at a point low enough to obtain the selectivity needed.

The power so resulting was little, if at all, reduced; but the selectivity was much higher than could be obtained with transformer coupling (1:1).

W. BONAVIA-HUNT.

Littleport, Cambs.

[1103]

* I first used a serialised M.M. H.F. barrel A.W. transformer here. Quite O.K. This was in 1925-6. Mr. Hallows was working on these lines at the same time.—W. B. H.

WAVELENGTH SHUFFLES

IN reply to Mr. H. Gardner's observations on my letter (No. 1084), I certainly insist that the old conditions (2LO, 5GB, and 5XX) gave a far better arrangement than that we now endure. To lead off with, I find horrible distortion on the daily service at 10.15. That never happened with 2LO.

Mr. Gardner says when stations worked on fewer kilowatts, listeners could count on at least one uninterrupted programme, but to-day that is only possible during daylight hours, unless one gives up all hope of real quality.

Unfortunately our unnecessary powerful transmitters have forced foreigners to increase power, so to-day we have interference and stuff not worth listening to after dark.

We should have stuck to several low-power transmitters—or else one or two high-power transmitters, say two in England, two in Scotland, and two in Ireland. They could (if given suitable wavelengths) have radiated six home programmes (enough for anybody).

I agree again with Mr. H. Gardner that we may, under existing methods, be forced to gramophones—or perhaps wired wireless laid on locally and only needing a loud-speaker, will come about. Then good-bye to the set-manufacturers' business.

W. H. MORRIS.

[1104]

Criticisms by WHITAKER-WILSON

My Broadcasting Diary

Sunday

BEGAN with a little chamber music this afternoon and heard the Spencer Dyke people play a favourite quartet of mine by Beethoven. Quite pleased with it. Also with Betty Humby, who played me some Weber I did not know. That, except that I heard Ethel Evans sing a ballad, is all I have heard to-day.

Monday

A LITTLE of Henry Hall I liked; still less of Act II of *The Mastersingers*, which I liked rather less than Henry, to be candid—didn't come through as well as I hoped—and then settled down to hear those two Scandinavian plays.

Thought *Three Trappers* quite good and, in a sense, original. Howard Rose, producing, departed from his usual careful reserve in effects. Too much rattling of crockery.

Otherwise no complaints, which is another way of offering a compliment to Rodney Aekland, Charles Mortimer, and Matthew Boulton for their splendid acting.

The Copy, produced by M. H. Allen, appealed to me less. The comedy in it was rather laboured. Again, well acted. Good acting in serious plays is now a feature of the B.B.C. productions. Harold Scott was amazingly good.

Tuesday

PICTURE PEOPLE definitely a good show. Mr. Clayton-Hutton must go on with this idea of relays from sound tracks of films. Such programmes are sure to be popular.

Wednesday

A NICE supper concert to-night. I do not make a habit of having wireless on at meal-times, but I was trying out my new set, specially made for me in the AMATEUR WIRELESS laboratories plus a Baker loud-speaker.

The C Orchestra, led by Marie Wilson and conducted by Joseph Lewis, appealed to me because they played a light programme with all the delicacy—and yet the dignity—of a full symphony orchestra. Also John Armstrong sang *Onaway, Awake!* in a straightforward, musicianly manner, without sobbing and getting sentimental, as tenors generally do when they sing that most beautiful of all love songs.

Between those two I switched on to Peterborough Cathedral for the Choir and Cloister broadcast. Candidly, I didn't think much of the Peterborough boys; but, then, I am a very hard critic of cathedral singing, having lived that sort of life once on a time.

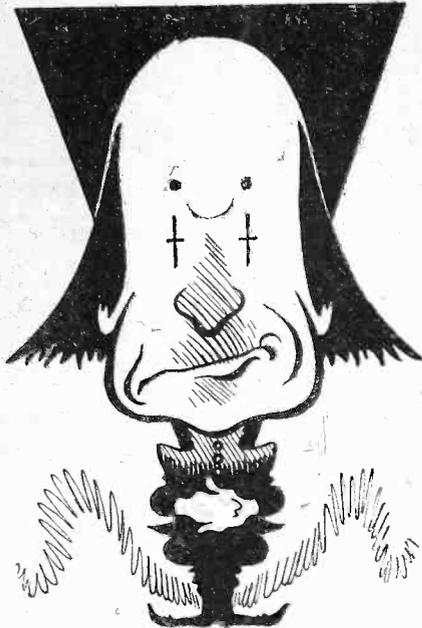
What I really did like was the gorgeous sense of echo. None of your synthetic stuff, such as we get in spookey plays, but a real, healthy three-and-a-half-second affair with some atmosphere about it.

