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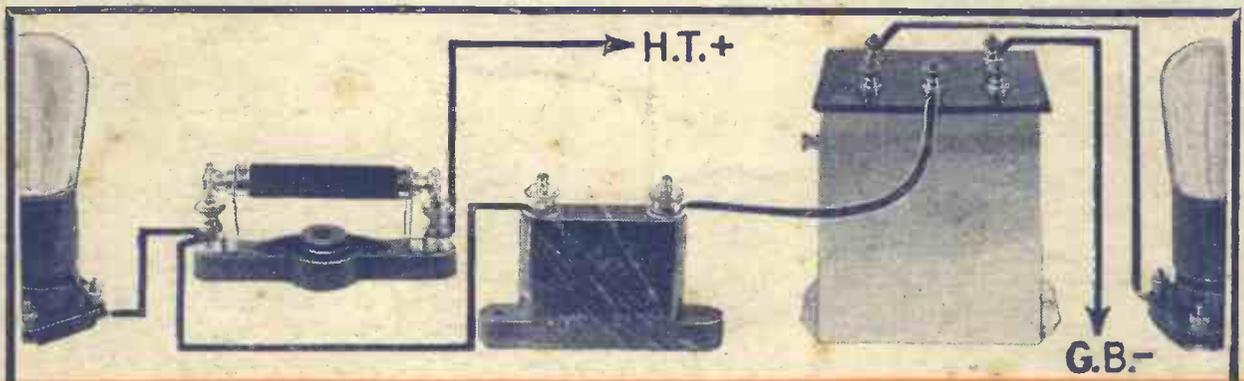
Amateur Wireless

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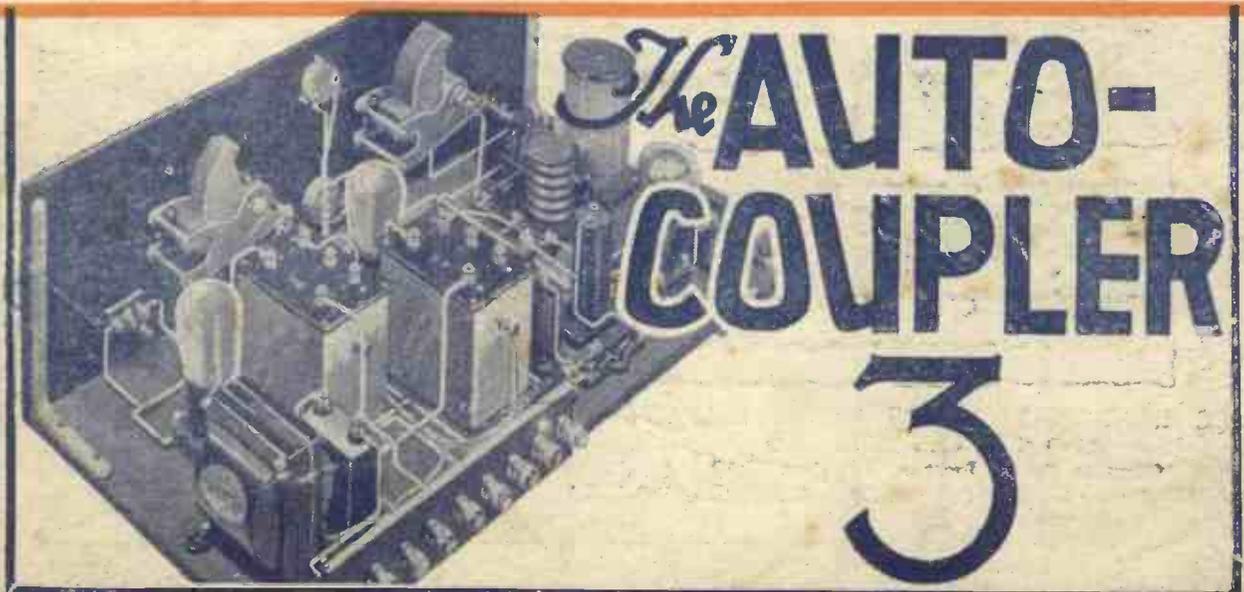
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Vol. XVI. No. 406

Saturday, March 22, 1930



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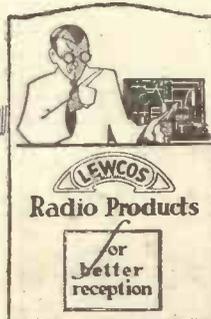
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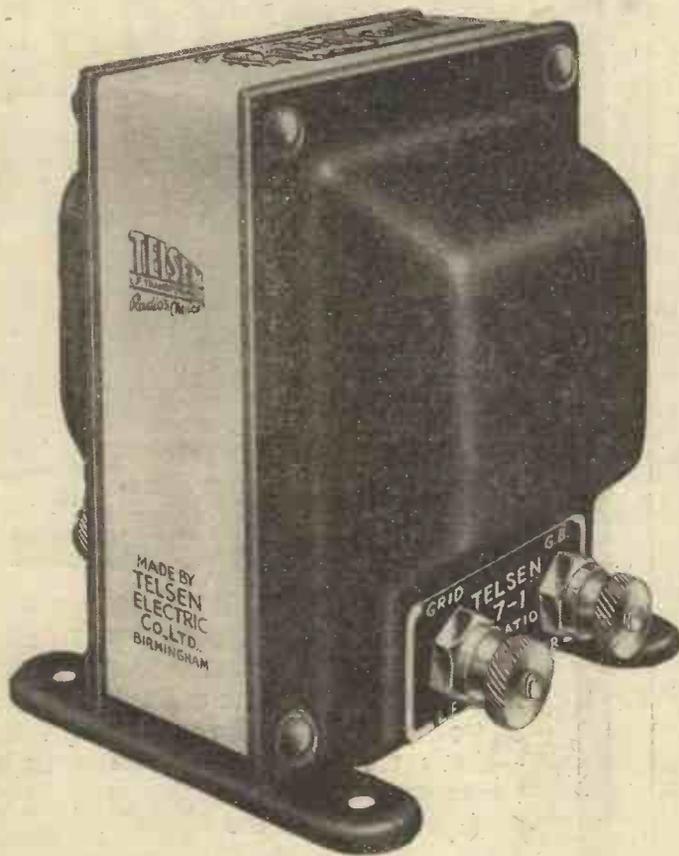


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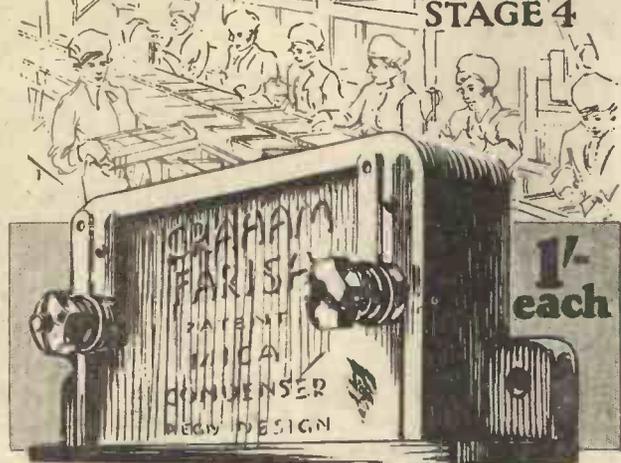
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Amateur Wireless and Radiovision

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How's Yours?—Those Highbrows—“Mike” Catches a Thief—A New Use for Speakers!—The “Effects” Room—Television and Speech—To Africa on 10 Metres!

How's Yours?—How is your reception now that the two Brookmans Parks have been working for about two weeks? Some people say this about the Regionals and some say that, and a very pronounced “that” in some cases! But what matters is how you are faring. If you've any peculiar selectivity experiences, or any novel gadget for sharpening up the tuning, then let us have it for the benefit of other readers.

Those Highbrows—Despite criticism, the B.B.C. concerts of contemporary music still go on. Did you listen-in to “Facade,” which is the latest plaything of modern Chelsea? A well-known music critic said:

“It is a pity that television played no part in the broadcast of the fantastic inanities of ‘Facade’; it would have been so much more ludicrous.” Some people called it a Sitwellian orgy. There is no doubt that these things are not generally popular.

“Mike” Catches a Thief—An East End firm of cigarette manufacturers adopted a novel idea recently to catch a petty thief. Three microphones were installed by a Marconiphone engineer, in the guise of a telephone inspector, and a five-valve amplifier was installed on the roof. Then detectives listened in on phones during the early part of the night until a rustling sound was heard and footsteps.

They made their capture—the night watchman. He is probably still wondering how he was caught!

Even American kiddies seem surprised to see such a giant radio set as this! This outsize in sets has been erected in one of the main streets of Boston, Mass.

A New Use for Speakers!—A new use has been found for a loud-speaker on a race-track, where it is used to start races. A gramophone record, which incorporates the warning “Are you ready? Set,” is played through an amplifier, and is immediately followed by the actual pistol shot. This method of starting a race has been found to be most satisfactory, as every competitor clearly hears the warning. In some cases the pistol shot is incorporated in the record! Philips have just rigged up a big “L.S.” installation, using such a record for race-starting.

The “Effects” Room—Most people heard the play *Exiles* which was broadcast

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recently from the main stations. From the radio point of view, it is the most interesting play we have yet had. A B.B.C. dramatic official says that in *Exiles* they had to make the greatest use of the various effects which Savoy Hill can now offer as an accompaniment to radio drama. No matter what you thought of *Exiles* from the interest point of view, you must admit that the various effects were very well done.

Television and Speech—Both television and speech will, for the first time, be broadcast from the Brookmans Parks on March 31. “Sight” will come through on 261 metres, while the 365-metre B.P. will give the accompanying sound. This first programme, starting at 11 a.m., will be an introduction by our radio critic, Mr. Sydney Moseley, a speech by Sir Ambrose Fleming, and items by Miss Gracie Fields, Miss Annie Croft, and Mr. R. C. Sherriff. Lord Ampthill and Sir Edward Manville may also broadcast.

To Africa on 10 Metres!—These amateur transmitters in this country do cover the globe with ultra-short waves. Here comes news that an amateur at Herne Hill, the owner of the transmitting station, G5WK, has recently succeeded in opening two-way communication with South Africa on a “wavelet” of 10 metres! This marks a new stage in the use of these extremely short wavelengths.



THOSE ALTERNATIVE PROGRAMMES!

Listeners have been promised full alternative programmes with the coming of the Regional Scheme. Here is information from a Savoy Hill



NOW that the Brookmans Park stations have been working together for a fortnight, listeners will want to know how they stand regarding a choice of programmes. The opinion was expressed last week in AMATEUR WIRELESS that the Regional Scheme is wasting the ether—owing to the difficulty which may arise in the future in getting a reasonable number of programme alternatives.

Particular interest, therefore, attaches to what amounts to a "statement of policy" from a Savoy Hill official. It explains the way in which the Regionals will—according to plan—provide a choice of programme matter.

The National programme, we understand, will remain very much that which has hitherto been known as the 2LO and 5XX programme. To it will be added the Regional programmes, providing contrasted alternatives.

Some similarity will be noticed in what may be called the "lunch time" period, that is, 12 to 2.30 p.m., National, and 12 to 3 p.m., Regional, when light music will be given. These programmes will provide for late workers who cannot listen in the evening; and for the trade, to facilitate radio demonstrations.

In the 5.15 to 6.15 p.m. period, the Regional wavelength makes possible an

alternative. The National and Midland Regional programmes will consist of Children's Hours, as in the past from 2LO, 5XX and 5GB; but London Regional will, in this period, give dance music.

Again, after an all-stations' broadcast of the first news bulletin, which will take place at 6.15 p.m. as usual, the Regional wavelength will help to solve what has been the very difficult problem of trying to cater for a multitude of tastes outside those to which such items as "Foundations of Music," critics' talks and a series of talks at 7.25 do not especially appeal. While, therefore, the National programme will continue to give such things, some form of light entertainment will be broadcast from the Regional transmitters from 6.40 to 8 p.m.

official showing how the twin programmes will be arranged. Make a note of the times given so that you will know which station to tune in.

On the National wavelength, from 7.45 until 9 o'clock comes the first main programme of the evening, with the second news normally at 9, a talk at 9.15, and the second main programme from 9.40 until 10.30 or 11 p.m.

The evening's broadcasting will conclude, as usual, with dance music which will be broadcast on a new time scheme.

And now for Sundays! The main Sunday afternoon programme will begin on the National wavelength at 4.15, when there will be a concert lasting until 6 o'clock. The earlier part of the afternoon, before 4.15, will be devoted to the usual features, to which, from 3.30 onwards, there will be the alternative, from the London and Midland Regional transmitters, of a concert lasting until 5 o'clock.

The evening programme will begin in both instances at 8 o'clock with the evening service. Following the appeal at 8.45 and the news at 8.50, there will be, at 9.5 p.m., concerts of a contrasted character on National and Regional wavelengths, continuing until 10.30, when the Epilogue is broadcast.

These time schedules appear very satisfactory on paper, and a few weeks will serve to show how the choice of programmes will work. In the meantime, we can only "wait and see." K. U.

A RADIO BEDTIME STORY

"JUST a short one, Mummy. Tell me the story of the man who had two cats, a big one, and a little one, and as he wanted both of them to come into his bedroom every morning, he cut two holes in the door. You know, the large one for the big cat, and a smaller one for the kitten."

"You've heard that one so many times, Winnie. Now, listen, here's another."

"Once upon a time there was a very rich man who owned a singing bird which he called Twello. It sang beautifully, but everybody in the land could not hear it warbling, so he gave it away, and bought two bigger ones; he named them Reg and Nat."

"Were they much bigger?"

"Oh, ever so much bigger. He trained them to sing two different songs at the same time."

"What, quite different, Mummy?"

"Well, nearly almost different, at times. Don't interrupt, Winnie."

"Were the people pleased, Mummy?"

"The rich man said they were very pleased, darling, so they had to be."

"But were they pleased, Mummy?"

"No, not quite, because they heard bits of both songs and they were all mixed up together."

"And then what did he do?"

"He said that the songs were good for the people, and that they didn't know what they really wanted. You see in the meantime, he had been training another big bird, Fivex—a real big one—and now and then when he thought it was worth it, he got Fivex to sing the same song as Twello did, but in a much louder voice so that people could hear him all over the country."

"And then what happened, Mummy?"

"Now, let me see. Oh, yes. Then when he gave Twello away, he made Fivex work every day and he repeated all Nat said, did, and sang, so that . . ."

"But, Mummy, wasn't Nat a very big bird?"

"Yes, very big; he was even bigger than Fivex."

"And wasn't Nat's voice heard everywhere?"

"Yes, Winnie, and . . ."

"But, Mummy, couldn't the people also hear Fivex all over the land?"

"Yes, darling, and . . ."

"Well, Mummy, then what did he want Nat for?"

"Don't ask silly questions Winnie, but go straight up to bed."

JAY COOTE.

WHAT LANCASHIRE THINKS

The Puzzle of 2ZY

By **BAYNHAM HONRI**

THERE is an old saying in the North of England, "What Lancashire thinks to-day, London will be thinking to-morrow." But in the case of the problems of radio-reception selectivity, the two places seem to have been doing some pretty hard thinking concurrently.

"Breeze Up" at Blackpool

London, with its twin regional transmitters, has its selectivity troubles. Who has not met the London radio man who accuses the B.B.C. of broadcasting "all round the dials" of his set? In many parts of the British Isles, even those distant from broadcasting stations, the selectivity problem is cropping up in various forms. In the Fylde district of Lancashire, which is the area around the important county borough of Blackpool (also well known as a seaside resort), a fierce controversy has arisen in the local newspapers about the adequacy—or inadequacy—of the B.B.C.'s service to the town.

On one side it is affirmed that Manchester 2ZY, the nearest B.B.C. station, is weak in strength and impossible to separate from Toulouse. One local amateur, who is supporting a petition which is being sent to the B.B.C. on the subject, has stated in the *Blackpool Evening Gazette* that it is practically impossible to receive the Manchester transmissions locally without interference from stations on adjacent wavelengths. "There is only a 4 metres clearance between Toulouse and 2ZY," he said, "and this is an exceedingly small margin compared with the amount of clearance allowed to many of the German stations. To receive Manchester well, one would need a highly selective set, and this would be quite outside the means of the ordinary listeners, costing well over £50 to build." Others state that the reception of the Manchester station has steadily deteriorated since the site of the transmitter was changed from Trafford Park to the centre of the city, years ago, and that foreign stations are now the chief stand-by of Fylde-district radio men.

Explanations!

Another technical "expert" had some rather amazing theories on the problem. He said: "I think the principal trouble is that stations do not 'stay strong.' If Toulouse kept on its proper wavelength there would not be much difficulty. After the wave leaves a foreign station, it 'lifts,' and by the time it gets somewhere near us is at the same periodicity as at its source. When it works at practically the same power as Manchester, or at a higher power, there is heterodyning. Of course, the insertion of a wave-trap in the aerial circuit of a set might be of some advantage."

Another Grouch

A few listeners state that they have no difficulty in separating

2ZY from foreign stations and that the trouble is due simply to the use of receivers of obsolete design. They add, rather dryly, that the selectivity which allows them to listen to 2ZY is of no value, from the entertainment point of view!

I was recently in Blackpool and became interested in the fiery discussions that were going on. I had opportunities of trying my skill on various sets, and the results obtained may be of interest to those who are tussling with the battle of the Regional-National stations and to the disgruntled ones up Fylde way.

"Clearance"

First of all, I would like to consider the opinions and theories of some of these disgruntled gentlemen of Fylde. Take the grievance about the clearance in metres of 2ZY from foreign stations compared with the clearance of German stations from the adjacent wavelengths of other stations. The actual amount of "space" in the ether which a wireless telephony transmission occupies is measured in frequency, not wavelength, since the latter will vary numerically according to whether the station is high or low in wavelength. Thus, stations should not be closer in frequency to one another than 10 kilocycles, which is roughly equivalent to 1 metre at 200 metres, 5 metres at 350 metres, and 50 metres at 1,250 metres. So that the question as to whether a "clearance" of 4 metres is adequate for non-interference between broadcasting stations depends absolutely on the position of those 4 metres on the wavelength scale. In the case of 2ZY, which works on a wavelength of 376.4 metres, a clearance of 4 metres should give no heterodyning trouble, providing the stations on the adjacent wavelengths keep to them and don't go straying the smallest fraction nearer the Manchester wave.

Typical Results

Actual results obtained on various typical receiving sets in the neighbourhood varied.

(Continued at foot of next page)



2ZY, Manchester—the headquarters of Lancashire broadcasting

A SELECTIVITY SUGGESTION

NOWADAYS almost anything is worth trying which is likely to result in sharper tuning. Since the opening of the twin transmissions at Brookmans Park some thousands of London listeners must have been forced into tinkering about with all manner of "stunt" arrangements in the endeavour to get rid of the gigantic wipe-out effect resulting from the too close proximity of two 30-kilowatt broadcasters.

