

LARGEST RADIO CIRCULATION IN THE WORLD

Popular Wireless

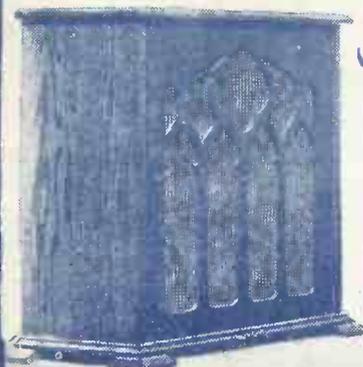
Every Thursday
PRICE
3d.

No. 442. Vol. XVIII.

INCORPORATING "WIRELESS"

November 22nd 1930.

THE "INTERCHANGE" THREE



▲
IN
THIS
ISSUE
▼

ALSO
AN INEXPENSIVE
"BROOKMANS"
REJECTOR



AT HOME WITH CLAPHAM AND DWYER
MAKING A PICK-UP ADAPTOR
CONCERNING VALVE AMPLIFIERS (2) — BY CAPT. P. PICKERSLEY, M.L.E.E.

THE PROFESSORS AGREE

Professors both artistic and scientific agree that the Lewcos L.F. Transformer is the most efficient of its class; treble notes respond admirably and the bass notes are reproduced with an effect more nearly approaching the true musical tones than it is possible to obtain with the majority of makes.

Special care in design has been taken and the provision of a Centre Tapping on the secondary winding renders this component adaptable for push-pull amplification.

This transformer—the latest development of the Lewcos Leyton Laboratories—is the natural and inevitable link between the high-frequency side of your receiver (tuned with the world-famous Lewcos H.F. Coils) and your loud-speaker.

The Lewcos L.F. Transformer is available in either moulded Bakelite or metal case—please specify when ordering.



The LEWCOS L.F. TRANSFORMER.

PRICE
25/-

(Ref. L.F.T. 5.)

Stocks held at the following Branches:—

BELFAST
BIRMINGHAM
CARDIFF
DUBLIN
GLASGOW
LEEDS
LIVERPOOL
LONDON
MANCHESTER
NEWCASTLE
NOTTINGHAM

THE LONDON
ELECTRIC WIRE
COMPANY AND
SMITHS LIMITED

Church Road,
Leyton, London,
E.10



TWO NEW MARCONI VALVES!

LP2/c

HIGHER MAGNIFICATION— LARGER POWER OUTPUT!

Volume enough for most purposes—magnification of a high order, giving extra strength on weak signals—this is the ambition which has been realised in Marconi LP2/c—the new 2-volt power valve with an amplification factor of 8 and an impedance of only 4,000 ohms—mutual conductance 2.0 MA/volt! LP2/c provides reproduction of ample strength and excellent quality with an ordinary cone speaker, to which its impedance is particularly suited. A high amplification factor and small consumption of H.T. current render it the supreme output valve for portables and in fact for every set in which the highest standards of efficiency and economy must be maintained.

**MARCONI LP2/c—THE NEW HIGH MAGNIFICATION
POWER VALVE - - PRICE 10/6 - - ALL BRITISH**

HL2/c

A NEW 2-volt GENERAL PURPOSE VALVE OF STRIKING EFFICIENCY

Once again Marconi produce a valve of unusual merit—HL2/c, a 2-volt general purpose valve with a mutual conductance of 1.1 MA/volt! Marconi HL2/c has an amplification factor of 22 and an impedance of only 20,000 ohms; thus it combines good magnification, high quality reproduction and the ability to deal with comparatively large inputs without distortion. Entirely non-microphonic and having a long, useful life, HL2/c is ideal for the H.F. stages of portables, for detection when preceded by one or more screen grid valves or as initial L.F. amplifier.

MARCONI HL2/c - - PRICE 8/6 - - ALL BRITISH.

MARCONI VALVES

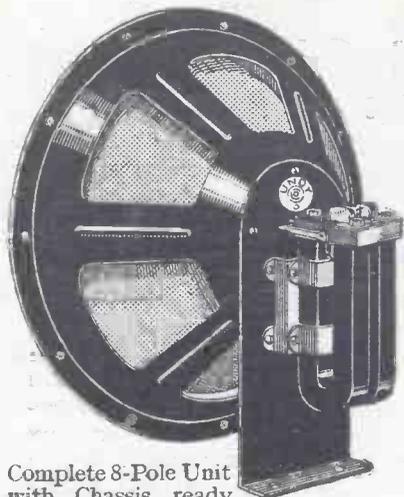
Buy the Valves



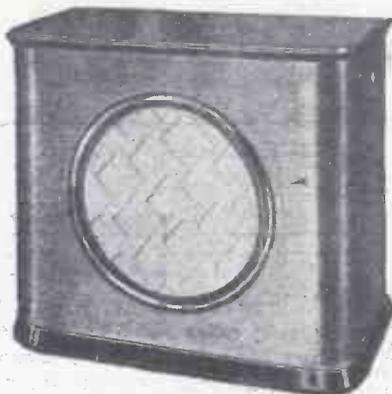
the Experts use!