Finished up with the symphony concert of Russian music. I even listened to Prokofiev; but, then, Albert Coates was conducting and I knew I should get an authoritative rendering.

Thursday

There was a Ridgeway Parade.

BEGAN my listening later than usual to-night. Lauri Kennedy's 'cello recital wholly delightful. He played works that



An impression of Wilkie Bard, the well-known music-hall star

should have appealed to all lovers of the 'cello as a solo instrument.

Just about to switch off when I heard the announcer say Engle Lund was singing folks songs of many lands: On looking at the programme I found them to be in German, French, English, Yiddish, Swedish, and Norwegian.

Rarely have I enjoyed a recital of this kind more. Miss Lund's diction was so clear that—especially as she supplied translations—the words of her songs were equally intelligible in all languages.

Her broken English during her announcements added to the charm of her recital, and I liked her Danish encore most of all. May she be asked again?

Friday

I NOTICED to-night that the announcer gave news-headings before reading the bulletin. I suggest emphatically that this be continued. So often I have thought to myself "I won't listen to the news to-night; I shall see it in the paper to-morrow," whereas if I had heard an attractive item in spoken headings I might have acted otherwise.

I submit to Broadcasting House that it would be a good idea definitely to use headings, making a feature of them. I am sure it would be appreciated.

Saturday

THE *In Town To-night's* do vary! Suppose it can't be helped, but to-night's lot were feeble.

Variety good. I liked the Dalton Sisters because their voices matched in tone; I liked Jenny Howard because she can hiss her s's better than anyone I know, except Stainless Stephen; I liked Wilkie Bard immensely because he handled both audiences so well; I liked Arthur Askey's song, *What, No Milk?*; I liked Scott and Whaley in their ridiculous sketch about taking the girl out to dinner; I liked Al Bowly better than his songs; and I definitely liked the way the Theatre Orchestra played Eric Coates' *London Bridge*. To Kneale Kelley, Konduktor, congratulations!

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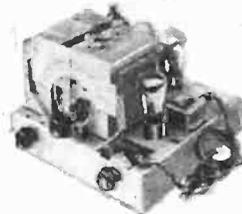
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Puzzling Broadcasters

By JAY COOTE

IT is often puzzling to account for the reason for which during certain periods signals from particular stations are weaker or more powerful than at other times. Many suggestions are put forward, including weather conditions, full moon, fading, barometric readings and anything which might or might not influence radiation.

On the other hand, as fate will have it, the true reason—and probably the simplest one—is discovered later and we find that our hypotheses were hopelessly at fault.

I quote four examples, namely Moscow 1, which suddenly on 1,724 metres provides a much heftier signal than hitherto; Prague, which without reason almost dropped out of our logs; the relatively anaemic character of Langenberg broadcasts; and Budapest, which, from a faint whisper during the afternoon, clears its throat and comes across at full blast towards 5 p.m. (1700 B.S.T.).

The answers to the puzzles are: (1) Moscow, hitherto working on 200 kilowatts, and capable of 500 kilowatts, since May 15 has worked at its full energy.

(2) Prague's aerial was struck by lightning and the older and smaller station has been used pending repairs.

(3) Langenberg, now being converted to a 100-kilowatt, is closed down and the 17-kilowatt station is on the air.

(4) The Budapest aerial mast is being repainted; the high-power station is out of action between B.S.T. 0645 and 1645, all broadcasts being sent out through the old transmitter.

Another item of interest lies in the fact that notwithstanding contradictory statements, it is now definitely confirmed that Radio Toulouse

has been authorised to use the 60-kilowatt St. Agnan station which, completed many months ago, was not permitted to be brought into operation. With this power in hand it should be well heard; it is unfortunate that the channel is within 7 kilocycles of Radio Luxembourg's fourth harmonic (326 metres) which can be picked up as a background to Brno.

The new Nice P.T.T. station, in course of construction at La Brague, is being hurried forward and I learn that tests may be expected in August next; the wavelength to be used is 253.2 metres (1,185 kilocycles), or just below Copenhagen. It will be one of France's high-power transmitters.

Powerful Catholic Station?

For some months past in Roman Catholic circles proposals have been put forward to install in mid-Europe a powerful station for the transmission of broadcasts in defence of Catholic interests. At the outset a site was to be chosen in German Switzerland, but since the change in the policy of the Austrian Government and its resistance to Hitler propaganda, this latter country has been selected as being more favourable for such broadcasts in the German language.