The conventional advice given by AMATEUR WIRELESS, and backed up by the B.B.C., is one of three things: shorten your aerials, insert a small condenser in the aerial lead, or add a wave-trap.

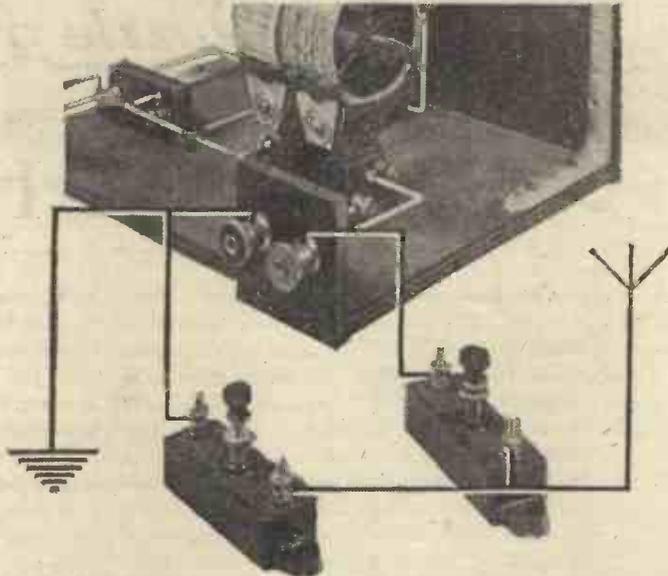
In some cases this advice does not effect a remedy, either because the set is too close to Brookmans Park or because the arrangement of the aerial circuit results in any one of the three schemes upsetting results or being ineffective.

Perhaps you have already tried inserting a small variable condenser or a .0001 fixed condenser in the aerial lead. This first suggestion is a variation. Two small condensers of the pre-set type are required, preferably having a maximum capacity of .0003 microfarad.

Connect them together and connect the two outside terminals by short leads to the actual aerial and earth terminals of the set.

Disconnect the aerial from its terminal and take it to the middle connection of the two condensers, leaving the earth connection as it is.

Screw the knobs of both pre-set condensers right in, so that the maximum value is obtained, and then tune in as



The connections of the condensers will be quite clear from this picture

usual. The two knobs can then be slacked off by a turn or so at a time, and the selectivity will vary accordingly. At the minimum position a certain loss of signal strength will be noticed.

The second tip for selectivity is an

elaboration of that mentioned recently in "On Your Wavelength," by "Thermion." It is, of course, well known that with some sets the tuning is sharper when the earth wire is disconnected, and this without affecting the stability.

This raises two points: first, that with a mains eliminator in which one mains wire is earthed it may seem impossible to remove the earth connection (for there is always one through the mains) and, second, that a snag arises if a loud-speaker extension is used.

Regarding the mains problem, one may try the effect of putting an H.F. choke in each mains lead, thereby stopping the high-frequency currents; but this may make the set rather unstable.

What is often forgotten when the earth is removed is that the actual tuning is upset when the loud-speaker extension is connected or disconnected, for this affects the amount of counterpoise earth in use. The remedy is to use an output filter circuit with H.F. chokes or to leave the leads connected.

This will obviate that annoying trouble, so frequently experienced when the earth lead is removed, of the tuning varying as the loud-speaker is moved about the house, or even moved about in one room. K.U.

"WHAT LANCASHIRE THINKS"

(Continued from preceding page)

With receivers including one stage of H.F. in circuits of modern design, little difficulty was experienced in picking up Manchester. The statement that a set costing £50 to build was necessary for the proper reception of Manchester seemed to me to be something of an exaggeration. Naturally, the selective reception of stations on adjacent wavelengths means that low-loss H.F. circuits have to be used, and that if the best-quality reception is desired, the tuning curve should be sharp, but with a flat top. Such a tuning curve is most easily obtained by having two or three stages of well-neutralised H.F. amplification, with each stage not too sharply tuned, i.e. with a little more resistance in the tuning circuits than is permissible when "low loss" is the ideal. But good reception under these circumstances can be obtained with far less elaborate circuits. Toulouse may occasionally stray away from its correct wavelength, and when this happens in the Manchester direction, the high-pitched whistle of the heterodyne between the two stations will ruin the reception of both.

Obsolescence

The sets I tested and tried in the Blackpool area which were not giving satisfaction were mostly of somewhat antiquated design. Swinging-coil reaction, plug-in coils, grid-leak-and-condenser rectification, absence of H.F. amplification, and other memories of the past, were prominent points about them. These, together with bad earths and long, multi-wire aerials, all helped to broaden the tuning of the less satisfactory receivers. In fact, in regard to the performance of old-type receivers, the situation seemed to be curiously the same as it is in London, with its two extra strong local stations having a big difference in wavelength. Further complications will arise when the Northern Regional stations are put into operation.

NEXT WEEK:

W. JAMES ON HOW
SELECTIVITY
AFFECTS QUALITY

AT THE QUEEN'S HALL

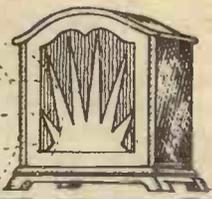
THE B.B.C. offered on Friday, March 7, a symphony, two concertos, and a bolero. The last was a dance rhythm, tapped out with gradually increasing force until the end. I trust that this field of experiment will now be considered exhausted.

The greatest work of the evening was the Brahms "Double Concerto." The soloists were Arthur Catterall, whom the audience was glad to see in this position, and Lauri Kennedy. The performance was spirited and distinguished. L. R. J.

In aid of the British Wireless for the Blind Fund, a ballad concert is to be held in St. Andrew's Hall, Glasgow, on March 22. The artistes who will contribute will include some of the most distinguished blind musicians in the country, and the B.B.C. are giving the services of the Wireless Octet and the Wireless Singers.

£17,000 was the figure collected on the recent Glasgow University Charities Day—not £1,700, as was stated under the photograph of a collecting car published in our issue dated March 8.

LOUD-SPEAKER RESPONSE CURVES



In this article Dr N. W. McLachlan, the well-known authority on loud-speakers, points out that the output from a loud-speaker may not be so terrible as the response curves would appear to indicate. Some interesting points are raised

FROM time to time curves appear indicating the performance of transformers, resistance-capacity amplifiers, and the like. These curves indicate the results which can be obtained under certain conditions. Occasionally we run across the term, "response curve of a loud-speaker," and occasionally such a curve is published. In appearance, compared with a good trans-

interference which can disturb the distribution of sound around the loud-speaker. A simple definition of a response curve would, therefore, be: a curve showing the relationship between the air pressure due to the issuing sound at various frequencies taken at any point in front of the diaphragm, when the voltage input to the power valve is constant.

they must be amplified some hundreds or thousands of times. Accordingly a suitable amplifier is connected to the microphone and the output from the former can be read on a meter. Knowing the calibration of the microphone the reading of the output meter can be directly converted into sound pressure due to the loud-speaker. The experiments are, preferably, conducted in a

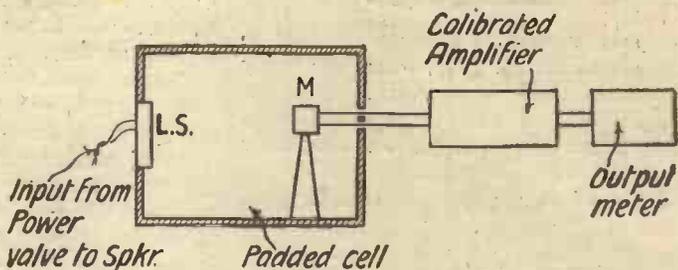
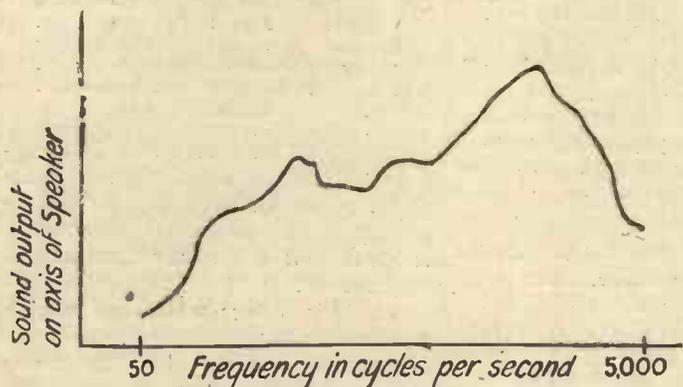


Fig. 1 (left). Illustrating response curve of a loud-speaker with conical diaphragm and large baffle. Fig. 2 (above). Method of taking response curve

former characteristic, the average loud-speaker characteristic looks like the profile of the Rocky Mountains on a reduced scale (see Fig. 1). Nevertheless in practice the output from the instrument is—aurally—not so terrible as the vagaries of the response curve seem to suggest. This is due to the peculiarity of the human ear, which itself is sensitive only to extremely large variations in sound intensity.

What Is a Response Curve?

What is meant by the expression, "response curve"? To reduce problems of this nature to the simplest possible state, the conditions associated with a response curve are usually deemed to border on the ideal. Just as transformer characteristics are taken under certain conditions where there is no valve following the transformer to inflict its effect (input impedance)—it throws a load across the secondary winding—upon it, so with a response curve we endeavour to take it under conditions where there are no reflections from the walls of the room. Nor are there other sources of

In practical measurements the arrangement for taking a response curve are indicated in Fig. 2. The loud-speaker is mounted to occupy a hole in a large wall so that one side of the diaphragm can operate quite independently of the other. At some convenient distance along the axis is situ-

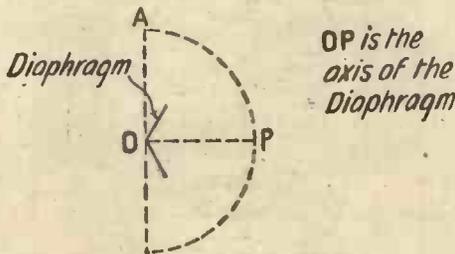


Fig. 3. The higher frequencies with a cone diaphragm are absent from certain points

ated a calibrated microphone M. The microphone responds to the sounds from the loud-speaker, and currents are generated as a result. These currents are much too weak to be measured directly, so that

free open space, where there is no superimposed noise and the air is calm. Care should be exercised to have the apparatus at an adequate height above the ground to prevent reflection therefrom. The net result of ground reflection would be to cause either an increase or decrease in the sound pressure at the microphone according to the frequency.

It is seldom convenient to go to the open spaces for experimental work—a captive balloon might serve the purpose in a large city!—and one must, therefore, be content with some condition of a more or less approximate character. To this end the walls and floor of a room are covered with absorbent material, which prevents reflection of sound as far as possible. Arrangements are usually made so that all the measuring apparatus (and the research engineer!) are without the walls of this padded cell. In this way the observer is kept out of the line of fire of the loud-speaker and his body cannot interfere with the distribution and magnitude of the sound. In any case it is a very difficult

matter to provide adequate ventilation within such an enclosure.

In our elementary definition of "response curve" we said that the mechanical pressure due to the sound was to be measured at any point in front of the loud-speaker. As a general rule, the response curve will vary according to the particular point chosen. It is desirable to select a point from 3 to 5 metres from the diaphragm, since one usually listens at such a distance. If we draw a semi-circle with the apex of the diaphragm as centre (see Fig. 3), we can place the calibrated microphone anywhere upon the semicircle. Choosing the quadrant PA, the response curve will vary with the position of the microphone on PA. At

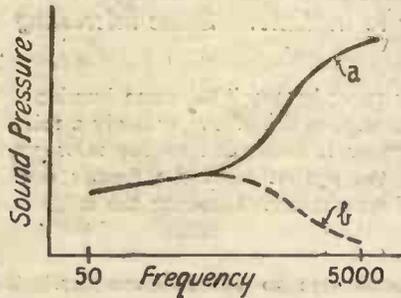


Fig. 4. Illustrating sound pressure at P(a) and at A(b) in Fig. 3

the point P, suppose the curve is akin to that shown in Fig. 4 (a), where the upper register is more marked than the lower. What type of curve can we expect to obtain at A? When the diaphragm is an absolutely rigid, flat disc, the response at A will be lacking in high frequencies, due to an effect known as "interference," i.e., the radiated energy at the sides of the disc can be regarded as destroying itself.

Theory and Practice

In practice, however, a diaphragm is not rigid and some parts of it move forward, whilst others move backward. The net effect is that with a paper diaphragm the higher frequencies are absent from points such as A in Fig. 3, and the response curve is of the form shown in Fig. 4 (b). An observer situated at A would hear sounds similar to those emitted from a set with very heavy reaction. The reproduction would lack brilliance. It is important to observe that this applies to the loud-speaker when operated in the open air free from external interference. On the other hand an observer at P would find the result of, say, an orchestral item a bit too brilliant. Now, as we remarked before, listeners do not shiver in the open, nor do they rusticate in padded enclosures, even in the best interests of improved reproduction. Hence we must interpret the response curves of Fig. 4 in terms of ordinary domestic conditions.

Anyone who has even a passing interest in loud-speaker performance must have noticed that the quality varies from room to room. It also varies with the position of the speaker or the listener in any particular

room. Several years ago, when loud-speakers were more of a nightmare than a pleasure, this statement would have been rather ludicrous. But, despite the failings of present-day loud-speakers, it is easy for the reproduction from a good speaker to be marred by an inappropriate room or by the promiscuous choice of its position in a room. I do not propose to give a general solution for this little problem, because the experimenter can readily cope with the situation himself. Every room has curtains, etc., which damp the sound. The higher frequencies are usually damped more than the lower frequencies, so that in a heavily-draped room the reproduction may lack brilliance.

Local Effects

Suppose the response from a loud-speaker is such that the low frequencies are equally reproduced from P to A of Fig. 2, whilst the higher frequencies are focused like a beam as shown in Fig. 5. Further, let the energy emitted by the loud-speaker at all frequencies from 50 to 10,000 cycles be equal, despite the focusing effect at the higher frequencies. This means that the pressure on the axis will increase with the frequency as shown by the response curve of Fig. 4. Such a loud-speaker would sound rather terrible in the open if one listened at a point on the axis. But in a room where the sound is reflected from the walls, floor, and ceiling, the pressure tends to even up and constant energy will mean a fairly constant pressure at all frequencies, say, at the end of the room remote from the loud-speaker. Of course there will be a decrease in the upper register due to the enhanced absorption at high frequencies. On the axis of the loud-speaker the higher frequencies will be more powerful. This can be verified experimentally, and is an

extremely important fact. To crystallise the argument we can say that under suitable room conditions, when one listens in an appropriate place, it is the total energy from a loud-speaker at any frequency which matters, the distribution of the sound in front of the diaphragm being of secondary importance.

This being an experimental fact, the reader will immediately see how erroneous it would be to draw conclusions from the response curve of Figs. 1 or 4 (a) alone. By itself, we should say the speaker was awful. In practice the effect of a room is to alter the result from a travesty to a reality.

If a response curve taken on the axis shows a powerful bass, the result in prac-

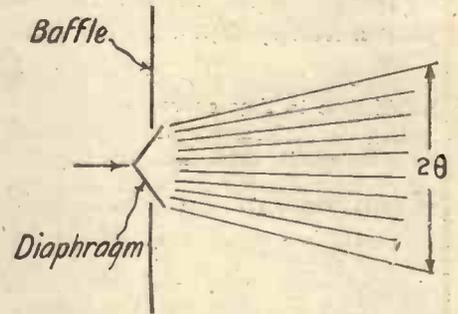


Fig. 5. Illustrating focusing effect of a diaphragm at high audio frequencies. The energy is confined almost entirely to a narrow beam of angular width 2θ . The angle 2θ decreases with increase in frequency

tice is usually disconcerting, since the damping of the average room at low frequencies is small. Considerable annoyance can be caused by placing the speaker in a room so that one or more of the room resonances is readily excited.

In conclusion, there are a large number of people whose business it is to demonstrate loud-speakers to the public. Since the room or enclosure exercises an appreciable influence on the reproduction from a good loud-speaker, it is advisable to demonstrate the instrument under suitable conditions. Loud-speakers for average household purposes—into which category by far the greater number fall—should be arranged to give the proper acoustic atmosphere and a reasonable degree of loudness which any person of normal temperament and aural proclivities will tolerate. Demonstrations amid a plethora of cosmopolitan junk, however fantastically arranged or camouflaged, are not, in general, calculated to be suited to either musical artistry or to the reproducing propensities of the loud-speaker.



A Slade Cartoon of Cicely Courtney

Mr. W. D. Terrell, chief of the U.S. Radio Division of the Department of Commerce, stated, because of the scarcity of trained radio engineers, the United States Radio Commission has three positions unfilled. They are the posts of chief engineer (£2,000) and two assistants (£1,500 each). Eight to ten vacancies for radio inspectors are waiting to be filled with salaries from £480 to £1,200 a year.

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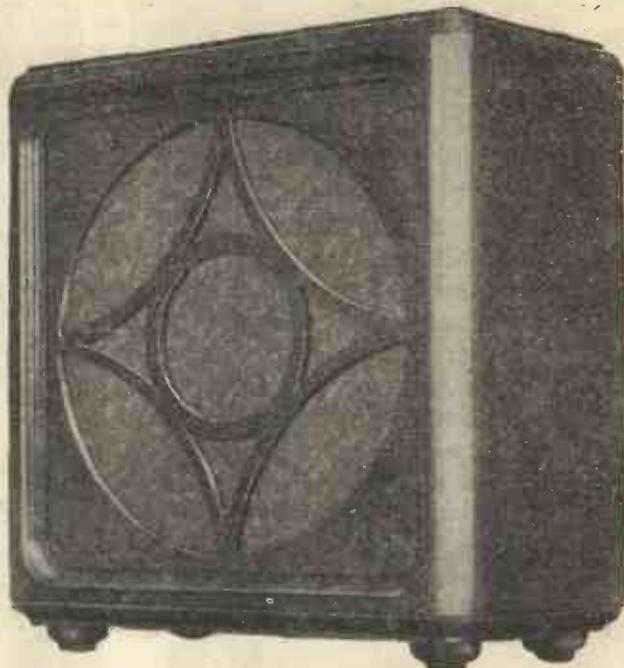
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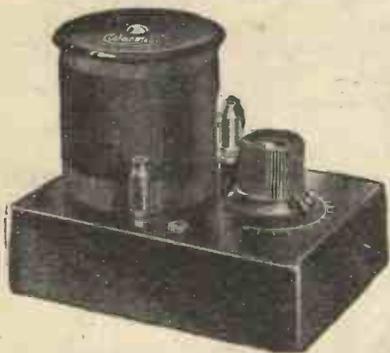
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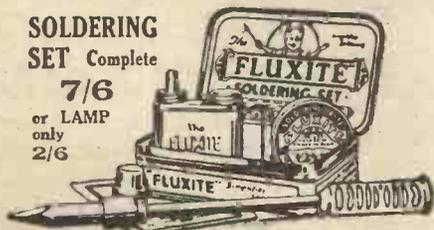
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On Your Wavelength!