We may therefore see a new transmitter spring up in the neighbourhood of Salzburg or Innesbrueck in order that the talks may be heard over the greater part of Germany and Central Europe.

By the way, Austria has made arrangements to exchange broadcasts from the Salzburg Musical Festival with Italy, as against relays of operatic performances from the Scala at Milan.

New Sets for Old!

IN these days when one part of the country is on D.C., another part on A.C. and some of the remainder without mains at all, it is certainly a problem for the battery user who is about to have mains laid on to determine just what he is going to do with his old battery set.

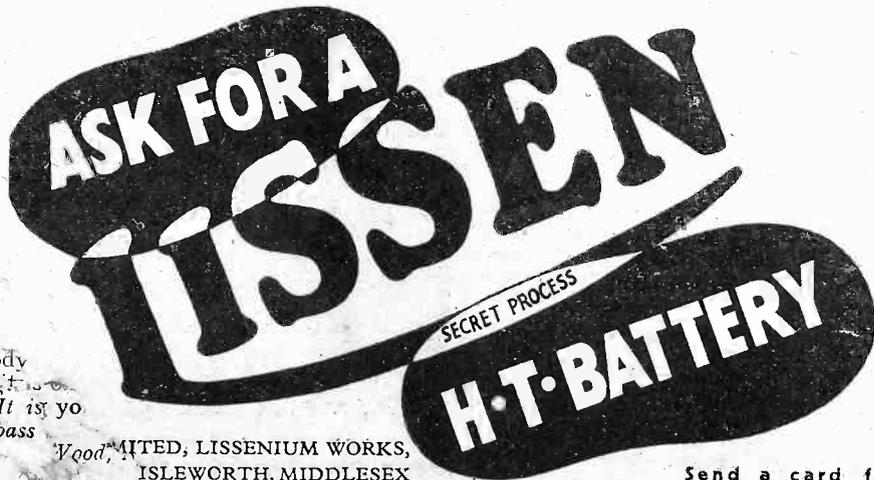
The Universal High-voltage Radio Company have solved this problem in a very satisfactory manner. They have formed what they call a set conversion department, consisting of a number of highly-trained radio engineers who will alter any battery set so that it will run from A.C., D.C. mains or both.

They will also modify any existing D.C. mains set to run from A.C. mains, so that any

old receiver that you may think will be obsolete when the supply changes is now given a new lease of life.

This unique service has proved so satisfactory and the volume of business so great that this company is now able to make conversions of this kind at the low cost of 10s. per valve holder and the price of the new valve. For example, a three-valve battery set converted to all-mains working would cost 30s., plus the cost of three mains valves.

This service is not restricted to any particular types of receivers. Commercial sets of any make or type, as well as home-constructed kit sets, can be modified in this way.



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Medium-wave Broadcasters

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

Metres	Kilo-cycles	Station and Call Sign	Country	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Country	Power (Kw.)
203.5	1,474	Flymouth	Great Britain	.3	312.8	959	Poste Parisien, Paris	France	60
203.5	1,474	Bournemouth	Great Britain	1	315.8	950	Breslau	Germany	60
204.2	1,468.6	Pecs	Hungary	1.25	318.8	941	Goteborg	Sweden	10
206	1,456	Fecamp	France	20	321.9	932	Brussels (2)	Belgium	15
208.6	1,438	Miskolez	Hungary	1.25	322.2	931	Algiers	North Africa	13
209.4	1,432.5	Beziers	France	1.5	325.4	922	Brno	Czechoslovakia	35
209.9	1,429	Newcastle	Great Britain	1	328.6	913	Radio Toulouse	France	60
211.3	1,420	Tampere	Finland	1.2	331.9	904	Hamburg	Germany	100
214	1,402	Sofia	Bulgaria	5	335.2	895	Limoges PTT	France	7
215.1	1,394.9	Radio Lyon	France	7	335.2	895	Helsinki	Finland	10
216.8	1,384	Warsaw (2)	Poland	2	338.6	886	Graz	Germany	100
218.2	1,375	Basle, Berne	Switzerland	.5	342.1	877	London Regional	France	7
221.1	1,357	Turin (2)	Italy	2	345.6	868	Poznan	Poland	50
222	1,354	Dublin (2)	Irish Free State	1.2	347.2	864	Sofia	Bulgaria	13
222.2	1,354	Milan Vigentino (2)	Italy	4	349.2	859	Strasbourg	France	15
222.6	1,348	Koenigsberg	Germany	.5	350	857	Bergen	Norway	1
222.6	1,348	Bordeaux S.O.	France	3	352.9	850	Valencia	Spain	3
224	1,339	Montpellier	France	.8	356.7	841	Berlin	Germany	100
224.2	1,338	Lodz	Poland	1.7	358.6	836.6	Paris, LL	France	1.2
225.6	1,330	Hanover and other Hamburg relays	Germany	1.5	360.6	832	Moscow (4)	U.S.S.R.	100
227.6	1,318.5	Magyarovar	Hungary	1.25	364.5	823	Bucharest	Roumania	12
230.2	1,303	Danzig	Germany	.5	368.6	814	Milan	Italy	50
231.8	1,294	Linz and other Vienna relays	Austria	.5	373.1	804	Scottish Regional	Great Britain	50
233.5	1,285	Aberdeen	Great Britain	1	377.8	794	Barcelona (EAJ1)	Spain	8
234.3	1,270	Dresden	Germany	1.5	378.8	792	Lowel	Poland	21.5
235.1	1,276	Stavanger and other Oslo relays	Norway	5	382.2	785	Leipzig	Germany	120
236.8	1,267	Nurnberg	Germany	2	386.6	776	Fredriksstad	Norway	7
238.5	1,258	San Sebastian (EAJ8)	Spain	.6	386.6	776	Toulouse PTT	France	25
238.5	1,258	Rome (III)	Italy	1	391.1	767	Midland Regional	Great Britain	25
240.2	1,249	Juan-les-Pins	France	2	395.8	758	Katowice	Poland	16
241.9	1,240	Cork	Irish Free State	1	400.5	749	Marseilles PTT	France	2.5
243.7	1,231	Gleitwitz	Germany	5	405.4	740	Munich	Germany	100
245.5	1,222	Trieste	Italy	10	410.4	731	Seville	Spain	1.5
247.3	1,213	Lille PTT	France	1.4	410.4	731	Tallinn	Estonia	11
249.2	1,204	Prague Stranice (2)	Czechoslovakia	3	414.4	724	Madrid (Espana)	Spain	1
251	1,195	Frankfurt - am - Main and relays	Germany	17	415.5	722	Kiev	U.S.S.R.	36
253.2	1,185	Kharkov (2)	U.S.S.R.	35	420.8	713	Rome	Italy	50
255.1	1,176	Copenhagen	Denmark	10	426.1	704	Stockholm	Sweden	50
257.1	1,167	Monte Ceneri	Switzerland	15	431.7	695	Paris PTT	France	7
259.1	1,158	Moravska-Osava	Czechoslovakia	11	437.3	686	Belgrade	Yugoslavia	2.8
261.1	1,149	London National	Great Britain	50	443.1	677	Sottens	Switzerland	25
261.1	1,149	West National	Great Britain	50	449.1	668	North Regional	Great Britain	55
263.2	1,140	Turin (I)	Italy	7	455.9	658	Langenberg	Germany	50
265.3	1,131	Hoerby	Sweden	10	463	648	Lyons PTT	France	15
267.4	1,122	Belfast	N. Ireland	1	470.2	638	Prague (I)	Czechoslovakia	120
267.4	1,122	Nyiregyhaza	Hungary	6.25	476.9	629	Trondheim	Norway	4.2
269.5	1,113	Kosice	Czechoslovakia	2.5	483.9	620	Lisbon (tests)	Portugal	20
269.6	1,112.6	Radio Vitus (Paris)	France	1	489.9	620	Brussels (I)	Belgium	15
271.7	1,104	Naples	Italy	1.5	489.9	620	Cairo (tests)	Egypt	20
274	1,095	Madrid EAJ7	Spain	3	491.8	610	Florence	Italy	20
276.2	1,086	Falun	Sweden	.5	499.2	601	Sundsvall	Sweden	10
277.2	1,082	Zagreb	Yugoslavia	.75	499.2	601	Rabat	Morocco	6
278	1,079	Bordeaux PTT	France	13	506.8	592	Vienna	Austria	100
280.9	1,068	Tiraspol	U.S.S.R.	10	514.6	583.2	Latvia	Latvia	15
283.3	1,059	Bari	Italy	20	514.6	583.2	Riga	Latvia	15
285.7	1,050	Scottish National	Great Britain	50	522.9	574	Agon	France	5
288.6	1,040	Leningrad (2)	U.S.S.R.	100	531	565	Muhlacker	Germany	100
288.6	1,040	Rennes PTT	France	1.3	539.6	556	Athlone	Irish Free State	60
290	1,034.5	Paredo (Lisbon)	Portugal	5	549.5	546	Beromunster	Switzerland	60
291	1,031	Heilsberg	Germany	60	559.7	536	Budapest	Hungary	120
293.5	1,022	Barcelona (EAJ15)	Spain	2	569.3	527	Wilno	Poland	16
296.2	1,013	North National	Great Britain	50	569.3	527	Viipuri	Finland	13
298.8	1,004	Bratislava	Czechoslovakia	14	578	519	Ljubljana	Yugoslavia	7
301.5	995	Hilversum	Holland	20	578	519	Innsbruck	Austria	5
304.3	986	Genoa	Italy	13	696	431	Oulu	Finland	1.2
304.3	986	Cracow	Poland	1.7	724.6	414	Ostersund	Sweden	.6
307.1	977	West Regional	Great Britain	50	748	401	Gencva	Switzerland	1.5
312	962	Grenoble PTT	France	3	748	401	Moscow	U.S.S.R.	20
					775.2	387	Boden	Sweden	.6
					824	364	Smolensk	U.S.S.R.	10
					833.4	360	Budapest (II)	Hungary	3
					845	355	Vadso	Norway	10