Straws Show

NOT so very long ago we prided ourselves upon having the best wireless programmes in Europe, and that there was some justification in our boast was proved by the fact that the foreign papers in their lists of transmissions always gave special prominence to 2LO and 5XX. Now I notice, in the French paper that I see, that it is far more common for none of our stations to be mentioned at all. The issue before me as I write, for example, selects items from Genoa, Hilversum, Madrid, Bucharest, Eiffel Tower, Breslau, Toulouse, Copenhagen, Hamburg, Prague, Frankfurt, and Königsberg, but makes no mention of any British station. On the previous day the only one of our stations mentioned was 5XX for a single item. There is certainly no question that our stations are well received in France, for both 5XX and the 356-metre 2LO are heard all over that country. The only conclusion, then, that one can come to is that our French friends feel that they can get brighter items from other stations. Some of us have the same idea.

Meeting the Case

Our manufacturers are rising nobly to the new conditions imposed by the coming of "Raucous Reg" and "Noisy Nat." Though one expects something pretty good from the best firms, I have been agreeably surprised lately to find just how good are the new sets that some of them are now turning out. It comes my way quite a lot to test out manufacturers' hook-ups before the final design is decided upon. Mine happens to be one of the prime spots of the swamp area of Brookmans Park, and set after set is sent down to me to be put through its paces on both indoor and outdoor aerials before the design is finally passed along to the workshops for production on a large scale.

Testing of this kind is most interesting work, for one is able to see how different designers tackle the very knotty problems with which they are now presented. What I do like about some of the very latest models is their combination of complete efficiency with utter simplicity. When you have dials calibrated in wavelengths—and properly calibrated—when, even with an outdoor aerial, you can tune in or tune out either "Raucous Reg" or "Noisy Nat" with a tiny movement, when the volume control is as smooth as smooth, and when reaction is like velvet, then you can say that you have a wireless set worth using; and many of the newest sets that I have tried out do all these things, and more.

An Interesting Point

One of the greatest handicaps which our

makers have had to labour under during the last three or four years is how to make their sets capable of receiving by the mere flick of a switch, either the medium-wave or long-wave stations. American designers have had no such handicap, and have therefore been able to produce sets of wonderful efficiency. We are now in much the same position, except, of course, where the purchaser insists upon a set capable of receiving all Europe. It used to be essential for a set to be able to pick up 5XX's programmes, but this is no longer of such importance, since the National transmitter is now sending out the same programmes, and shortly every regional station will have a medium-wave transmission of this programme. I expect that we shall see quite a number of sets brought out before the next exhibition designed only for the medium band. Though those who purchase them won't be able to get Hilversum and Huizen and Motala and Radio Paris, they will gain enormously in simplicity and in efficiency upon the medium waveband.

What of 5XX?

Speaking of national programmes prompts me to inquire what is going to happen to 5XX when all five regionals are in operation with twin transmissions. The idea is that one of these shall send out the national programme and the other the local programme. Clearly, then, it will be unnecessary for 5XX also to transmit the national programme. Will it continue to do so in order to keep this wavelength for the B.B.C. or will it be closed down? Or is it proposed to make 5XX the Midland National transmitter and 5GB the Midland local transmitter? In any case, it seems to me that 5XX is going to be rather wasted, for this is the most reliable of all our home stations and has, even with its present power, the greatest range. I believe that if 5XX were put up to 100 kilowatts it could take charge of all the national part of the programmes and make twin transmitters, with their attendant evils, quite unnecessary.

The Short-wave Revival

I was bold enough to predict recently that we should very soon be finding conditions far better for short-wave reception. This prophecy, rash as it may have seemed, has been born out in fact, for there has been quite a definite strengthening up in distant short-wave signals. Except on occasions, stations are not yet roaring in as they did a couple of years ago, but the nights when one can hear nothing at all below about 30 metres are becoming fewer and fewer. Quick fading also is rather less in evidence. I am going to be very rash

now by predicting that within two months from this date short-wave enthusiasts will be having as good a time as they had the year before last. And not only the short waves show signs of improvement. Anyone who is fond of distant listening on the medium waveband must have noticed how much better foreign stations are coming in now.

Wanted—REAL Valve Figures

It is, I think, rather a pity that makers always give the figures for their valves for zero grid volts. In the modern set few valves, if any, are operated in this way. Many people, for example, use from .75 to 1.5 negative bias on their H.F. valves; the detector has always a positive bias if it is of the leaky-grid pattern and a negative one when the anode-bend method is used; L.F. valves are given all the negative grid bias that they will stand for proper working. Would it not be much better if the figures for impedance and amplification were given not for zero grid volts, but for a grid bias suitable to the plate voltage recommended for ordinary working? At any rate, these figures might be given in addition to those which we now have, and they would be exceedingly useful to the designer of coils, transformers, and complete circuits.

D.C. Mains

Every day in every way, I become less envious of the people who have D.C. lighting mains in their houses, especially those with "positive main earthed." A friend of mine recently bought a commercially-made electric gramophone, with an amplifier designed to work from the house electric supply. In the shop, it worked splendidly. But when he got it home, the signals were weak—and the hum of the electric-light station's generators was reproduced loudly and clearly! Needless to say, his house supply was from a three-wire D.C. system, and the positive main was earthed. At least, it was nearly earthed! The hum was practically eliminated by putting a large L.F. choke in the negative H.T. lead. This choke had a low D.C. resistance and an inductance of 25 henries, and was used in addition to one already in the positive H.T. lead. The general rule in such cases is to put the smoothing choke in the house mains lead which is not at earth potential; if it is in the other lead, the earthing of filaments or screening boxes (through a condenser) will short circuit and nullify the smoothing effect of the choke.

Directional "Mikes"

I had been hearing things about "directional" microphones in connection with the recording of talkies, and so I betook myself

:: :: *On Your Wavelength!* (continued) :: ::

the other day to Elstree to find out what it was all about. Some years ago, the B.B.C. experimented with various devices for restricting the microphone pick-up to a certain direction. This was intended to be used in relays of operas and musical comedies, when the principals moved about the stage as they spoke their words. The experiments were not entirely successful, for it was not found possible at the time to obtain a good directional effect without considerable loss of quality. Since then, the B.B.C. practice has been to have many microphones placed in the footlights and around the stage, and to fade from one to the other, so that the microphone nearest to the artistes was the only one "alive." The ex-B.B.C. engineers at Elstree have now devised a horn fitting for the talkie microphones, which definitely limits the direction of sound pick-up with but little loss of quality. It is a queer copper affair, with little resonance chambers next to the microphone itself. An engineer sits in front of the "set" and points it at the actor speaking.

Progress

This directional microphone is a tricky gadget. I am told that it gives marvellous results—sometimes; at all other times, it gives a peculiar "gramophony" tone to the quality of speech. Still, it has been found to be a reliable stand-by when it has not been possible to have an ordinary microphone close to a speaking actor. Normally, in talking-picture recording, the microphone is hung as close as possible to the actors without being "in the picture." Sometimes it is in the picture, disguised as a Post Office telephone, a flower pot or a chandelier. The more echoey a studio is, the nearer the microphones have to be to the actors. And so, talking picture studios are made as "dead" to reverberation and echo as possible.

Reverberation

The problems of echo and reverberation are quite different for the various types of mechanical reproduction. In broadcasting, the sound is usually reproduced in a small room having a short period of reverberation. Assuming that the quality of the receiver is good, a reasonable amount of echo and room reverberation may be permitted without reducing the intelligibility. Almost the same rule applies to gramophones, though in this case the recordists have to remember the large number of poor-quality portable gramophones and other relics of the past which are still being used, and on which echoey records sound mushy. In talking films, the sound is reproduced in a theatre with a reverberation of, at least, 1½ seconds. If there is an echo on the original recording, it is added to the

theatre echo, with the result that speech is not clear or intelligible. So that, so far as talking pictures are concerned, echo should be as dead as the proverbial doornail.

The Surprise Item

By the way, I wish the announcers of the B.B.C. would give us some indication at the end of the "Surprise Item" as to the identity of the performers. Once or twice lately I happened to switch on in the middle of a "Surprise Item," which has been somewhat attractive. For example, the other night I tuned in to a fellow and a girl who were putting over some quite clever mimics. "I May be Wrong," rendered as it might have been sung by Tallulah Bankhead and Frank Lawton, was exceedingly funny, and I have not the remotest idea who the two entertainers were.

With an ordinary programme, if one switches on in the middle it is always possible to refer to the printed programme, and even if the time does not synchronise exactly with the schedule, one can, at any rate, make an intelligent guess as to who the performers are. With the "Surprise Item" no such solution is possible, and I think it would be really desirable to announce at the end who the performers were, as well as introducing them at the beginning.

Graduated Exploration in Television

I have mentioned before in these columns the question of the best type of hole to use in the scanning or exploring disc for television purposes. Judged from the standpoint of the most economical use of a given area for the light to pass through, then obviously the square hole is best suited, and under normal circumstances this is the case. There is another aspect, however, which calls for a certain modification. In order to keep within the kilocycle sideband now available, the detail or extent of the scene is, of course, limited, and it becomes necessary to make use of this allocation to the maximum effect. The Baird Company has therefore developed what is aptly termed graduated exploration.

Three holes at the beginning and three holes at the end of the spiral of thirty around the disc periphery are made rectangular, the longest side of the rectangle being in a radial direction. Thus for a given picture width, the remaining twenty-four square holes are slightly smaller than they would be if the whole thirty were square. The resultant picture has a finer grain over about the inner two-thirds than at the outer edges.

Concentrating Detail

This gives the effect of concentrating the available detail to some extent in the centre portion of the picture where it is most use-

ful. The claim for improvement would appear to be quite justified by pursuing this policy and in the machines now going on the market, the discs are designed in this way. In addition, it is as well to note that the picture ratio is 7 to 3, that is depth to width. This information is necessary for those who wish to try their hand at making up discs for themselves, as it will enable them to calculate the hole positions exactly. Unless the correct number of holes and the right picture ratio are used, the resultant image will naturally be distorted as some amateurs who have taken up television have already found out.

Picture Drift

Although the inclusion of the cogged-wheel automatic synchronising device is necessary to hold the picture steady, provided one has an efficient motor for driving the receiver disc, the picture drift can be reduced to the barest minimum by manipulating carefully a motor field rheostat. Bearing in mind that the neon is behind the disc and on the right-hand side when viewed from the front, the motor should revolve in an anti-clockwise direction when looking straight at the disc. Any upward drift of the picture, therefore, means that the motor is running too fast and conversely a downward drift indicates that the speed is too slow. One can become quite adroit at manipulating the rheostat and reduce any drift into a slight hunt about a mean position.

Dual Transmissions

The date when the second wavelength is to be placed at the disposal of the Baird Company by the B.B.C. has now been definitely settled. From Monday, March 31, all those in possession of a Baird Televisor and a loud-speaker, together with the two receiving sets for tuning in the signals, will both see and hear at the same time. Vision without speech was almost as bad as speech without vision, and the combination of the two will thus enable the amateurs to judge for themselves what benefits this new science of television has to offer.

Choosing Your Records

A lesson could be learnt by the gramophone papers from the present issue of *Wireless Magazine*. I refer to the admirable arrangement of presenting lists and tabloid criticism of new records. I have already made a note of half a dozen to get the next time I visit my dealer, and many gram-radio enthusiasts must find the feature of equal value.

Indeed, if you are as keen as I am about these things, you will kick yourself if you fail to get a copy before your newsagent has sold out! THERMION.

WIRELESS PROGRESS IN GERMANY

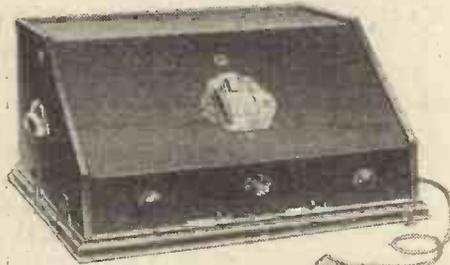
Some Impressions Culled
from the Leipzig Fair
By J. H. REYNER

A YEAR or two ago few people would have thought it worth while to visit Germany in order to see what is being done there in the radio field. To-day an increasing number of people travel to the various fairs and exhibitions which are held during the year, for it is becoming evident that German design and manufacture is attaining a high standard. I have just returned from a visit to the Leipzig Fair, which is held every spring and possesses a quite extensive radio section.



The German radio industry differs from that in this country in one important particular. The Telefunken Co., which holds the principal patents, only licenses a limited number of firms to make complete radio sets. This number is between twenty and thirty for the whole of Germany, and no increase in the number is permissible under any circumstances. In fact, the tendency is for the number of firms to decrease, for if any firm ceases to manufacture, the licence is not transferred to some other firm without a very special reason.

Whatever one may think of such a condition of affairs, it undoubtedly has the effect of maintaining a good standard. The



A good example of German receiver design—the Telefunken, 90/W

receivers which I saw at Leipzig all impressed me with the neatness and compactness of their construction, even though I did not like the design in many cases. Moreover, the receivers were not merely an assembly of components. They were definitely production models in which the majority of parts were specially made for the receiver with the view to saving time in assembling and a general reduction of the cost.

As regards the receivers themselves there was, I think, little of particular novelty. The greater number exhibited were intended for mains operation, for Germany is much better equipped than we are in this country

in the matter of electric power supply. We must cater to a large extent for users who have no electric supply, and therefore with us the battery sets predominate; but in Germany, as in America, the reverse is the case. Two sets impressed me particularly.

German Receiver Design

The first of these was the Telefunken 90/W set. This is a five-valve receiver for mains operation, provided with a single tuning control calibrated in wavelengths for both wavebands. A photograph of this receiver appears herewith, and it will give some idea of the general trend of design in Germany. The key in the front locks the cover, and switches the set on or off. The very act of unlocking the cover, therefore, makes the receiver dead; so that no danger will result from an examination of the inside.

The coils in this receiver were of special interest. They were cylindrical coils wound on a relatively long former and arranged to cover both wavebands with a switching system. The coils were then housed in copper tubes, having open ends, the diameter of the tube being about 1 in. greater than the diameter of the coils. This gives a partial magnetic screen, which is apparently sufficient, even with a relatively high-power receiver, if used in conjunction with simple capacity shielding between the condensers and valves.

Few Portables

The second point of interest was the Seibt portable set. There are very few portables in use in Germany—a marked contrast to the state of affairs in our own market. In the whole of the exhibition I only saw two or three, whereas at a British exhibition almost every other stand is exhibiting a portable set of some form.

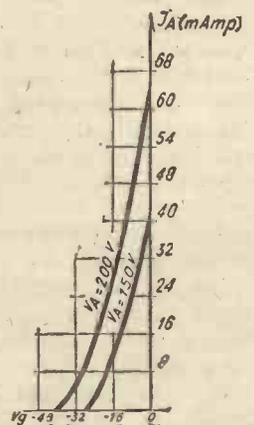
The Seibt portable was a screen-grid

four, having two tuning circuits. It was of the suit-case type with the loud-speaker in the lid, the batteries being housed in the main case towards the back, while the receiver itself is towards the front. The interesting point was that the receiver was built on an entirely separate frame, so that it could be removed entirely as a unit. Another noteworthy point was that the batteries were provided with Fahnestock clips instead of plugs and sockets. This is, perhaps, a little more expensive, but it is undoubtedly preferable to

our own system of wander plugs, and I often wonder that greater use is not made in this country of this very convenient form of terminal.

Loud-speakers were exhibited in great numbers. In fact, one might say they were the outstanding feature of the exhibition; but the organisation was bad in one respect, namely, that every firm was allowed to demonstrate its own records instead of taking a common output, as is done in this country. The result was an unpleasant blare rather than a melodious noise, and this made it rather difficult to judge the quality of the exhibits. There was nothing, however, which appeared to

The characteristic curve of the Telefunken RE304 valve



be of outstanding merit by comparison with the standard of reproduction in this country.

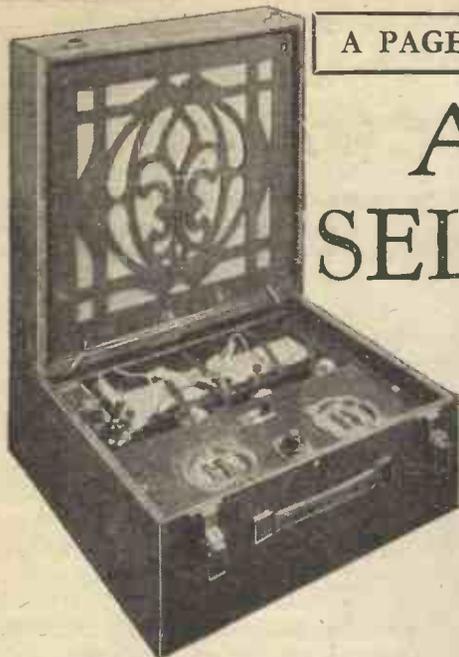
A review of the new German valves is of interest. Generally speaking, the German valves run more or less on parallel lines with our own. Four-volt heating is, of course, universal throughout Germany, except for special valves where a higher filament voltage is employed. The result

(Continued in third column of next page)

A PAGE FOR THE SET BUYER

ARE PORTABLES SELECTIVE ENOUGH?

In drawing attention to the question of selectivity in portables, "Set Tester" gives the results of his experiments with the Kolster Brandes K.B.103 Portable



EVER since Brookmans Park started in earnest, the word selectivity has loomed large in the conversation of wireless listeners, especially in southern England. Many unsuspected troubles have been encountered since the B.B.C.'s high-power era came into being. Portable sets, to give one example, have been amongst the chief sufferers from twin-transmission mix-ups.

Many portables are inherently unselective. They rely on the directional properties of the frame aerial to separate stations. As the two Brookmans Park transmissions come from the same direction, this means of obtaining selectivity is obviously useless.

From the point of view of selectivity, the portable having two stages of tuning is the most useful in dealing with high-power twin transmissions. The sharp tuning of the frame-aerial circuit with the added selectivity of an inter-valve tuning circuit is, in my opinion, sufficient to cope with the new problem.

One of the best designed four-valve portables I have yet tested is the Kolster Brandes K.B.103 model. It is made by Kolster Brandes, Ltd., of Cray Works, Sidcup, Kent. The price is 18 guineas—an inclusive figure. The circuit consists of a screen-grid high-frequency amplifying valve, a detector, and two transformer-coupled low-frequency amplifying valves. There are two separate tuning controls, giving the degree of selectivity necessary for modern conditions.

Designed on the suit-case principle, the Kolster Brandes portable is more robust than usual. The lid is unique; when opened the hinges bring it forward, so that it is supported by the back of the set. As with all Kolster Brandes sets, this portable is exceptionally sturdy in its construction.

I like the control of this set. Thumb-operated discs, with fast and slow move-

ments, control the two tuning circuits. Both wavelength bands are covered. The medium wavelength range is roughly from 180 to 580 metres. On the long waves the tuning goes from under 1,000 to well over 2,000 metres. The wave-change switch is also the on-off switch.

Sensitivity in a set can usually be judged by the amount of reaction that has to be used to tune in well-known stations. I found that I could get such old friends as Toulouse, Langenberg, and Rome with very little reaction. The range of this portable is considerable. The strength of the weaker foreign stations is increased by the use of reaction, which builds up the signals very satisfactorily.

There is something distinctive in the

Every set referred to in this regular feature by "Set Tester" has reached a certain standard of efficiency in the "Amateur Wireless" Laboratory. Reports are not given on sets that fail to reach this standard. This will explain why reports that do appear express general satisfaction with the set's performance.

quality of reproduction on the Kolster Brandes portable. I am especially impressed by the clarity of speech.

Maintenance Costs

The upkeep costs of this portable are less than might be expected. One of the best points about the K.B.103 is its low anode-current consumption. My measurement gave a reading of just under 7 milliamperes. This was taken while the set was in operation. The self-contained high-tension battery should last for several months. The accumulator is rather small and will require recharging for every twenty-five hours of service. It is of the non-spillable type.

The designers of the Kolster Brandes portable have eliminated some of the weaknesses of this type of set. They have paid attention to the minor details. The wander plugs for the high-tension and grid-bias batteries are a good fit in their sockets. No amount of rough handling seems likely to unhook the battery connections.

To those listeners anticipating trouble from high-power local interference I warmly recommend this Kolster Brandes portable. Besides offering a welcome relief from local-

station interference, this set provides a good selection of foreign stations at full loud-speaker strength.

"WIRELESS PROGRESS IN GERMANY"

(Continued from preceding page)

is that the number of types of valves is considerably reduced.

It is interesting, perhaps, to compare one of the newest Telefunken valves, the RE304; with similar types of our own. This valve is a 4-volt output valve, and I have compared it in the table below with the Osram P425:—

	RE304	P425
Filament volts ...	3.8 to 4.0	4.0
Filament amps. ...	0.3	0.25
Max. anode volts	200	150
Internal resistance	2,500	2,300
Amplification factor	5.0	4.5

A characteristic curve of the Telefunken valve is also appended. It will be seen that the figures are much the same in the two cases, the only point of difference being that the maximum anode voltage is somewhat higher in the case of the Telefunken valve.

A rather interesting Telefunken valve of which I cannot call to mind an equivalent is the RV218. This has a filament taking 1.1 amperes at 7.5 volts, and will stand up to 800 volts on the anode. The valve is really a small transmitting valve, but should have possibilities for power amplification. The characteristics are shown below.

TELEFUNKEN RV218

Filament volts ...	7.5
Filament amps. ...	1.1
Maximum anode volts ...	800
Internal resistance ...	3,500
Amplification factor ...	7.0

Maximum anode dissipation 24 watts
The valves in normal use, such as screen-grid, detector, L.F., etc., are generally very similar to our own, and there is little of interest here.

Generally speaking, one came away with the impression that, while the Leipzig Fair reveals little startling novelty, the German radio industry is in a flourishing condition.

SYDNEY MOSELEY'S WEEKLY PROGRAMME CRITICISM

A Change
of View
The Cup
Final

**WITHOUT FEAR
OR FAVOUR**



The
Sunday
Programme
The
Claque

SAVOY HILL does not repeat itself, but I see that much publicity has been given to a new series entitled "Great Hoaxes."

I myself gave a talk on the same subject, giving most of the particulars that are now advertised, some long time since. Then the subject was only considered worth one talk. Now, however, there is to be a series. Quite worth it, you will find.

In a programme that frankly bored me I chanced my arm—or, should I say, my ears?—and listened to Clapham and Dwyer again. The people who were with me in the room laughed again and again; and, alas, I was in the minority of one!

Well, we could not have the running commentary of the F.A. Cup, and we had a good musical programme instead. I think the F.A. is right in not risking losing its audience, while the B.B.C. is certainly right in not yielding to extortionate terms for the privilege of broadcasting.

Was it a coincidence that Marcelle Meyer had to have a special announcement concerning her on the two occasions she appeared? The first time she did not turn up at all, and her explanation is that her date had been altered, and on the second occasion she was announced as not having arrived, but she herself said she was in the building all the time.

I think it is due to the listeners that the B.B.C. clear this matter up finally. Either an injustice has been done to her or else we are being trifled with.

In the concert conducted by Sir Henry Wood we had Mozart, Beethoven, Schubert, and Wagner. Sandwiched between them was some extraordinary modern composition entitled "Little Symphony." Now, I wonder whether Sir Henry played it on his own volition or was he asked to do it?

Eureka! Sunday concerts at 3.30.

One more complaint satisfied.

Hurrah—for the larger choice of programmes. This, together with the advent of television, should give quite an impetus,

Dame Ethel Smythe certainly had something to say, and said it with a plain vigour

SPARKS

A Paddington man who stole a wireless set was caught by the police. He got an entire new station!

Writing to a paper, a man says: "When other men are on their radio sets I have to wheel a pair of babies in a pram."

"Twin transmission"!

"Does listening-in make people liverish?" asks a newspaper. It often makes "flex" come before the eyes.

There is a complaint that modern buns contain little or no fruit. The currant is certainly not of high frequency.

A police official says: "By the use of the radio, we are catching the criminal red-handed." The *raid-io*!

A lorry is reported to have charged into a railway booking-office during fog. Trying to cut out the local station?

that earned our commendation. It would be a good thing if all who came to the microphone really had something to say.



An impression of Rispan Goodacre

The obvious drawbacks of musical transmissions, particularly those labelled "burlesque," is that usually you cannot understand a single word of the chorus. This applies, of course, to all choral works.

Beaten at the Post was described as "a musical burlesque in one act," but this was rather too ambitious a term to apply to a half-hour of a rather ridiculous and noisy effort.

I rather suspect that the announcers or producers responsible for vaudeville help in leading the studio claque. Again and again you hear guffaws leading the hysteria that follows.

This studio nuisance is one of the few complaints that the B.B.C. ignores, but I shall persevere until something is done about the matter.

A comedian the other night made the remark, "Here comes the man who clears away the snow on our landing," and this was followed by a prolonged and sustained hysteria—as if something really witty had been said. Perhaps readers will inform me where the wit came in.

I am afraid Mr. Alfred Kenyon was rather too nervous in telling us about the buried treasures in old Mexico, which showed that there are all sorts of nerves and all degrees of bravery.

Glad to welcome Leslie Sarony back with his bright singing. He is unsurpassed in that old song, "Don't do that to the poor puss-cat."

Jack Hylton's men are certainly equilibistic. Jack always manages to attain tuneful melodies, and the house always rises for him, particularly in the sentimental sob-songs that are put over in the weirdest of voices with extraordinary effect.

What shall we say of the De Courville's hours? My own view is that they are not so sparkling as those that we had before. But, still, we must give them a run.

I think that Sir Walford Davies rather overdid the farewell stunt, since he is still very much in the picture—to the advantage of the school children. When I shed tears on his departure I thought he was going away for ever and ever. Something like Patti's farewell—what?

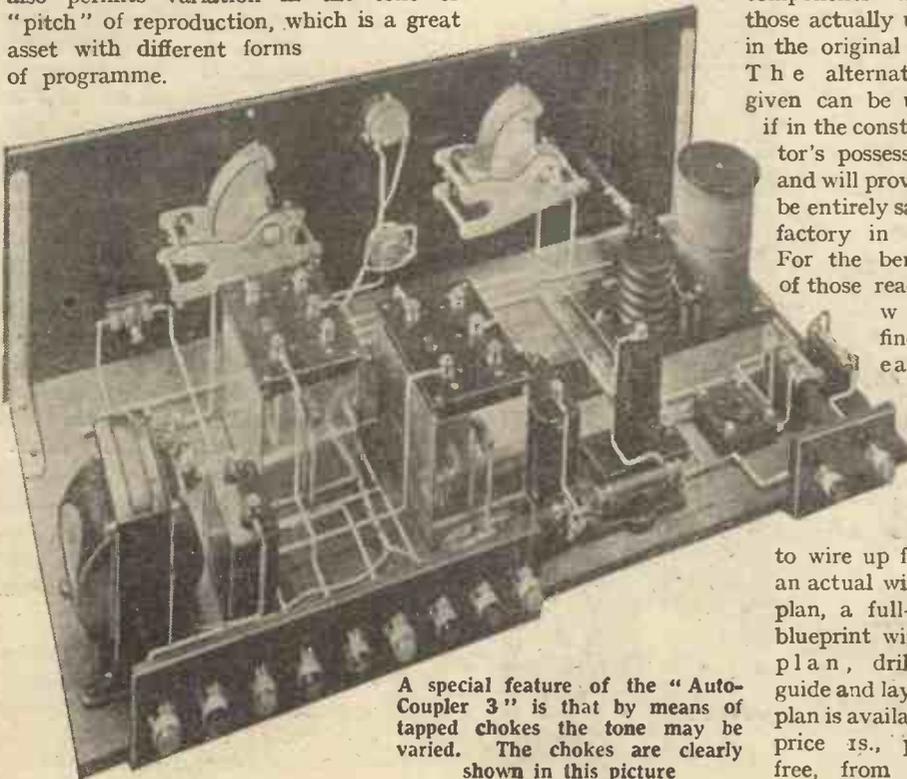
THE "Auto-coupler Three," as its name implies, is a receiver incorporating the new system of auto-coupling which was briefly mentioned on page 416 in our last issue.

Glancing at the circuit, it will be seen that in its essentials, it differs very little from many hundreds of other circuits that have previously been published. It follows the conventional leaky-grid detector arrangement with Reinartz reaction and two stages of L.F. amplification. It is certainly a very straightforward design, and one which commends itself both for simplicity in construction and operation. Now, although this receiver follows so closely the main outlines of many other designs that have already been published, it has a special appeal; it is designed expressly for present-day reception.

To Suit Present Conditions

The conditions obtaining now differ very considerably from those which had to be contended with before the advent of the powerful regional stations. A receiver must now be capable of more than fair selectivity, it must also have incorporated a volume control to prevent overloading of the valves by the regionals, and it must also be capable of giving purity of reproduction and good amplification for the reception of the more distant stations. The "Auto-coupler Three" embraces all these desirable features and more.

This new form of coupling gives not only purity of reproduction and amplification, it also permits variation in the tone or "pitch" of reproduction, which is a great asset with different forms of programme.



A special feature of the "Auto-Coupler 3" is that by means of tapped chokes the tone may be varied. The chokes are clearly shown in this picture

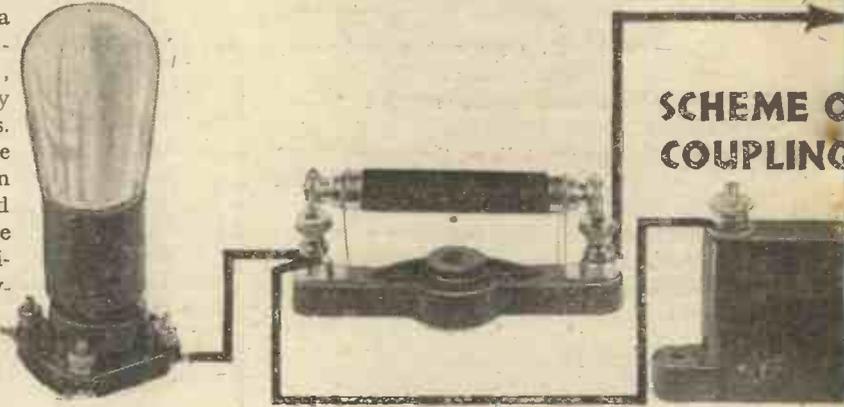
To obtain the degree of selectivity required and yet to retain simplicity in tuning and general operation, use has been made of a new Binowave coil, designed by Mr. W. James. The presence of this is, in itself, a good omen of the set's capabilities. Leaky-grid rectification is incorporated to ensure sensitivity in reception and reasonable receiving range.

A choke-filter output system is also incorporated to maintain quality of reproduction, whilst a small milliammeter is included in the feed circuit to the last valve to register distortion and to help the user to rectify faults in this respect.

Attention may now be directed towards the practical work of construction. So far as the components used are concerned, those given first in the accompanying list of components are those actually used in the original set. The alternatives given can be used if in the constructor's possession, and will prove to be entirely satisfactory in use. For the benefit of those readers who find it easier

to wire up from an actual wiring plan, a full-size blueprint wiring plan, drilling guide and layout plan is available, price 1s., post free, from the

The AUTO-CO



ANOTHER SPECIAL "A.W."

Blueprint Dept. of AMATEUR WIRELESS, 58-61 Fetter Lane, London, E.C.4.

Wiring

When the components have been collected the panel can be cut and drilled, as illustrated by the blueprint, and the components mounted thereon. When this part of the work is finished, the panel can be screwed up to the baseboard, and the remaining components arranged on the latter.

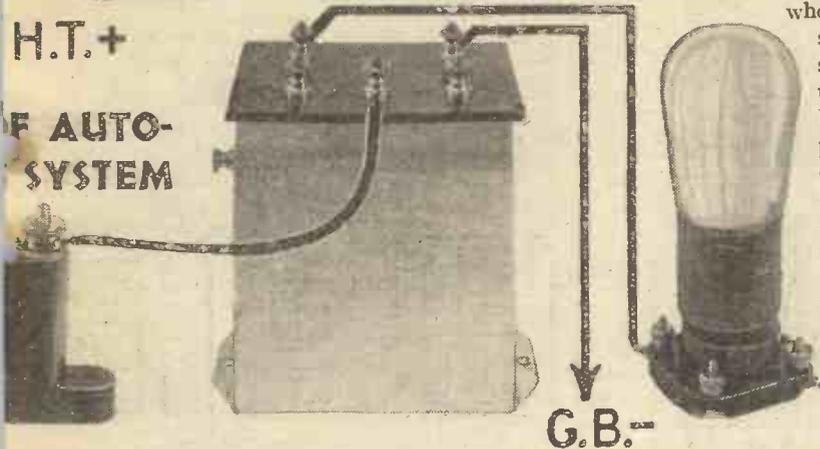
The wiring is greatly facilitated by the aid of the full-size blueprint. It should be noted that each of the components as used in the original set has its own connection terminals, with soldering lugs as well in some cases, so that those who do not wish to trouble about soldering can make use of the terminal connections provided. If the wiring up is carried out in the sequence of the numbering of the wires, the consecutive connections will closely re-

COMPONENTS REQUIRED

- Ebonite panel, 21 in. by 7 in. and two strips, one 3 in. by 2 in. and the other 9 in. by 2 in. (Trolitax, Lissen, Becol).
- Baseboard, 21 in. by 10 in. (Camco, Pickett).
- Panel brackets (Bulgin, Lissen, Ready-Radio).
- .0005-mfd. variable condenser (Igranic, Lotus, Lissen, Burton, Ready-Radio, Dubilier, Formo).
- .0003-mfd. variable condenser (Igranic, Lotus, Lissen, Burton, Ready-Radio, Dubilier, Formo).
- Variable resistance 0-500,000-ohms (Clarostat "Volume control," Harlie, Regenstat).
- Push-pull filament switch (Bulgin, Lissen, Benjamin, Lotus, Junit, Keystone).
- Panel-mounting milliammeter, 0-50 milliamperes (Bulgin DM 19).
- 1930 Binowave coil, type C (Wearite).
- Three valve holders (Formo, Burton, Brownie, Junit, W.B., Trix, Lotus).
- High-frequency choke (Lewcos, Keystone, Lissen, Tunewell, Watmel, Varley).
- Fixed condenser .01-mfd. (T.C.C., Lissen, Watmel, Dubilier, Graham-Farish, Atlas).

COUPLER 3

H.T.+

F AUTO-
SYSTEM

G.B.-

DEVELOPMENT—by L. A. Chapman

semble those in the original set. Furthermore, it will not be necessary to have many bends and turns in the wire, in order to clear others in the set. As each wire is put into position, the number of it should be crossed off from the blueprint. In this way, there will be very little chance of a lead being missed out in this part of the construction.

Selectivity Points

The wire shown for shorting out the series-aerial condenser should be made in the form of a shorting clip with complete "eye" at one end and a "broken eye" at the other end. This will facilitate shorting out or bringing the condenser into use as required. This condenser, when in series with the aerial, considerably improves the selectivity of reception and readers should only have this aerial condenser shorted out for the first reception test. The condenser, when in circuit, is a great aid in the elimina-

tion of interference between the powerful regional stations. Returning to the constructional matter, when the constructor is satisfied that the wiring has been completely carried out, attention can be directed to the first tests. Suitable valves to use with the receiver, are an H.F. type valve, having an internal impedance of between

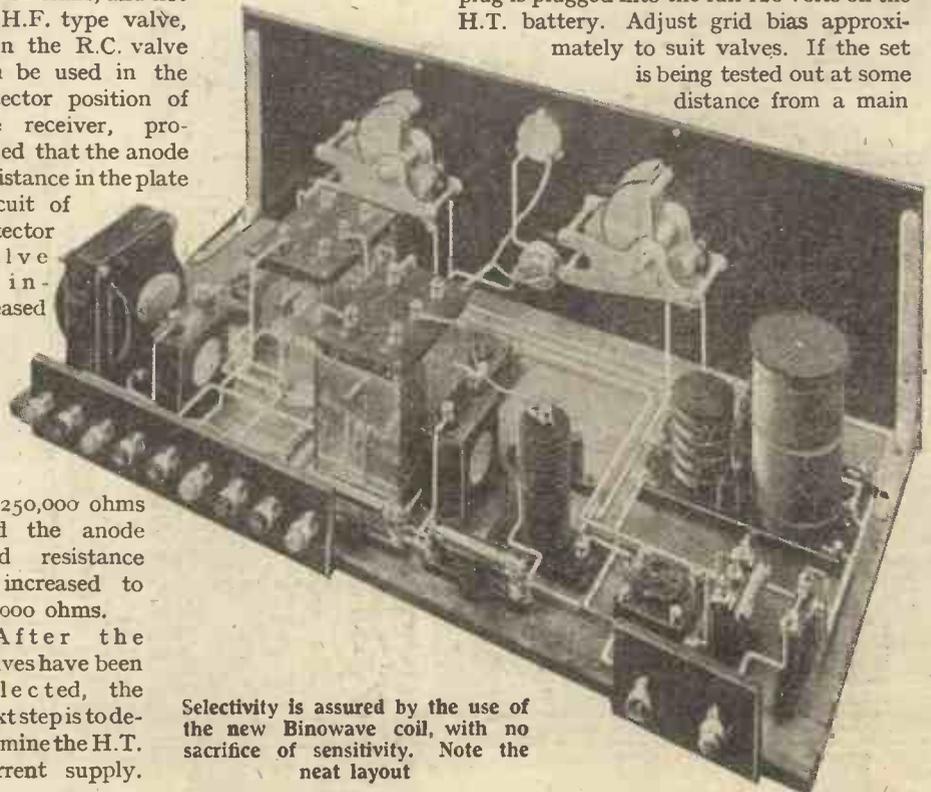
20,000 and 30,000 ohms, for the detector position, an L.F. type valve having an internal impedance of about 8,000 to 15,000 ohms for the first L.F. position and a small power valve, having an internal impedance of about 4,000 to 7,000 ohms for the last L.F. position. Should a reader already have an R.C. type valve in his possession, one having an internal impedance of between 50,000 and 90,000 ohms, and not an H.F. type valve, then the R.C. valve can be used in the detector position of the receiver, provided that the anode resistance in the plate circuit of detector valve is increased

The valves mentioned above will consume a total of about 12 milliamps, so that for economical working and long life from the H.T. battery a triple-capacity battery of the dry-cell type is to be advised. An accumulator H.T. battery of 5,000 milli-ampere hours capacity will be suitable, or an eliminator H.T. unit capable of an output of 20 milliamps at 120 volts will be suitable.