NOTE:—The following wavelengths are common to several transmitters: 206 m. (1,456 kcs.); 207.3 m. (1,447 kcs.); 208.6 m. (1,438 kcs.); 211.3 m. (1,420 kcs.); 218.2 m. (1,375 kcs.); 221.1 m. (1,357 kcs.); 225.6 m. (1,330 kcs.); 228.7 m. (1,312 kcs.); 235.1 m. (1,276 kcs.); 236.8 m. (1,267 kcs.); 251 m. (1,195 kcs.).

Notes and Jottings

AFTER extensive research by Ediswan engineers on the reliability of contact of valve top-cap connections, it has been decided that the plug-type metal contact is far more reliable than the screw type.

The metal plug-type contacts will be fitted as standard connection to all future Mazda valves having a top terminal and many of the existing types will also be fitted with the plug-type cap.

When ordering replacement valves with the alternative connection, the type required must be specified.

The largest number of public-address jobs ever booked by Marconiphone for one day will be carried out on July 18. There will be in use 129 loud-speakers and fourteen micro-phones.

On the same day there will doubtless be hundreds of other sports meetings throughout the country which will be covered by Marconiphone agents, and it would be really interesting to know just how much Marconiphone gear is in use on this day.

In the list of components for our *Flicker's* Headphone Portable, described in *AMATEUR WIRELESS* dated May 12, we incorrectly specified the accumulator as an Exide type MR2; this should have been type LC1.

Four new Drydex batteries of the Yellow Triangle series have been added to their list. These are the types H109r (which replaces the type H1075), H1092, H1093 and H1094.

Continued on next page

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"VARLEY" CONSTANT SQUARE PEAK COILS, new, boxed; 3/3 each (list 15/-).

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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.

BURGOYNE £4 4s. De Luxe 3-valve Battery Sets, complete. £2 19s. 6d.

MARCONI £4 4s. 3-valve Battery Sets, complete, £2 5s.

TRIOTRON Class B Units, with Valve, 21 6.

STALL Class B Driver and Choke; pair, 8 6.

TRIOTRON 8 Mid. Electrolytic Condensers, 2 6.

DUBILIER 1,500-volt Condenser Banks 1 by 2, 1 by 25, 3 by 1, 4 by 1 Mfds., 4 6. Dubilier 1,500-volt Condensers 2 by 2 Mfds., 2 6.

LUCERNE Iron Cored Coils, 2 6.

AMPLION Dual Range Coils, 2 6.

VARLEY Constant Square Peak Coils (list 15/-), 2 6.

COSMOS 2-volt Green and Blue Spot Valves, 2 6.

COSMOS 4 or 6-volt Red Spot Valves, 1 6.

TRIOTRON VALVES, 3/6; Power, 4/6; Super, 5/-; S.G. 6/6.

AMPLION 39/6 Permanent Magnet M.C. Speakers, 17/6. Amplion 27/6 Sonette Permanent Magnet M.C. Speakers, 10/6. Celestion 47/6 Permanent Magnet M.C. Speakers, 19/6. Celestion 27/6 Soundex Permanent Magnet M.C. Speakers, 10/6.

IGRANIC 7/6 Parvo Transformers, 2/6.

FERRANTI A.F.3 Transformers, 11/6; A.F.8, 6/6.

OSRAM Thirty Three Music Magnet Kits, Assembled and Tested. List £6 15s. 6d.; 70/-.

POST PAID, cash with order, or C.O.D. P.C. for Bargain List.

TUNNEL RADIO, Chester Street, Birkenhead.

HIGHEST POSSIBLE ALLOWANCE made on used wireless sets or parts in exchange for any new set, kit, or parts. Peto-Scott kits supplied. Goods bought for cash.—R. Wigfield, Furlong Road, Goldthorpe, Yorks.

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BANKRUPT BARGAINS.—List free. S.T. 300 Kit, 35/-; S.T. 400 Kit, 45/-; S.T. 500 Kit, 52/6. Burgoyne Class B3 Sets, £4 complete. Celestion Soundex P.M., 13/6. Universal and A.C. Sets at keenest prices. A.C. Eliminators from 25/- Full stock of components. Part exchange.—Butlin, 143b Preston Road, Brighton. Preston 40 0.

Notes and Jottings—Contd. from preceding page

The last mentioned is a grid-bias battery, the others being high-tension.

Egypt has ordered two radio stations. These two have been built by the Marconi company.

One of the transmitters, a high-power installation operating on 483.9 metres, is at Abu Zabal near Cairo and the other a relay transmitter operating on 267.4 metres, is at Ras el Tin, near Alexandria.

The stations are connected by landlines with a suite of studios at Radio House, Cairo, the headquarters of the State Broadcasting service.

A Radio Leg-pull

A SOUTHEND pilot was recently the victim of a curious radio leg-pull. He was making a trip to Leeds, with an urgent delivery of Ekco sets, and shortly after leaving the aerodrome he discovered that his machine stubbornly refused to settle down on the proper course.

Instead of steering "as the crow flies," he found himself going "as the crab crawls." Every time he checked his position by landmarks, he found himself further off his course, although the compass had been corrected only a few days before.

With visions of arriving at Yarmouth or Bristol instead of at Leeds, he decided that it might be as well to land to carry out investigations.

He found that, when the cargo was stowed, an Ekco Model 54 had been packed within nine inches of the instrument board.

This particular set is battery-operated, and the permanent magnet of the moving-coil loud-speaker was deflecting the compass needle over 30 degrees from its true reading!

Removal of the set to a different position cured the trouble, and the flight was completed without further incident.

*** FULL-SIZE BLUEPRINTS ***

When ordering, please send Postal Order. NOT STAMPS. Quote the Blueprint number shown below; not the number of the issue.

CRYSTAL SETS (6d. each)

1931 Crystal Set AW308
Four Station Crystal Set AW427

ONE-VALVE SETS (1s. each)

Easy to Build One AW304
Portable Short-wave One AW354
B.B.C. One-valver AW387
S.W. One-valver for America AW429

TWO-VALVE SETS (1s. each)

Home Station A.C.2 (D, Pen) AW374
B.B.C. National Two (D, Trans) AW377
Melody Ranger Two (D, Trans) AW388
"A.W." Iron-core Two (D, Trans) AW395
"A.W." Iron-core Two with Q.P.P. AW396
Big Power Melody Two, with Lucerne Coils (SG Trans) AW386A
B.B.C. National Two, with Lucerne Coils (D, Trans) AW377A
Consolectric Two (D, Pen) A.C. AW403
Lucerne Minor (Det, Pen) AW426
Screen-grid Two (SG Det, Trans) WM1289
A Two for 7 Metres (D, Trans) WM1295
New-style Radiogram (D, Trans) WM1299
A.C. Quality Gem (D, Trans) WM312

THREE-VALVE SETS (1s. each)

Everybody's Home Radiogram (SG, D, Trans) AW381
Our Up-to-the-Minute Three (SG, Westrector, LF, Trans) AW384
Class B Three (D, Trans, Class B) AW386
"Up-to-the-minute Three" with Class B, 1/0 AW384B
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Fan and Family Three (D, 2LF) AW410
£5. 5s. SG. 3 (SG, D, Trans) AW412
A.C.-D.C. Universal Three (SG, Det, Pen) AW414
1934 Ether Searcher (SG, Det, Pen) Baseboard AW417
1934 Ether Searcher (SG, Det, Pen) Chassis AW419
Lucerne Ranger (SG, Det, Trans) AW422
P.W.H. Mascot (Det, RC, Trans) AW337A
Cossor Melody Maker with Lucerne coils AW423
Mullard Master Three with Lucerne coils AW424
Schoolboy's Three (Det, 2 RC) AW428
Penta-quester (HF, Pen, Det, Pen) AW431

FOUR-VALVE SETS (1s. 6d. each)