Notes on Operating

Connect up the batteries to the proper terminals and insert the valves in their respective holders. Now turn the dual-wave coil switch to its fullest extent in an anti-clockwise direction. This is the correct position for medium-wave reception. Turn the reaction condenser knob to zero and adjust the main tuning condenser knob, so that the plates are about a third to half in mesh. The central knob on the panel is that controlling the value of the anode resistance in the plate circuit of the first L.F. valve. It not only enables the user to adjust the working of the first L.F. valve to obtain greatest amplification, it also enables the user to control the volume from the receiver. The adjustment for the best value of resistance can only be determined by test, but for the try-out of the receiver, the knob should be screwed right down hard in an anti-clockwise direction and then unscrewed about two complete turns.

The stage is now set for the actual reception test. Pull out the knob of the filament on-off switch and see that the H.T. positive plug is plugged into the full 120 volts on the H.T. battery. Adjust grid bias approximately to suit valves. If the set is being tested out at some distance from a main



FOR "AUTO-COUPLER 3"

Fixed condenser .005-mfd. (T.C.C., Lissen, Watmel, Dubilier, Graham-Farish, Atlas).
Fixed condenser .0002-mfd. (T.C.C., Lissen, Watmel, Dubilier, Graham-Farish, Atlas).
Fixed condenser .0003-mfd. (T.C.C., Lissen, Watmel, Dubilier, Graham-Farish, Atlas).
Two 2-mfd. fixed condensers (Lissen, Dubilier, T.C.C., Hydra, Ferranti).
2-Megohm grid leak (Lissen, Dubilier, Watmel, Ediswan, Graham-Farish).
One 30,000-ohms and one 100,000-ohms resistance with holders (Graham-Farish, Lissen, Dubilier, Ferranti, Ready-Radio).
Two auto-couplers (Wearite).
Output choke (Ferranti B.1., Varley, Lissen, Igranic, Bulgin, Formo).
Eleven terminals marked: Aerial, Earth, H.T.+, H.T.-, L.T.-, L.T.+, G.B.-1, G.B.-2, G.B.+ L.S.-, L.S.+ (Belling-Lee, Burton, Ealex).
Connecting wire (Glazite).
One yard of thin flex (Lewcoflex).
Two dial indicators (Bulgin).
Two 4 in. dials (Ready-Radio, Trolite, Keystone).

to 250,000 ohms and the anode feed resistance is increased to 50,000 ohms.

After the valves have been selected, the next step is to determine the H.T. current supply.

Selectivity is assured by the use of the new Binowave coil, with no sacrifice of sensitivity. Note the neat layout

“THE AUTO-COUPLER 3” (Continued from preceding page)

station, then the reaction condenser knob may need to be adjusted to bring the set to the verge of oscillation.

Slowly rotate both condensers, keeping the set on the verge of oscillation, until the local station is tuned in. When this is heard, the final adjustments may be made to the volume control resistance, and also to the grid-bias voltages. For the valves specified, the bias voltages will need to be roughly 4½ volts for the first L.F., G.B. -1, and 9 to 12 volts to the power valve, G.B. -2.

Altering the Tone

If the choke tapplings, for the initial tests, have been arranged as shown in the blueprint; that is, with the flexible wires connected to terminals No. 2 on each auto-coupling unit, then the wiring can be assumed to be correct for general working.

If the tone of reproduction is inclined to be too mellow for the item being received, such as for a man speaking or singing, then the tone can be raised by connecting flexible wire “A” on to terminal No. 3 of the first auto-coupling unit. A further slight raising or lowering of the tone can be effected by changing the flexible wire marked “B” to terminal No. 3 or to terminal No. 1 on the second auto-coupling unit.

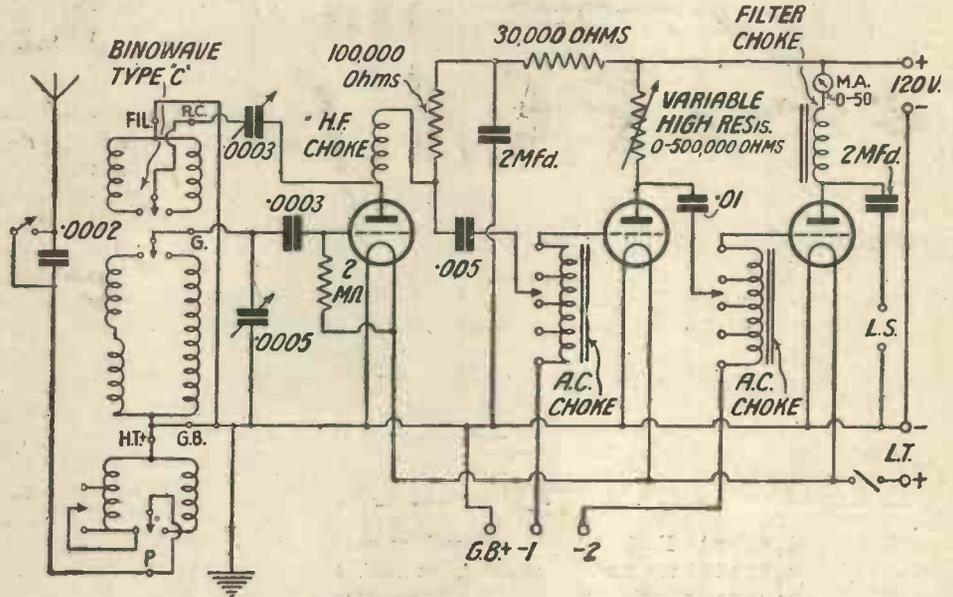
To lower the tone or pitch of reproduction, change the flexible connecting wires “A” and “B” to terminals No. 2 or ter-

minals No. 1 on the respective auto-coupling units.

As regards results that are obtainable from this receiver, it would first be as well to mention the type of aerial used. This was an inverted “L” type pointing roughly

depth of 3 feet. Both aerial and earth wires were 7/22 copper wire. Tests were conducted at a place some 12 miles south-west of London.

During the course of a week-end, listening at odd times, it was possible to bring in the



Study this circuit in conjunction with the heading on the preceding pages and note the novel coupling in the L.F. stages

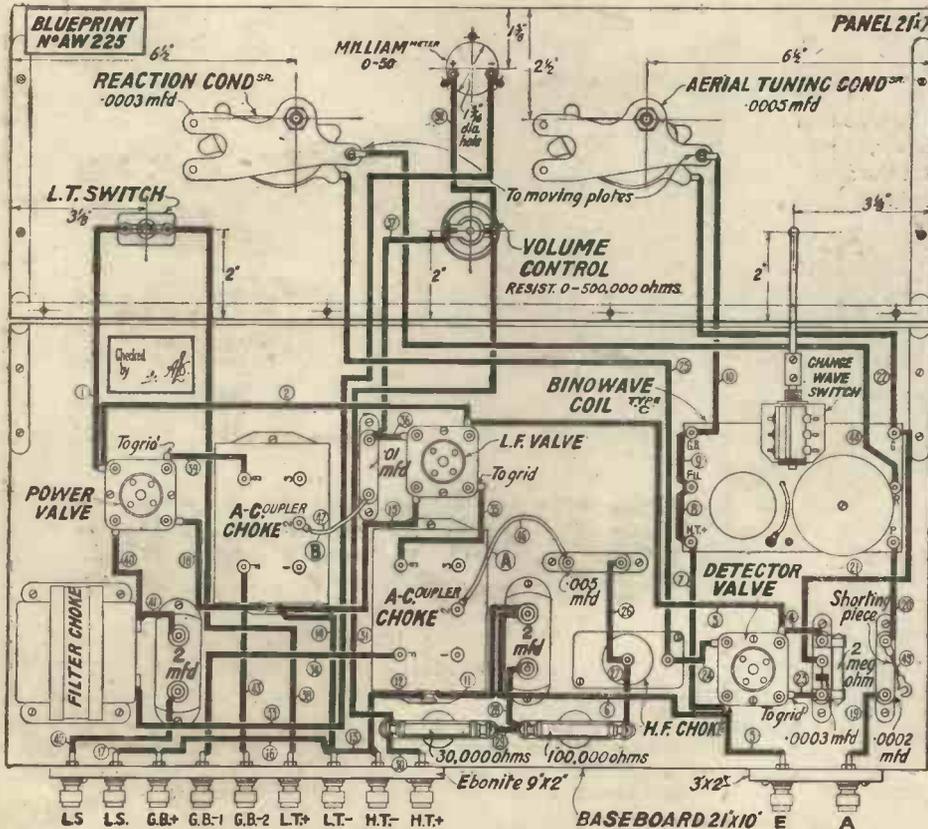
north and south and was approximately 30 ft. high with a 20-ft. long overhead part. The earth connection was a length of copper tube driven into the ground to a

following stations on the loud-speaker. Daventry 5XX, Hilversum, Radio Paris, and Zeesen; and on the medium waves, 5GB, 2LO, the new National transmitter, Turin, Kaiserslauten, and Toulouse.

Next week it is hoped to give a fuller test report, together with further operating notes.

WIRELESS IN PARLIAMENT

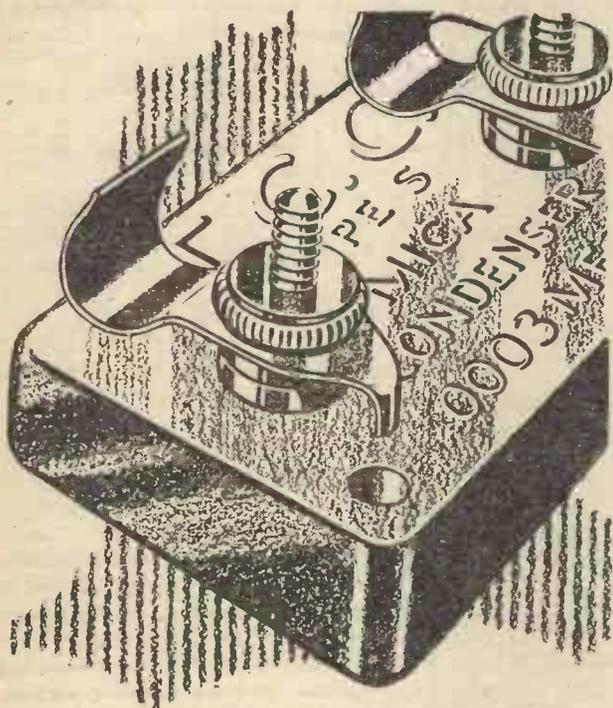
MR. LEES-SMITH, the Postmaster-General, stated in the House of Commons that out of the 10s. which was paid for a licence to the B.B.C. the Post Office took 1s. 3d. for the expenses which the collection of those licences entailed. Not very much profit was made out of that part of the transaction. But it was a remarkable fact that, whereas the original Post Office Estimates were founded on the assumption that the rate of increase of broadcasting licences to listeners to the programmes would be at the rate of last year, the number of licences for which fees were paid increased so unexpectedly in the first three months of the year that a Supplementary Estimate was needed. One of the causes of that increase was that the unlicensed sets were being dealt with, and a great many more licences were taken up, not only because of the prosecutions that were reported, but because it was known that the Post Office detective agency for this purpose was at work.



A full-size Blueprint of this wiring diagram is available, price 1/-

**A .0003 mfd.
is a .0003 mfd.
if it's a T.C.C.**

THAT'S the big point about a T.C.C.—you know that if you ask for a .0003 mfd. you'll get a .0003 mfd. Whatever the specification of a T.C.C. condenser may be, the initials T.C.C. guarantee strict adherence to that specification. The "condenser in the green case" has thus become the recognised standard amongst condensers and, as such, their accuracy and dependability are acknowledged facts. Insist on T.C.C. always and be sure.



Here are the new prices of the Flat Type Mica Condensers.

mfd.	s. d.
.0001 to .0009	1 3
.001 to .004	1 6
.005 & .006	2 0
.01	2 6

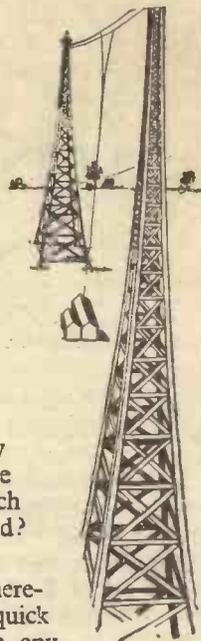
Tested to 500v. D.C.
to work at 250v. peak.



Advt. Telegraph Condenser Co. Ltd.
Wales Farm Road, N. Acton, London, W.3.

4160

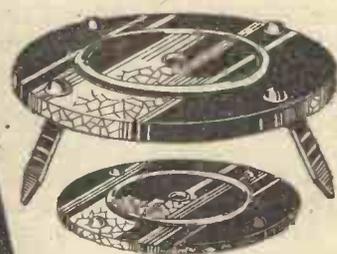
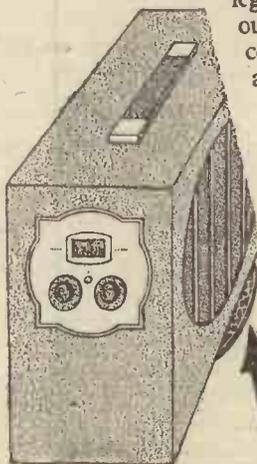
**Do
You
Know—**



that every portable radio set with a self-contained aerial is directional, which means that to obtain the loudest volume and the greatest selectivity the set must be in direct line with the station from which signals are to be received?

A Portable Receiver, therefore, must be capable of quick and easy manoeuvring in any direction, and the Benjamin ball-bearing Turntable will enable your set to do this without any alteration to its existing design.

Attractive crystalline finish, ball-bearing, and with hinged and folding legs. These folding legs enable the set to be used out of doors, raising the Receiver above the damp ground and thereby considerably reducing capacity to earth. The legs can be folded up for indoor use. Price, 7/6 complete.



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BENZAMIN

Send for illustrated leaflets on all Benjamin Radio Components.

**The Benjamin Electric Limited
Brantwood Works, Tottenham, N.17**

MY WIRELESS

Weekly Tips,
Constructional and Theoretical—

Those Puzzling Coil Figures

THE fact that the high-frequency resistance of a coil is, say, 10 ohms whilst its resistance to direct current is perhaps only .5 ohm, must puzzle not a few readers who have not actually looked into the matter.

A simple explanation is available, however, the magnetic field created by a conductor carrying current being the principal reason. Thus, when a direct current flows a certain number of magnetic lines of force are created. If the current is increased, a greater number of lines of force is built up; and, similarly, a reduction in the current is accompanied by a falling off in the number.

When an alternating current flows through a wire the lines of force build up from the centre to the maximum and then fall again to zero. In fact, the number of lines of force is continually varying in accordance with the variations from instant to instant of the alternating current. Now, when lines of force cut a conductor, a voltage is set up, and it will be clear that an element of the conductor near the surface will not have so great a voltage set up in it as an element nearer the centre. Therefore, the opposition to the flow of the current will be greater at the centre, with the result that it tends to flow near the surface or skin of the wire.

This is known as the "skin" effect. The resistance of a wire is greater to H.F. than D.C. currents (excepting very thin wires), and when the wire is wound to form a coil, the effect is even more marked. A factor is the shape of the coil as well as the actual size of the wire.

"Watching" Distortion

Many amateurs connect a milliamperemeter into the anode circuit of the last valve for the purpose of showing distortion. If the normal reading is, say, 10 milliamperes, and when a signal is being received the reading goes up to, say, 12 milliamperes, there is usually a little too much grid bias. A reduced reading whilst receiving indicates, on the other hand, that the grid bias is not enough.

The third condition is one of overloading. In this instance the needle swings about the normal value. These tests are interesting and of value, but it is not wise merely to connect the meter to the last



DEN

By
W. JAMES

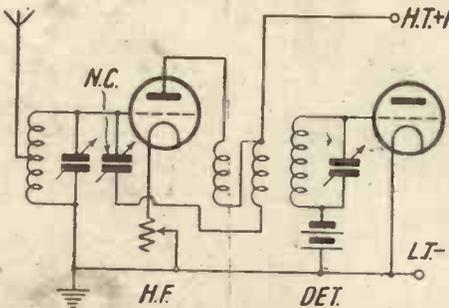
For the
Wireless Amateur

valve and to assume that it alone is capable of distorting.

Perhaps the detector itself is being overloaded or there may be a first low-frequency stage that is not properly set up. It is, therefore, necessary to check each stage. A set ought to be so designed that the power stage is the first to overload; but in these days of good high-frequency amplifiers this is not always true in practice where one is left with a volume control to regulate the input to the detector.

For "Neut." Users

A point to remember when dealing with an ordinary neutralised stage of high-frequency is that the stability depends to a large extent upon the actual amplification obtained in the primary circuit. This will obviously be greater as the size of the primary of the transformer (as in the accompanying diagram) is increased.



W. James raises an interesting point about this circuit in the accompanying paragraph

It is the difference in voltage of the anode and grid at high-frequency which matters, and for stable working this cannot exceed a certain amount, no matter how good the high-frequency coils may be. Actually, the power factor of the neutralising condenser is hardly ever the same as that of the stray capacity it is being used to balance, with the result that a perfect balance cannot be obtained.

The effect, therefore, of fitting a better valve in the H.F. stage may be to produce instability. This may be overcome by reducing the size of the primary and balancing windings, or the efficiency of the

valve may be reduced. To effect this it is only necessary to apply negative grid bias or to lower the value of the high tension.

My Ideas on L.F.