"A.C. Melody Ranger" (SG, D, RC, Trans) AW389
Home-lover's New All-electric 3 for A.C. mains (SG, D, Trans) AW383
Melody Ranger (SG, D, RC, Trans) with copy of "A.W." 4d. postage AW375
Signpost Four (SG, D, LF, Class B) AW398
"A.W." Ideal Four (2SG, D, Pen) AW402
2 H.F. Four (2SG, Det, Pen) AW421
Lucerne Major (2 H.F., Det, Trans) AW433

FIVE-VALVE SETS (1s. 6d. each)

The Etherdyne (Super-het) AW406
Super-quality Five (2 HF, D, RC, Trans) WM1320
Ideal Home Super (Super-het) WM1280
Easytune 60 (Super-het) WM1284
New Class-B Five (SG, D, LF, Class-B) WM1340
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SIX-VALVE SETS (1s. 6d. each)

1934 Century Super (Battery super-het) AW413
1934 A.C. Century Super (Super-het) AW425

SEVEN-VALVE SETS (1s. 6d. each)

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Seventy-seven Super (A.C. Super-het) WM305

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General-purpose Portable (SG, D, RC, Trans) AW351
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Add-on Band-pass Unit AW359
Plug-in Short-wave Adaptor AW382
Experimenters' D.C. Mains Unit AW430
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Copies of the "Wireless Magazine" and of "Amateur Wireless" containing descriptions of most of these sets can be obtained at 1s. 8d. and 4d. respectively, post free. Index letters "A.W." refer to "Amateur Wireless" sets and "W.M." to "Wireless Magazine." Address letters:

Amateur Wireless Blueprint Dept., 51-51 Fetter Lane, London, E.C.4

Amateur Wireless
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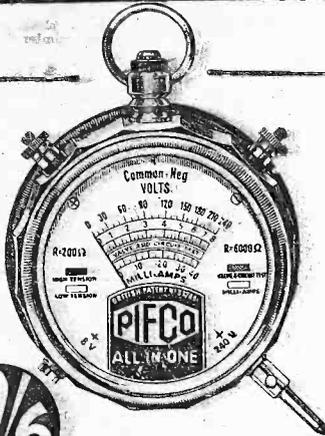
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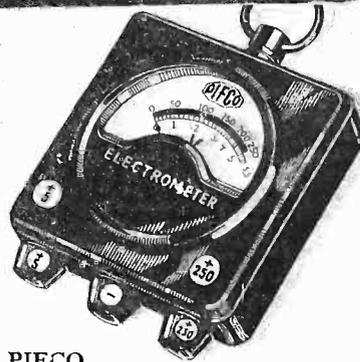
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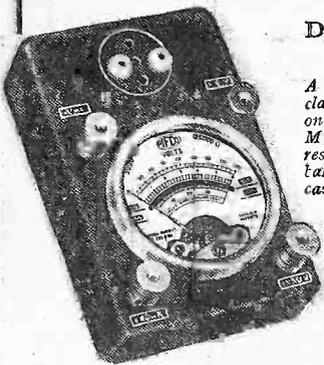
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These are just a few of the contents of Friday's remarkably fine issue of Radio Pictorial. Don't forget to get your copy, on sale everywhere price 2d.



EVERY
FRIDAY

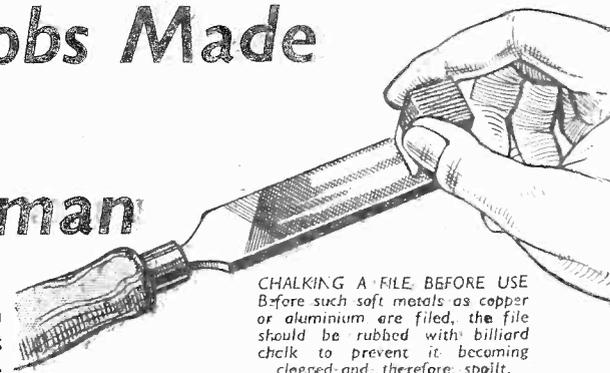
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Mr. R. W. Hallows, M.A., in the June issue of the "Wireless Magazine" explains the simple secret of easy, quick, and neat soldering. Not only hints about soldering, but all the hundred and one odd little jobs that crop up, whether you have a ready-built set or you build your own.

The "Wireless Magazine" which is now on sale, is worth the 1/- alone for the useful information that Mr. Hallows gives, but there are also nearly thirty other interesting features, including details of two sets which you can build at home.

Don't delay. Get your copy now, from all booksellers and newsagents.



CHALKING A FILE BEFORE USE
Before such soft metals as copper or aluminium are filed, the file should be rubbed with billiard chalk to prevent it becoming clogged and, therefore, spoilt.

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The Iron-Core Band-Pass Three.