What are the advantages of choke over resistance-capacity coupling? The chief, probably, is that a greater part of the high-tension available is applied to the anode of the valve. This in turn means that the valve, when suitably biased, will deal with stronger signals, and is therefore more suitable for working into the power valve.

Given a good choke, even amplification should be obtained over the audio range. This is not always true of resistance-capacity coupling, where the higher notes may be weakened.

Resistance in the choke will not matter, provided that it does not drop too much voltage. In fact, it could be said that resistance is a help in producing the low notes.

Be Careful of This

An effect to be watched by those who place the coils of a one-knob tuning set in metal boxes is that the circuit capacities be not seriously altered by the capacity of the coils to the sides of the boxes.

When a coil is fitted in a screening box it is probable that the effective inductance of the coil is reduced, but the capacity of the circuit will be increased. The two effects may possibly cancel. As a rule, however, the tuning is noticeably altered. When the shielding box is relatively large, the reduction in the inductance of the coil will not be very much and the capacity effect will be the minimum.

Too small a shield will always increase the resistance of the coil as well as change the tuning, and so will a shield of the wrong metal. Copper or aluminium ought to be used, and if there are joints they should be properly made. A poor joint may mean that the shielding is not effective. This point should therefore be attended to. When trimming condensers are provided, the initial capacity of all tuned circuits may be equalised. If this minimum value is made too great, however, the lowest wavelength to which the set will tune may be too high for present-day requirements. Circuit capacities are best kept the minimum in order that the wavelength range shall be as large as possible.

For the Newcomer to Wireless: HOW CURRENT TRAVELS

SOME time ago you told me that an electric current consisted of a stream of electrons. Will you please explain how it flows along a wire? It can't pass like water through a pipe.

Not exactly, though there are certain similarities. In conductors, that is substances which allow current to pass through them, each atom possesses one or more "detachable" electrons.

What are they?

The majority of the electrons in any atom are so closely bound up with it that unless the atom is exploded by some terrific force they cannot be removed. But revolving in much bigger orbits than these are electrons which require no great amount of force to remove them from their atom.

I follow that.

Now let us imagine a single electron at the negative terminal of a battery starting upon its journey through a copper wire which leads to the positive terminal. The electron is attracted with immense strength by positive ions at the other terminal. It leaves its own terminal at tremendous speed and reaches the end of the wire. There it

crashes into a copper atom.

What is the result of the collision?

One electron from the copper atom is driven out and the original electron takes its place.

Does the expelled electron also travel fast?

Yes, at terrific speed, but it doesn't get very far.

Why?

It collides with another atom, driving out and replacing another electron.

I see; then once the ball is started, so to speak, you have a long series of collisions.

That's it, and the net result is that one electron goes in at the negative end of the wire and one—though not the same one—is expelled from the positive end. You see much the same thing when a goods-engine is shunting a train. It bumps into the first wagon, which bumps into the second, and the shock is carried right down the train with a series of crashes and bangs. If the wagon at the far end has been uncoupled it is expelled from the end of the train.

Then what exactly makes a good conductor?

So far as we know the best conductor is a substance which has a certain number of very readily detachable electrons. In this case the expulsions of electrons require comparatively little energy. Remember that when a current of only one milliampere is flowing, countless millions of collisions and expulsions occur in every second. If much work must be done to detach electrons, then the wire has a high resistance and is a rather poor conductor. That is the difference between Eureka and copper wire.

Then what is an insulator?

An insulator is a substance whose electrons can be detached only by the exertion of terrific force.

But I thought that an insulator absolutely stopped an electric current flowing?

There is no perfect insulator known. The best that we have, such as mica, will stop the passage of current unless the pressure becomes too high. If we go on increasing the voltage until a tremendous figure is reached, electrons are torn out of their orbits and the insulator breaks down.

DOMINION VERNIER DIALS



Only Brownie's ability to produce 2,000 Dominion Vernier Dials a day enables them to keep the price as

low as 2/6. The special non-backlash design (for fine tuning) and the splendid finish (smooth black or beautifully grained mahogany bakelite) coupled with the low price, makes the Dominion Vernier Dial a real radio bargain.

BROWNIE WIRELESS COMPANY (G.B.) LIMITED, NELSON STREET WORKS, LONDON, N.W.1

BROWNIE WIRELESS



PRECISION INSTRUMENTS

The J.B. "Tiny" Condenser combines the most expert workmanship with many ingenious features of design—all in an area little more than that of a matchbox. The extreme neatness and lightness make the "Tiny" particularly useful for Portables and wherever space is restricted. Its Ball Bearings, Pigtail Connection and thorough insulation are other points which speak for the efficiency of its design.

Supplied complete with knob, pointer and scale and fitted with Slow Motion, ratio 8-1.

J.B. "TINY" CONDENSER:		Prices:	
'0005	10/-	'0003	9/6
'0002	9/-	'0001	8/6

Advertisement of Jackson Bros., 72 St. Thomas' Street, London, S.E.1. Telephone: Hop 1837.

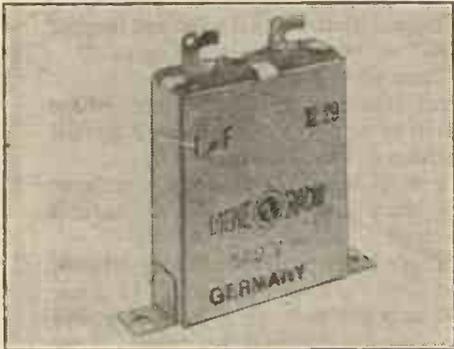
"A.W." TESTS OF APPARATUS

Conducted by our Technical Editor, J. H. REYNER, B.Sc. (Hons.), A.M.I.E.E.

Loewe Fixed Condenser

AMONGST the test apparatus for this week is a small paper-dielectric condenser made by Loewe Radio.

The electrodes of this condenser are



This compact paper-dielectric condenser is made by Loewe

mounted in a damp-proof metal container measuring $1\frac{3}{4}$ in. by $\frac{1}{2}$ in. by $2\frac{1}{4}$ in. high, and metal lugs are provided for fixing the component to a baseboard. This condenser has a capacity of one microfarad and is rated at 500 volts; it is not stated whether this figure represents the test or "working" voltage, but we would rather expect from the physical dimensions that the working voltage is approximately 250.

Nevertheless, the condenser was tested in our laboratories on a D.C. potential of 600 volts, for approximately half an hour, and, when immediately after the test was placed across a megger, it showed the insulation between the plates to be infinity.

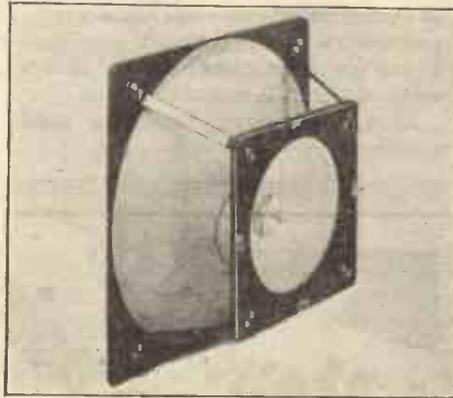
It appears, therefore, that these condensers will continuously stand up to high voltages, and they may be recommended.

Wates' Double-cone Chassis

WE have tested this week a Wates' double-cone assembly (The Shaftesbury Radio Co.) in the form of a chassis for mounting in a cabinet or behind a baffle. The two diaphragms employed measure 11 in. and 6 in. in diameter and are made of a material resembling heavy greasepaper. The seams are carefully stuck together, and are spiral in form radiating from the centre. The apexes of the diaphragms meet at a point where they may be clamped to the spindle of the driving unit. The cones rest freely at the periphery on rings of felt stuck down to the wooden framework of the assembly. This framework is light and consists of two square frames fixed together by four metal supports.

Any standard type of cone unit can be

fitted without difficulty. During our test we mounted a well-known English unit to a narrow strip of wood, and fixed this on to the frame. An extension spindle is provided which can be clamped to the armature spindle of the unit and be fitted in the sleeve at the apex. A glutinous material in the sleeve automatically grips the spindle and prevents rattle. Although a locking screw is also provided, we found its use unnecessary. The assembly was finally set up behind a 2-ft. baffle and connected to a 3-valve set. The results were distinctly pleasing, the tone being round, and quite free from any "dither" when handling considerable volume. Even the best units will give indifferent results



This Wates double-cone chassis will give excellent results with practically any unit

with a poorly designed cone, so that the musical qualities and clearness of speech obtained from this speaker were due as much to the cone assembly as to the unit itself.

The price of this assembly is 11s. 6d., and we can recommend it to readers.

Varley Regional Coil

WE have recently tested a selection of the new Varley regional coils made by Varley, Ltd. These have been designed to conform with modern broadcasting conditions, and in addition to receiving both medium and high wavelength bands, incorporate a selectivity device for preventing pick-up of medium-wave stations, when tuning on the long wavelengths.

The windings which are placed on two formers, the outer having a diameter of 3 in. are mounted on a rectangular base with terminals on either side.

There are two main types of Varley regional coil, one for the aerial, and the other for the H.F. circuit: the former has a coupled aerial winding, and is fitted with separate reaction. The H.F. coil is ex-

pressly designed to follow a screen-grid valve; a winding is also included for neutralising purposes.

The coils were tested in a circuit comprising a screen-grid, detector and L.F. stage, and gave good results in our laboratories situated only six miles away from the Brookmans Park stations. The twin transmitters could quite readily be separated from each other, and from 5GB; it was also possible to receive a number of distant stations on the short-wave band whilst the high-power transmitters were in operation.

The performance on the long waves was commendably good: we were able to receive such a station as Hilversum on 1,071 metres without any interference whatsoever from the lower wavelength broadcasting stations.

The wave-changing switch fitted to these coils appears to be fool-proof, and may be linked up if more than one are used, for single-control operation.

The wavelength range, always an important feature in dual-range coils, varied from approximately 200 to 520 metres on the short-wave band, and from approxi-



An efficient dual-range coil—the Varley Regional type

mately 900 to 2,000 metres on the long waves. Both coils are listed at 21s., and may be recommended for general use.

The Regentone Trickle-Charger

In view of the present great popularity of trickle-chargers, which obviate those tiring trips to the charging station, it should be noted that the price of a very well-known charger—the Regentone—was not clearly given in the Regentone advertisement in No. 405. The price of this handy "trickler" is, of course, £5 17s. 6d., and it can be used with 2-, 4-, or 6-volt accumulators. Mains users should realise that by fitting a charger such as this they can obviate all battery troubles.



RADIOGRAMS

AN interesting talk in the "Looking Backward" series down for broadcast on April 8 should be that given by Mr. R. D. Blumenfeld, editor of the *Daily Express*.

On April 5, an excerpt from Jack Hulbert's revue *The House that Jack Built*, will be relayed from the stage of the Adelphi Theatre; it constitutes one of the new "Diversions" broadcasts.

Attempts are being made by the B.B.C. to develop the vaudeville programmes on more distinctive lines. Listeners will be given an opportunity of comparing two kinds of variety programmes in the near future. On March 24, London National will present an entertainment of the comic and syncopated type, with Leonard Henry, Mabel Constanduros, Michael Hogan, Billy Thorburn and Rupert Hazell; on March 26 the programme will consist of a mixture of comedy and music. The latter broadcast from London and Midland Regional will include an operetta. Nora Blaney, Naunton Wayne, Effie Kalisz (pianist) and The Albert Sandler Trio will also contribute.

In *Harking Back*, a new revue by Cyril Nash, to be broadcast to National listeners on March 27, and through the Regional station on March 29, Gordon McConnel, the producer, will present a *retrophone*. In appearance the instrument should be something like the familiar "mike" but instead of dealing with present events, it is said to recapture the past! The entertainment provides answers to such questions as "Was Mark Anthony strong and silent?" and "Did Nero invent chamber music?"

For March 27, a special programme will be staged, in which the listener will be transported to a *café* in Vienna. Rex Evans will add materially to the continental atmosphere by singing in several languages, and Greta Keller will assist him.

As in previous years the B.B.C. will give a running commentary on the Oxford v. Cambridge boat race. The description will again be given by Mr. Oliver Mickaels and J. C. Squire from the launch *Magician*. In this instance the transmission will be made on a low wavelength and will be picked up by two temporary receiving stations at Barnes, then conveyed via telephone line to Savoy Hill for supply to Brookmans Park and Daventry 5XX. Other B.B.C. stations will take the 5XX broadcast by wireless link.

Through London National on March 20 we are to hear the first microphone performance of a sketch entitled *The Nineteenth Baron* by John Heygate. In the variety programme for that evening will also be found *The Love Parade* male chorus from the Carlton Theatre, Flotsam and Jetsam, Tom Clare, Annie Croft, and Kneale Kelley.

Leoncavallo's opera *I Pagliacci* as presented by the Birmingham Grand Opera Society, will constitute the main feature of the London and Midland Regional programmes on April 2.

The departure for New York of the new German liner *Europa* on March 19, will be made the subject of a running commentary to be broadcast through the German stations.

The new Finnish relay station at Tampere was officially opened on February 20 last. The transmitter relays the Helsingfors programmes on 453 metres with a power of 700 watts in the aerial.

The United States liner *Leviathan* is shortly to be equipped with a specially sensitive microphone capable of detecting the presence of icebergs, within a distance of five to six miles from the steamer. The instrument is constructed on the lines of a medical stethoscope which, by means of a rubber tube is connected to a species of funnel on the side of the ship below sea level. The invention is due to Dr. Howard T. Barnes, a member of the Van Horne Polar Expedition. It is claimed that the microphone will pick up the sounds made by the melting of the ice, and the consequent disintegration of the bergs as they drift in the vicinity of the regular trade routes.

Listeners to the broadcasts of the Ecole Supérieure, Paris, or through its relays, should bear in mind that the announcer has curtailed the call to: "*Ici Paris Radio Etat.*" The provincial P.T.T. stations are adopting the same principle, namely, "*Lille Radio Etat,*" "*Lyon Radio Etat,*" and so on.

The P.T.T. Colonial Section has decided to erect a broadcast repeater station at Oran. The new station, which will be ready by the summer, will radiate a power of 6 kilowatts. In addition to relaying the programme from Algiers, for which the station has primary been designed, Oran will at times broadcast its own programme.

1930 CLARION THREE

AVAILABLE IN COMPLETE NON-SOLDERING KITS OF PARTS

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ALL PARTS EXACTLY AS SPECIFIED BY "AMATEUR WIRELESS" AND OFFICIALLY APPROVED.

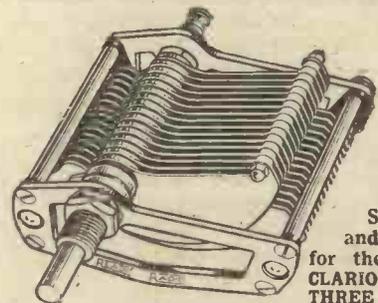
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READY RADIO LOGARITHMIC CONDENSER



Specified and chosen for the 1930 CLARION THREE 4/6

TO HOME CUSTOMERS

Your goods are despatched post free in sealed cartons or carriage paid by rail. Note.—You can if you desire avail yourself of the C.O.D. system.

TO OVERSEAS CUSTOMERS

All your goods are very carefully packed for export and insured, all charges forward.

Ready Radio

159 BOROUGH HIGH STREET, LONDON BRIDGE, LONDON, S.E.1
Telephone: HOP 5555

JUST HERE AND THERE

JOTTINGS FROM MY LOG

By JAY COOTE

THIS Louvain-Velthem-Brussels No. 2, Poste 21,401 mystery somewhat recalls the story of a business man who, telephoning from a music-hall to the effect that he was detained in the city on business affairs, was asked by his wife how he accounted for the orchestra!

You see on about 338.2 metres I have heard many calls and various musical broadcasts, and on these occasions the announcements regarding the origin of the transmission have been different. In two instances the calls were in Flemish, in the third it was in French, and assumed a cryptic and mystifying character. "Ici Poste 21,401," did not, I admit, convey much information; but, for all that, it provided a solution to the puzzle.

At Velthem, near Louvain, a transmitter will be eventually installed for separate programmes from the Boerenbond and from Radio Belgique. In the meantime, although on Thursdays and Sunday

evenings you hear the call "Hier Velthem, de Katholieke Radio Omroep," and on Tuesdays you pick up "Hier Radio Belgie S.A.R.O.V.," the actual broadcast is made from the constructor's works at Forest, a suburb of Brussels, where the transmitter is being tested before its final erection near Louvain. At the same time, Radio Belgique is experimenting with this plant on Saturday evenings and on Sunday mornings. On these days you are told that it is an experimental broadcast of the Poste 21,401, S.B.R. At present the power does not exceed 8 kilowatts, but later the Velthem station will put 15 kilowatts in the aerial.

Another newcomer to the ether is 3RO (Rome), the short-wave station of which the tests on 25 and 80 metres are being logged all over Europe. The plant is of British origin and the tests are made by British engineers almost daily. One of them, at least, possesses a keen sense of

humour, and passes amusing observations regarding the temperature and draughtiness of the temporary studio used. On one occasion, as he was closing down, he informed the world at large that "it was now time to put the baby to bed." Believe me, a 12-kilowatt infant with such a lusty voice must want some tucking up! The choice of literature, also, usually chosen for speech tests, is, as we know, mostly of an uninteresting nature, and his casual remark that he "didn't expect the listeners enjoyed the dry rot very much," was, to say the least, most refreshingly candid.

Paris Experimental Radio, by the way, which you may have already heard on 31.65 metres, in future will provide a relay of the famous Padeloup concerts (broadcast by the French P.T.T. stations including Eiffel Tower) every Saturday at 5 p.m. G.M.T. On Thursdays also it will simultaneously broadcast the Straram concerts.

MR. FLEX IS IN TROUBLE—



—BUT IT ISN'T HIS SET THIS TIME.



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The only British Valve with a written Guarantee as to performance and life.



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Why pay fancy prices when you can get a perfectly finished British made valve with superior coating giving astonishing selectivity with a minimum H.T. consumption, which is the general opinion of the thousands who use P.R. valves. There are many valves on the market, but none are guaranteed—ask yourself why. The P.R. guarantee covers seven months with the right—not a favour, remember—but a right to exchange the valve under the guarantee. All you have to do is to post any defective valve to us, complying, of course, with the terms of the guarantee which is attached and enclose a note stating defect.—You will receive a new valve by return of post. All Orders Executed by Return of Post.

40, P.R. HOUSE, NEWGATE STREET, LONDON, E.C.A.

Opposite G.P.O. Tube Station. Telephone: City 3788.

LIST OF DULL EMITTERS

Type	Fil. Volts	Amp.	Imp. Ohms	Amp. Fac.	
3/6					
PR 2	2	.095	28 000	13	H.F. Det.
PR 3	2	.095	15 000	8	L.F.
PR 4	2	.095	60 000	32	R.C.
PR 9	3.5-4	.063	24 000	14	H.F. Det.
PR 10	3.5-4	.063	15 000	8.7	L.F.
PR 11	3.5-4	.063	65 000	40	R.C.
PR 17	5-6	.1	24 000	17	L.F. Det.
PR 18	5-6	.1	15 000	9	L.F.
PR 19	5-6	.1	80 000	40	R.C.
POWER					
PR 20	2	.15	7 000	6	Power
PR 40	4	.15	8 000	6	"
PR 60	6	.1	8 000	6	"
SUPER POWER					
PR 120	2	.3	3 800	4	Super Power
PR 140	4	.2	4 300	4	"
Screened Grid					
SG 25	2	.2	220 000	150	S.G.

2 Valves or more sent POST FREE.

BROADCAST TELEPHONY

Broadcasting stations classified by country and in order of wavelengths: For the purpose of better comparison, the power indicated is *aerial energy*.

Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)	Metres	Kilo-cycles	Station and Call Sign	Power (Kw.)
GREAT BRITAIN											
25.53	11,751	Cheimsford (SSW)	15.0	255	1,175	Toulouse (PTT)	1.5	*441	680	Rome (Roma)	50.0
*200	1,500	Leeds (2LS)	0.13	265	1,132.2	Lille (PTT)	0.7	453	662	Bolzano (IBZ)	0.3
*242	1,238	Belfast (2BE)	1.0	268	1,131	Strasbourg	0.5	*501	599	Milan (Milano)	7.0
261	1,148	London Nat.	30.0	*272	1,102	Rennes (PTT)	0.5	LATVIA			
*288.5	1,040	Newcastle (5NO)	1.0	286	1,049	Radio Lyons	0.5	572	145	Riga	7.0
288.5	1,040	Swansea (5SX)	0.13	*296	1,049	Montpellier	0.3	LITHUANIA			
288.5	1,040	Stoke-on-Trent (6ST)	0.13	295	1,026	Limoges (PTT)	0.5	304	986	Bordeaux (PTT)	1.0
288.5	1,040	Sheffield (6LF)	0.13	307.6	975	Radio Vitus	1.0	304	824	Algiers (PTI)	13.0
288.5	1,040	Plymouth (5PY)	0.13	311	964.5	Agen	0.25	410	721	Radio Maroc (Rabat)	10.0
288.5	1,040	Liverpool (6LV)	0.13	*316	950	Marseilles (PTT)	0.5	1,250	240	Tunis Kasbah	0.5
288.5	1,040	Hull (6KH)	0.13	329	974	Grenoble (PTI)	0.5	NORWAY			
288.5	1,040	Edinburgh (2EH)	0.35	331.4	905	Poste Parisien	0.5	364	844	Bergen	1.0
288.5	1,040	Dundee (2DE)	0.13	368	875	Radio LL (Paris)	0.5	385	779	Frederiksstad	0.7
288.5	1,040	Bournemouth (6BM)	1.0	*381	788	Radio Toulouse	8.0	445	674	Rjukan	0.13
288.5	1,040	Bradford (2LS)	0.13	447	671	Paris (Etat)	3.0	453	662	Tromsø	0.1
*301	995	Aberdeen (2BD)	1.0	468	640	Lyons (PTI)	5.0	453	662	Aalesund	0.3
*310	968	Cardiff (5WA)	1.0	1,444	207.5	Eiffel Tower	12.0	453	662	Porsgrund	0.7
350	842	London Reg.	30.0	*1,725	174	Radio Paris	12.0	*493	608	Oslo	60.0
*377	797	Manchester (2ZY)	1.0	GERMANY							
*399	753	Glasgow (5SC)	1.0	*218	1,373	Flensburg	0.5	214	1,400	Warsaw (2)	1.0
*479	626	Midland Reg.	25.0	*227	1,319	Cologne	4.0	234	1,283	Lodz	0.5
1,554	193	Daventry (5XX)	25.0	*234	1,283	Münster	3.0	*313	959	Cracow	0.5
AUSTRIA											
*246	1,220	Linz	0.5	*239	1,256	Nürnberg	2.0	*335	896	Posen	1.2
*233	1,058	Innsbruck	0.5	*246	1,220	Cassel	0.25	385	779	Wilno	0.5
*352	851	Graz	7.0	*247	1,215	Kiel	0.35	385	779	Lemberg	0.5
*453	666	Klagenfurt	0.5	*253	1,184	Gleiwitz	2.0	*408	734	Kattowitz	10.0
*517	581	Vienna	15.0	*259	1,157	Leipzig	2.0	1,411	212.5	Warsaw	8.0
BELGIUM											
206	1,460	Antwerp	0.4	*270	1,112	Kaiserslautern	0.25	ROUMANIA			
216	1,391	Verviers	0.25	*276	1,085	Königsberg	2.5	*C04	161	Bucarest	12.0
220	1,364	Charleroy (LL)	0.25	*283	1,058	Magdeburg	0.5	824	364	Moscow (PTT)	20.0
239	1,256	Binche	0.25	*283	1,058	Berlin (E.)	0.5	938	320	Moscow (C.C.S.P.)	103.0
244.7	1,226	Ghent	0.25	*315.8	951	Bremen	0.35	1,000	300	Leningrad	20.0
246	1,220	Schaerbeek	0.25	*320	937.6	Dresden	0.25	1,056	284	Lodz	10.0
337.4	889.2	Forest	8.0	*325	923	Breslau	1.5	1,100	272	Moscow Popoff	25.0
*509	590	Brussels	1.0	*300	833	Stuttgart	1.5	*1,304	230	Kharkov	25.0
CZECHO-SLOVAKIA											
*203	1,139	Moravska-Ostrava	10.0	*372	806	Hamburg	1.5	1,380	217.5	Bakou	10.0
*279	1,076	Bratislava	12.5	*372	806	Hamburg	1.5	1,481	202.5	Moscow (Kom)	40.0
*293	1,022	Kosice	2.0	*390	770	Frankfurt	1.5	SPAIN			
*342	878	Brunn (Brno)	2.4	*418	716	Berlin	1.5	206.9	1,124	Barcelona (EAJ13)	10.0
*487	617	Prague (Praba)	5.0	*458	662	Danzig	0.25	*343	860	Barcelona (EAJ1)	1.0
DENMARK											
*281	1,067	Copenhagen (Kjopenhavn)	0.75	*456	657	Aachen	0.35	308	815	Seville (EAJ5)	8.5
1,153	260	Kalundborg	7.5	*473	635	Langenberg	13.0	426	703	Madrid (EAJ7)	2.0
ESTHONIA											
*206	1,013	Reval (Tallian)	0.7	*533	503	Munich	1.5	459	653	San Sebastian (EAJ8)	0.5
FINLAND											
*221	1,355	Helsingfors	0.9	*500	536	Hanover	0.35	SWEDEN			
*1,790	167	Lahiti	40.0	500	536	Augsburg	0.25	231	1,301	Malmö	0.6
FRANCE											
31.65	9,479	Radio Experimental (Paris)	1.6	569	527	Freiburg	0.35	270	1,160	Hörby	10.0
175	1,714	Cannes (8FY)	0.2	*1,635	183.5	Zeesen	30.0	270	1,112	Trollhättan	0.04
175	1,714	St. Quentin	0.1	1,035	183.5	Norddeich	10.0	297	1,010	Falun	0.5
187	1,605	Radio Flandres	0.25	HOLLAND							
195	1,539	Tourcoing (FSBH)	0.2	21.20	9,629	Eindhoven	30.0	*322	932	Göteborg	10.5
210	1,410	Radio Savoie	0.3	*208	1,004	Huizen (through Hilversum) until 5.40 p.m. G.M.T.	6.5	*436	689	Stockholm	1.5
212.4	1,412	Fécamp (Radio Normandi)	0.5	*1,071	280	Huizen (through Hilversum)	6.5	*542	554	Sundsvall	0.6
219	1,370	Beziere (Radio Bordeaux)	0.1	*1,071	280	Scheveningen-Haven	5.0	*770	389	Ostersund	0.6
225	1,274	Sud-Ouest	1.0	(from 10.30 a.m. to 5.40 p.m. G.M.T)				1,200	250	Boden	0.6
240	1,250	Nimes	0.25	*1,875	160	Hilversum (through Huizen)	6.5	*1,318	222.5	Motala	30.0
248	1,411	Juan-les-Pins	0.5	HUNGARY							
IRISH FREE STATE											
291	1,030	Turin (Torino)	7.0	210	1,439	Budapest (Csepel)	20.0	SWITZERLAND			
*332	905	Naples (Napoli)	1.5	550	545	Budapest	20.0	*257	1,160	Zurich	0.63
*385	779	Genoa (Genova)	1.0	ICELAND							
ITALY											
291	1,030	Turin (Torino)	7.0	*1,200	250	Reykjavik	10.0	080	442	Lausanne	0.6
*332	905	Naples (Napoli)	1.5	(under construction)				700	395	Geneva	0.25
*385	779	Genoa (Genova)	1.0	TURKEY							
YUGOSLAVIA											
431	695	Belgrade	2.5	*403	743	Berne	1.0	1,961	153	Angora	7.0
574.7	522	Ljubljana	2.5	*459	653	Zurich	0.63	YUGOSLAVIA			
SWEDEN											
231	1,301	Malmö	0.6	080	442	Lausanne	0.6	300.3	979.3	Zagreb (Agram)	0.7
270	1,112	Trollhättan	0.04	700	395	Geneva	0.25	431	695	Belgrade	2.5
297	1,010	Falun	0.5	1,961	153	Angora	7.0	574.7	522	Ljubljana	2.5
*322	932	Göteborg	10.5	YUGOSLAVIA							
*436	689	Stockholm	1.5	300.3	979.3	Zagreb (Agram)	0.7	431	695	Belgrade	2.5
*542	554	Sundsvall	0.6	431	695	Belgrade	2.5	574.7	522	Ljubljana	2.5
*770	389	Ostersund	0.6	YUGOSLAVIA							
1,200	250	Boden	0.6	300.3	979.3	Zagreb (Agram)	0.7	431	695	Belgrade	2.5
*1,318	222.5	Motala	30.0	431	695	Belgrade	2.5	574.7	522	Ljubljana	2.5
SWITZERLAND											
*403	743	Berne	1.0	574.7	522	Ljubljana	2.5	YUGOSLAVIA			
*459	653	Zurich	0.63	YUGOSLAVIA							
080	442	Lausanne	0.6	YUGOSLAVIA							
700	395	Geneva	0.25	YUGOSLAVIA							
1,961	153	Angora	7.0	YUGOSLAVIA							
TURKEY											
*1,230	243.9	Stamboul	5.0	YUGOSLAVIA							
1,961	153	Angora	7.0	YUGOSLAVIA							
YUGOSLAVIA											
300.3	979.3	Zagreb (Agram)	0.7	YUGOSLAVIA							
431	695	Belgrade	2.5	YUGOSLAVIA							
574.7	522	Ljubljana	2.5	YUGOSLAVIA							

TUNGSRAM A.C. VALVES



NOW STOCKED EVERYWHERE

You can buy TUNGSRAM A.C. Indirectly Heated Valves from your own dealer. He stocks the whole range—including Indirectly Heated A.C. Valves. They'll cost you nearly 50 per cent. less, too, than Association valves. But they're of better quality—they have the famous Barium filament: Why pay a higher price when you cannot get a better valve?

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Branches: Belfast, Birmingham, Bristol, Cardiff, Glasgow, Leeds, Manchester, Newcastle, Nottingham.

CHIEF EVENTS OF THE WEEK

NATIONAL (261 and 1,554 metres)

- Mar. 24 Vaudeville programme.
- " 25 Albert de Courville's Hour (4).
- " 26 The Bartered Bride, comic opera by Smetana.
- " 27 Ether Taps, by Gordon McConnel.
- " 28 The Grand National, relayed from Aintree.

LONDON REGIONAL

- Mar. 23 Military Band programme.
- " 24 The Bartered Bride, comic opera by Smetana.
- " 25 Brigade Exchange, a sound picture by Ernst Johansen.
- " 26 Vaudeville programme.
- " 28 Ether Taps, by Gordon McConnel.

MIDLAND REGIONAL

- Mar. 25 "Scents and Nonsense," a musical extravaganza
- " 26 "Fireside Singing."
- " 28 Symphony concert, relayed from Town Hall, Birmingham.

MANCHESTER

Mar. 27 Welsh singing festival relayed from the Pavilion, Corwen, North Wales (from Liverpool).

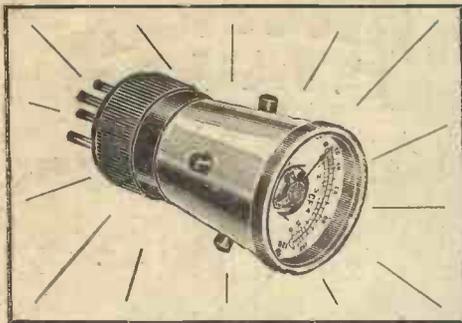
GLASGOW

Mar. 28 Variety programme.

As part of the 1930 population census in the U.S.A., a census of radio receiving sets, which will also serve to give an estimate of the number of radio listeners, will be made.

Five violins and a 'cello used by musicians of the A. and P. Gypsies on broadcasts every Monday evening over the network of the National Broadcasting Company in America are valued at £10,000.

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The C.F. Radio Controller

Saves hours searching in the dark. It *immediately* finds any fault in the filament, plate or grid circuit or in the L.T. or H.T. voltage under load. It tests the Valves, Transformers, Speaker and Potentiometer and checks all connections in the set, batteries and accumulators.

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Model 12c.	120v.	@	10/15	m/amps
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"	W.8.	200v.	@	40/50

Supplied with Tannoy rectifier or Westinghouse dry rectifier

L.T. UNITS from £2:7:6

Model L.W.A.	2, 4 or 6v.	—	1 amp
"	L.W.B.	without	ammeter

COMBINED UNITS from £5:12:6

Type H.L.1.	150v.	H.T., 2, 4 or 6 v.	L.T.
"	H.L.2.	120v.	"
"	H.L.8.	200v.	"
"	H.L.4.	180v.	4v. raw A.C.

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"WIRELESS MAGAZINE"

The L.g. British Wireless Monthly

1/-

LETTERS TO THE EDITOR

The Editor does not necessarily agree with the views expressed by correspondents

Radio Drama

SIR,—Poor Captain Kettle! If this was a fair sample of radio drama, I am glad I do not often switch on to this class of programme. Not one single convincing character, or convincing incident; childishy absurd "effects," and, as for the music, even American is inadequate as a means of expression. Altogether, a most deplorable example of why radio is not a suitable medium for "drama"—at any rate with existing technique.

G. W. P. (Woking).

Electric Gramophone Motors

SIR,—I have read with interest the paragraph regarding electric gramophone motors, by B. A. R., but I am afraid I cannot agree to his remarks.

When a gramophone sparks at the commutator, it is advisable to bed the brushes by means of a strip of glass paper placed between the commutator surface and brush. As regards his suggestion to use vaseline, I myself used an ordinary wax candle drawn once across the commutator as the motor rotated.

As regards screening, this is of no effect, I have tried sheet lead, zinc, copper and other metals, but if this gentleman has any considerable noise, I would advise him to carry out the experiment as above, and also connect two fixed condensers, .01 microfarad and .005 microfarad across the mains and earthed.

I have at present a D.C. motor set right on the top of an Amplion Lion loud-speaker, together with an amplifier of my own design, and there is no sign of noise.

T. G. W. (Seven Kings).

The Twin By-pass

SIR,—You may be interested to know that the "Twin Brookman's By-pass" here, about five miles from Brookmans Park, and within sight (this village is on a high hill with nothing in between it and the masts), works like a charm. I have only made a hook-up of two home-made coils and two "compression" condensers. A word of thanks is due to you for providing such an excellent means of getting other programmes when either Brookmans Park does not appeal.

R. O. S. (Hertford Heath).

Electrical Reproduction

SIR,—I read with interest Mr. Reyner's article "Is Electrical Reproduction Better than the Real Thing?" and while agreeing with him that a speaker which can reproduce the extra harmonics is really excellent from an electrical point of view, it

(Continued on next page)

AMAZING RESULTS with the DOUBLE CONE

LARGE FOR LOWER FREQUENCIES
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PRICE 11/6 with Universal Bracket.



50% IMPROVEMENT with any unit!

The richness, reality and verve of your unit will delight you when you use the wonderful Wates Universal Double Cone Chassis. Two cones for high and low frequencies give you perfect emission and non-over emphasis at any point.—Truly the Chassis for superb results. Can be fitted to any of the following units:—BLUE SPOT, ORMOND, WATTEL, EDISWAN, BEGRA, G.E.C., LISSEN, TRIOTRON, BROWN-VEE, AMPLION, E.A.E., LOEWEL, W. & B., SILVER CHIMES, GEAWOR 2-pole, GRAYWOL 4-pole, GRASSMAN, TEFAG, SIX SIXTY, KUKOO. From your dealer or direct: THE SHAFTESBURY RADIO CO., Dept. A.W., 184/188, Shaftesbury Avenue, W.C.2.

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Famous 'RADCROIX' POWER TRANSFORMERS

Tapped All Mains Transformer WW4A. Full Wave Rectification.
LIST PRICE 30/-
WIRING DIAGRAMS FREE.
This All Mains Transformer will operate from 200/250 volt, 40/50 cycle mains. It has three secondary windings: 1. High Tension Smoothed Output, 50 mA at 200 volts. 2. Rectifier filament heater winding delivering 1 ampere at 4 volts. 3. Centre tapped winding delivering up to 4 amps. at 4 volts for 4 indirectly heated A.C. Valves.
Designed for rectifying Valves—"Tungsram" PV476, 10/-; Phillips 508, 20/-; or "Mullard" DU2, 20/-.



COMPLETE KIT OF PARTS GIVING TWELVE VARIABLE VOLTAGES £3:14:6
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"A.W." Solves Your Wireless Problems

BUILD YOUR OWN S.G. PORTABLE

Leather case with Frame Aerial wound for long waves and short waves, Polished Fret and Battery Cover

42/-

As above but in Black Rexine Case

30/-

Speaker Unit and Cone 15/-
Miocarta Panel - - - 6/6

All necessary parts in stock

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Constructors of receivers described in this Journal should make full use of our Blueprint Service and avoid all risk of failure.

"LETTERS TO THE EDITOR"

(Continued from preceding page)

is not efficient from a musical point of view. For instance, a "difference" tone can be produced on a piano by playing C and G with the loud pedal down, but this is not done habitually.

Again, Mr. Reyner is of the opinion that the "difference" tones in the case of the radio music are produced in the ear, yet in the case of the piano are produced in the piano. Surely it would be more feasible to consider that the "difference" tones are produced in the speaker.

DERBIAN (Ripley).

B.P. at Nine Miles

SIR,—We have heard a lot about the twin B.P.'s. Haven't we? Poor old "Thermion"! He has got the twin B's in his bonnet!