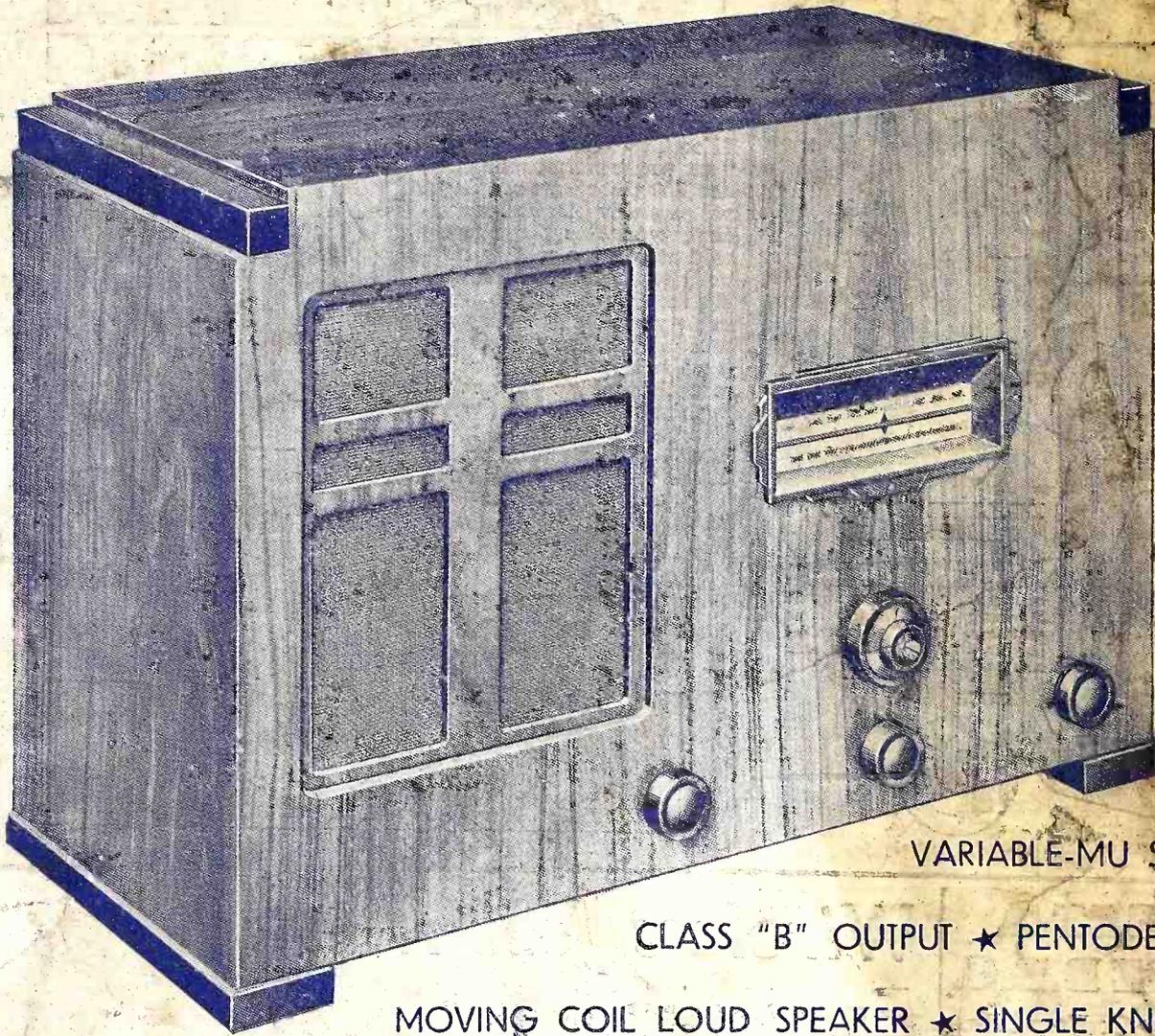
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Cosson 4-valve Battery-operated Receiver Model 435B with Class "B" Amplification, complete with Cosson Valves as follows: Screened Grid Variable-Mu H.F., H.F. Pentode Detector, Driver and Class "B" Output. Fully screened, super-selective low-loss coils. Single knob moving-pointer tuning with horizontal full-vision scale calibrated in wavelengths. Combination switch for on-off, wavelength change and gramophone pick-up. Selectivity control and volume control. Permanent Magnet Moving Coil Loud Speaker of the latest type. Handsome walnut and brown finish cabinet 20" x 14" x 10", with accommodation for batteries. Terminals for pick-up and sockets for extension loudspeaker.

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