May I give my experiences?

When the tests first started I had an out-of-date two valver—solenoid tuning (dual range), with reaction applied by rotating coil inside the tuning former!

However, I found no difficulty in separating one transmission from the other, or both from 5GB. 5XX, my only loud-speaker station on the long waves, was not affected.

Now I'm about nine miles from B.P. My aerial is 25 ft. high, 55 ft. long, pointing E.N.E.—almost direct at B.P.! My earth is a piece of disused railing 5 ft. 6 in. long, driven straight down under the aerial, with 7/22 copper clamped on to it well below surface.

I have a variometer crystal set, purchased in 1926, it separates them without any trouble! Volume! Well you can hear speech on the loud-speaker at 4 or 5 ft.

I am using the "Knife-edge Three" now and a "Music Lover's" speaker. What a combination! I've cut out the wave-trap, and am using a "Twin B.P. Bypass."

Rome, Belgrade, Katowitz, Bucharest, Toulouse, Algiers, Brussels, Göteborg, Turin, Hörby, and Cologne, provide me with reliable programmes at any time.

F. (London, W.).

Another Opinion

SIR,—Will you please pass my compliments to "Thermion" on his article on the B.P. twins. As you no doubt can guess the det. and L.F. sets are the majority, and honestly we are having the deuce of a time looking for our lost (swamped) DX stations.

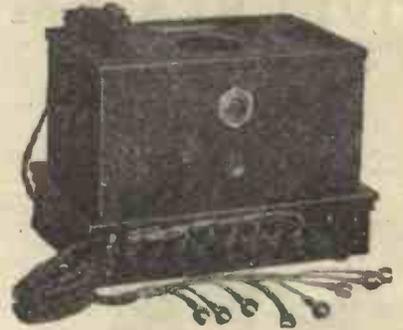
At one swoop I lose the majority of my DX stations. I cannot cut my aperiodic—it's only four turns as it is, and these twins swamp me three degrees either side of them.

Fortunately, I am going over to a five-valve hook-up; 2 H.F., split-primary idea. But can the average man do this? No, and it may interest "Thermion" to know that crystal sets are being substituted for valvers.

Is this going to assist the wireless trade? More power to "Thermion," and may

(Continued on next page)

The LOTUS All-Mains Unit



Converts an Osram "MUSIC MAGNET" to an ALL-ELECTRIC SET with minimum trouble and maximum effect

In less than five minutes, by using the Lotus All-Mains Unit, you can turn your Music Magnet Receiver into All-Electric.

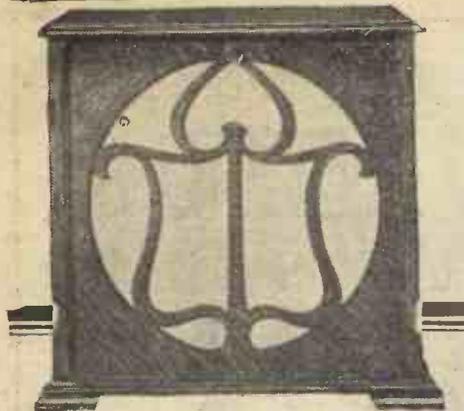
Make this change and effect a saving of nearly £4 a year, by dispensing with batteries. Send for full particulars.

Cash Price £7.7.0 (or 14/6 down and 11 similar monthly payments).

Made in one of the most modern Radio Factories in Great Britain

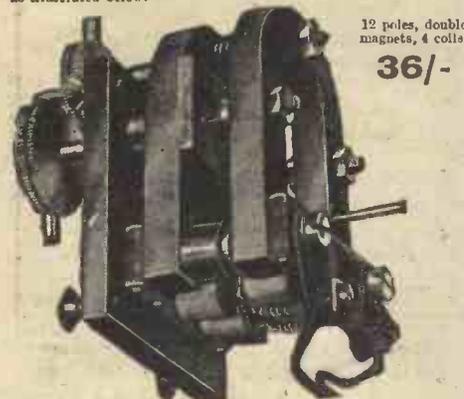
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"LETTERS TO THE EDITOR"

(Continued from preceding page)

AMATEUR WIRELESS adopt his views in entirety. SWAMPED (Uxbridge).

Brookmans Park in the North

SIR,—Your contributors appear strangely averse to any progress being made in broadcasting if, in the process, any of the London listeners are inconvenienced in any way.

"Thermion's" remarks, like other articles which have been written touching the Brookmans Park twin-transmissions, appear to have been written in blind or wilful ignorance of the past position of hundreds of thousands of his fellow-listeners in other parts of the country. These have, in the long past, been confined to 5XX and have, of necessity, received the full educational (doubtful) programmes of which this station has always been commander-in-chief.

"Thermion" states that thousands of listeners in the B.P. area have not, or will not, renew licences, but I note the issue of these has now exceeded the three-million mark. I also note that in the same issue of AMATEUR WIRELESS, "Thermion" shows these same troubled readers how simple it is to separate the one transmission from the other by disconnecting the earth. I have also a recollection of reading quite recently that Mr. McMichael tried out a portable set under the shadow of the B.P. aerial with success, while in a daily newspaper of only Tuesday last, it was stated that the B.B.C. engineers, with the aid of a much advertised wave-trap, attached to an old set, had separated the twin transmissions in the basement of the transmission station.

I invite "Thermion" to leave the slush of the South and come up North to reside. I am not a betting man, but I would in this case lay odds that after one month here, he could, with practical reason, write another article reversing his ideas.

H. H. (Carlisle).

A 10-kilowatt broadcasting station, operating on a wavelength of 380 metres, was recently inaugurated in Kumanoto, Japan; the call letters are JOGK.

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Everything radio on easy terms. Pay instalments when you like. Weekly, Fortnightly, or Monthly. With or without initial deposit. Immediate delivery.

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Grade A kit, as specified in "A.W.," with 7/1 Telsen super transformer ... £5 14 3
Grade B kit, as specified in "A.W.," with alternative components ... £4 14 0
Oak cabinet, 13/6. Valves, 45/- extra.
A kit, easy payments: 12 weekly payments of 15/-, or 12 monthly payments of 16/-

THE NEW CRUSADER (Wireless Magazine, March)

Complete kit (Valves, 23/- extra) ... £3 10 0
Or 12 weekly payments of 8/6.

AUTO-COUPLER THREE

Grade A kit, as specified in this issue of "A.W." ... £8 9 0
Grade B kit, with alternative components ... £7 15 0
Cabinet, 15/- extra. Valves, 33/6 extra.
Grade A kit, including valve and cabinet for 12 weekly payments of 18/-, or 12 monthly payments of 19/-.

THE NEW TELSEN 7/1 TRANSFORMER giving 50 per cent. better results, 17/6

CABINETS

Oak Loud-speaker cabinets with 14 in. square baffle ... 17 0
Oak Loud-speaker, with 24 in. baffle on legs standing 30 in. high ... £1 12 6
Any type of cabinet made to order.

Oak AMERICAN TYPE CABINETS

21 in. by 7 in., 18/- 18 in. by 7 in., 14/6
16 in. by 8 in., 13/6 14 in. by 8 in., 12/6
Oak Radio-gramophone Cabinets, space 22 in. by 7 in. panel ... £5 0 0
Mahogany Radio-gramophone Cabinets, space 22 in. by 7 in. panel ... £6 0 0

P.B. DOUBLE CONE SPEAKERS

Incorporating Triotron unit, suitable for 24 in. cabinet ... £1 12 6
Incorporating Blue Spot unit, suitable for 24 in. cabinet ... £2 2 6

SPECIALISTS in all kinds of short-wave receivers, etc. FREE EXPERT ADVICE on request.

Osram, Lewcos, and Cossor kits supplied immediately from stock.

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NEXT WEEK:—W. JAMES ON HOW SELECTIVITY AFFECTS QUALITY.

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AUTO-COUPLER 3

	£	s.	d.
1 Ebonite panel 21 by 7 (Resiston) and strips	10	0	
1 Pair of panel brackets (H. & B.)	1	3	
1 Variable condenser, .0005 (Igranic)	10	6	
1 Variable condenser, .0003 (Igranic)	9	6	
1 Variable resistance (Clarostat)	7	6	
1 Filament switch (Pioneer)	1	3	
1 Panel mounting M/A, 0-50	12	6	
1 1930 Binowave coil "C" (Wearite)	17	0	
3 Valve holders (Formo)	3	9	
1 H.F. choke (Lewcos)	7	9	
1 Fixed condenser, .01 (T.C.C.)	2	3	
1 Fixed condenser, .005 (T.C.C.)	2	0	
1 Fixed condenser, .0002 (T.C.C.)	1	3	
1 Fixed condenser, .0003 (T.C.C.)	1	3	
2 .2 mfd. condensers (Lissen)	7	0	
1 2-megohm grid leak (Lissen)	1	0	
1 30,000 ohm resistance (Graham-Farish)	2	3	
1 100,000 ohm resistance (Graham-Farish)	2	3	
2 Holders (Graham-Farish)	1	0	
2 Auto-couplers (Wearite)	2	2	0
1 Output choke (Ferranti B.1)	1	1	0
11 Terminals, named (Belling-Lee)	3	2	0
2 Rolls of connecting wire (Glazite)	1	0	0
2 4 in. dials (H. & B.)	2	0	0
2 Dial indicators (Bulgin)			4

Cash Price £8 10 9

Any parts sold separately.
 3 Mullard valves, specially matched, 45/- extra.
 1 Oak Cabinet, 25/- extra.
 Included in this kit is the Panel and Strips ready drilled, Baseboard, Full-size Blueprint, Wire and Screws.
 We can supply this set ready constructed, together with three Mullard valves, Marconi Royalties paid.

Marvellous, Marvellous, Marvellous

H. & B. 1930 SPECIAL CLARION THREE KIT

The kit with the 7-1 Super Transformer.
 Here it is

	£	s.	d.
1 Ebonite panel and strips (Resiston)	7	6	
2 Variable condensers, .0005, and dials (G.F.)	9	6	
1 Reaction condenser, .0061 (H. & B.)	2	6	
1 Pair Clarion 3 coils (Tunewell)	1	1	0
1 15-ohm rheostat (Wearite)	1	6	
1 Single-pole switch, No. 7 (Lotus)	3	3	
1 Pair panel brackets (H. & B.)	1	3	
3 Valve holders (W.B.)	3	9	
1 H.F. choke (Dubilier)	4	6	
1 .0001 fixed condenser (Graham-Farish)	1	0	
1 .0002 fixed condenser (Graham-Farish)	1	0	
1 .0003 fixed condenser (Graham-Farish)	1	0	
1 Series clip			6
1 2-megohm grid leak (Graham-Farish)	1	0	
1 100,000 resistance and holder (Graham-Farish)	1	6	
1 1-mfd. fixed condenser (Dubilier)	2	6	
1 2-mfd. fixed condenser (Dubilier)	3	6	
1 Telsen 7-1 Super Transformer	17	6	
1 Screen, 10 in. by 6 in. (H. & B.)	2	0	
6 Named terminals (Belling-Lee)	2	3	
1 Pre-set .0003 (Formo)	2	0	
1 1 1/2-volt cell (Siemens)			9
8 Marked wander plugs (Belling-Lee)	2	6	
2 Dial indicators (Bulgin)			4

Cash Price £4 14 1

Included in this kit is a Full-size Blueprint, Baseboard, Wire, Screws, and the Panel is Drilled Ready for you.

With the Telsen 7-1 Super Transformer, this set will give 50 per cent. greater volume. Will send this kit anywhere on approval against cash. Any parts sold separately.

Mullard, Cossor, or Marconi Valves £2 5 0 extra.
 Hand-polished Cabinet ... 17/6 extra.
 Clarion Three, ready built and tested, together with three Mullard Valves. Royalty paid £8 15 0

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Gerrard 2834.

AN S.G. VALVE HINT

MOST users of receivers embodying a shielded valve know—and those who do not soon find out—that if the S.G. valve anode lead is detached and accidentally touches the screen or any part of the circuit associated with it, the filaments may be burnt out.

A simple idea can be adopted, however, which completely obviates any risk of this occurring. Normally, the anode lead is fixed at the point from which the H.T. supply is drawn, and is detachable at the valve end. The lead is thus always "alive." If, however, the wire is made a fixture at the end which goes to the anode terminal, and is made detachable at the other end, then obviously it becomes "dead" the moment it is detached, and can do no harm. There are many ways in which this can be done. Probably the most convenient arrangement is to fit one end of the wire with a wander plug and to fit to the H.T. terminal a valve socket. When removing the valve, one first withdraws the wander plug, when the valve can be pulled out of its holder complete with lead.

Insulated terminals are, of course, available which obviate the possibility of any bare metal parts making contact if the anode lead comes loose, but the foregoing hint may be found of use if such a terminal is not at hand.

E. M. O.

The 600 odd broadcasting stations in the United States employ about 1,000 operators; the 350 point-to-point wireless stations about 700; the 101 transoceanic stations some 500; the 77 ship-to-shore stations about 300; and the 180 experimental stations approximately 200. Ships under the American flag employ about 2,500 operators. Many of the ships will soon have to double their staffs in accordance with the new provisions adopted last summer by the Safety of Life at Sea Conference in London.

The Government of Afghanistan recently placed a contract with a French firm for equipment necessary to the construction of three short-wave radio-telegraph stations.

When Asking Technical Queries

PLEASE write briefly

A Fee of One Shilling (postal order or postage stamps) must accompany each question and also a stamped addressed envelope and the coupon which will be found on the last page. Rough sketches and circuit diagrams can be provided for the usual query fee. Any drawings submitted should be sent on a separate sheet of paper. Wiring plans and layouts cannot be supplied. Queries cannot be answered personally or by telephone.



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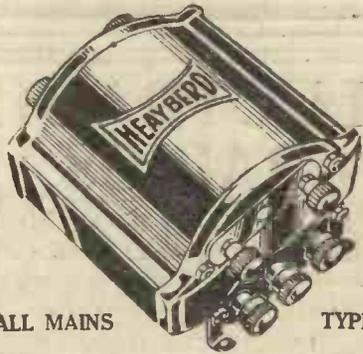
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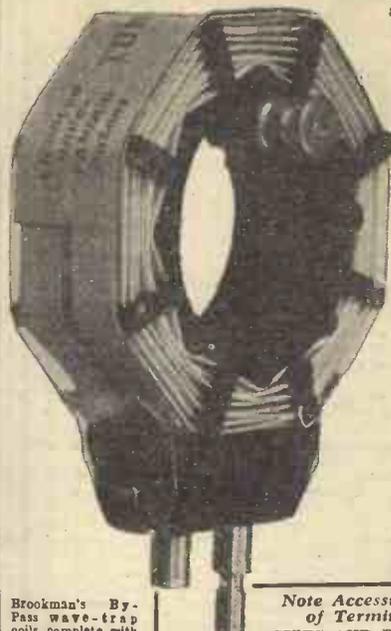
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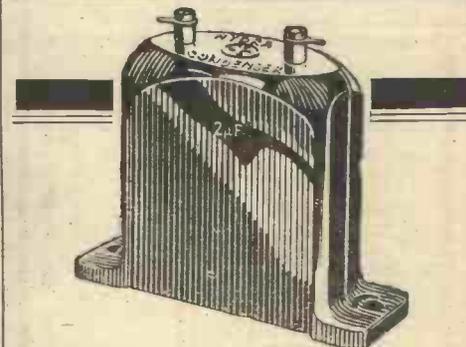
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A SWISS REGIONAL PLAN

SWITZERLAND is to have a regional broadcasting system, somewhat similar to that of the B.B.C., with three high-power stations in the German, French, and Italian-speaking sections of the country, and smaller relay stations where required in the principal towns.

An interesting fact is that England has been called upon to supply the stations, and Marconi's are arranging the scheme on B.B.C. lines. The most powerful of the new stations, a 60-kilowatt transmitter, is to be erected at Münster, about twelve miles to the north-west of Lucerne. This will constitute the main regional for German-speaking Switzerland, which is the largest of the three-lingual sections of the country.

While it is similar in design to Brookmans Park, Münster will employ greater power, with 60 kilowatts in the aerial, as compared with London's 30 kilowatts. It will thus be one of the most powerful stations in Europe, a condition rendered necessary in spite of the comparatively limited area served, by the fact that Switzerland, with its valleys, high mountains, and curious screening effects, is one of the most difficult countries in the world for broadcasting.

Studios in Berne, Zurich, and Basle will

provide the programmes for the Münster station, which will work on a wavelength of 459 metres.

To provide for crystal listeners in the towns, smaller stations of 1/2-kilowatt aerial power are to be erected at Berne and Basle. These are of special Marconi design, with crystal-controlled drive to ensure absolute constancy of frequency.

The new station at Berne will replace the present 1-kilowatt type Q station, which was erected in 1925, and which will later be modernised and re-erected elsewhere to play a part in the regional plan. At Basle the new station will be the frontier town's first full-time broadcasting station, the broadcasting service having previously been carried out by a transmitter at the Basle aerodrome, and which, of course, is primarily employed for wireless telephony with aircraft.

The reorganisation of Swiss broadcasting on the regional basis is expected to be quite finished by this time next year, when, in spite of difficult conditions due to the geographical formation of the country, Switzerland will have a broadcasting system as efficient and complete as any in Europe.

The Spanish Government has granted a franchise to the syndicate Transradio Espanol to operate a radio-telegraph service between Spain and other countries for a period of twenty years.

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MORE RADIOGRAMS

Rumours are current in France to the effect that Radio Paris has chosen a site in the neighbourhood of the French capital for the erection of a 60-kilowatt transmitter to be brought into operation towards the end of the current year.

Professor Lec De Forest, the newly-elected president of the American Institute of Radio Engineers, said in his inaugural address: "The radio public is, I believe, becoming nauseated by the quality of many of the present programmes. Short-sighted greed of the broadcasters, station owners, and advertising agencies, is slowly killing the broadcasting goose."

Under the lead of the *Glasgow Daily Record*, an agitation is being raised in Scotland for the formation of a Scottish broadcasting board to ensure "a representative Scottish entertainment." This board would be a chosen body of astute selectors, resident in Scotland, who would select from the general London programme, and add to it with discrimination. The B.B.C. has meantime no comment to make on the proposals, which, it is understood, are receiving full consideration. It is pointed out that there already exists a Glasgow Advisory Committee on broadcasting, but, on the confession of one of the members, it is a rather moribund body.

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General Correspondence is to be brief and written on one side of the paper only. All sketches and drawings to be on separate sheets. Contributions are always welcome, will be promptly considered, and if used will be paid for. Queries should be addressed to the Editor, and the conditions printed at the head of "Our Information Bureau" should be closely observed. Communications should be addressed, according to their nature, to The Editor, The Advertisement Manager, or The Publisher, "Amateur Wireless," 58-61 Fetter Lane, London, E.C.4.

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