To render music faithfully

IS THE AIM AND ACHIEVEMENT OF THE UNDY 8 POLE DYNAMIC SPEAKER



Complete 8-Pole Unit with Chassis ready for building into Cabinet or Baffle-board. **50/-**



Undy 8-pole Dynamic Loud-speaker in attractive Mahogany Cabinet **70/-**



Undy 8-pole Dynamic Loud-speaker in highly polished Walnut Cabinet de-Luxe **90/-**

The Undy 8-pole Dynamic Loud-speaker is the turning point in Loud-speaker design. The best Loud-speaker for sensitivity, power and frequency range. You must hear it to-day!

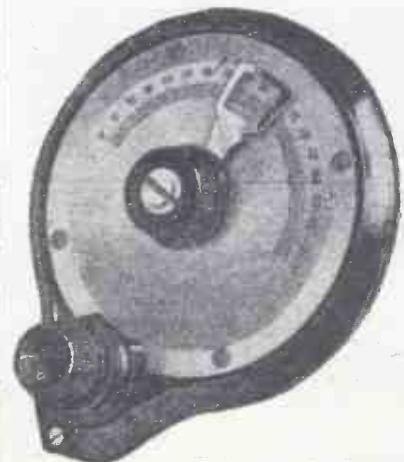
"UNDY"

Obtainable from your usual dealer.
ASK FOR DEMONSTRATION.



"ASTRA" Dial Type No. 2.

The marvellous geared movement of the "ASTRA" is a "masterpiece of precision," and enables really accurate adjustments to be obtained.



No backlash. Noiseless action. Both slow motion and direct drive are available, the latter by simply switching up the lower knob. The "Astra" is adjustable to fit any condenser spindle and is easily mounted. Diameter of dial 4 in. Finish: Black or brown moulding with aluminium scale or all black.

"ASTRA" Type No. 2.

Price 5/-

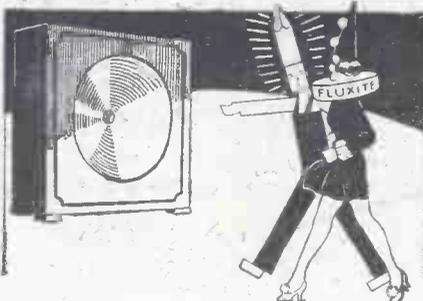
"ASTRA" Type No. 1.

3 in. diameter. Finish: Black or brown moulding with aluminium scale or brown with gilt scale.

Price 3/6

"Astra" are the only dials manufactured under Ormond licence.

ASK YOUR DEALER TO SHOW YOU THE FULL RANGE OF "ASTRA" DIALS AND CONDENSERS.
EMKABE RADIO CO., LTD., 47, FARRINGDON ROAD, LONDON, E.C.1.



"We're Fluxite and Solder—The reliable pair, Famous for Soldering, Known everywhere! If there's trouble with Wireless, Loud Speaker or Set, Just call US to help you—you'll be glad that we met!"

See that Fluxite and Solder are always by you—in the house, workshop, garage—anywhere where simple, speedy soldering is needed. They cost so little but will make scores of everyday articles last years longer! For Pots, Pans, Silver and Brassware; RADIO; odd jobs in the garage—there's always something useful for Fluxite and Solder to do.

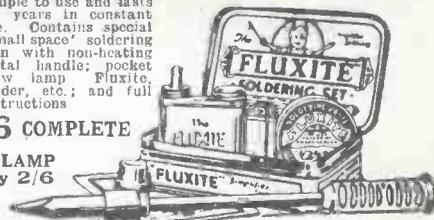
ANOTHER USE FOR FLUXITE: Hardening Tools and Case Hardening. Ask for leaflet on improved method.

FLUXITE SOLDERING SET

Simple to use and lasts for years in constant use. Contains special "small space" soldering iron with non-heating metal handle; pocket blow lamp. Fluxite, Solder, etc.; and full instructions.

7/6 COMPLETE

or LAMP only 2/6



FLUXITE LTD. (Dept. 324), Rotherhithe, S.E.16

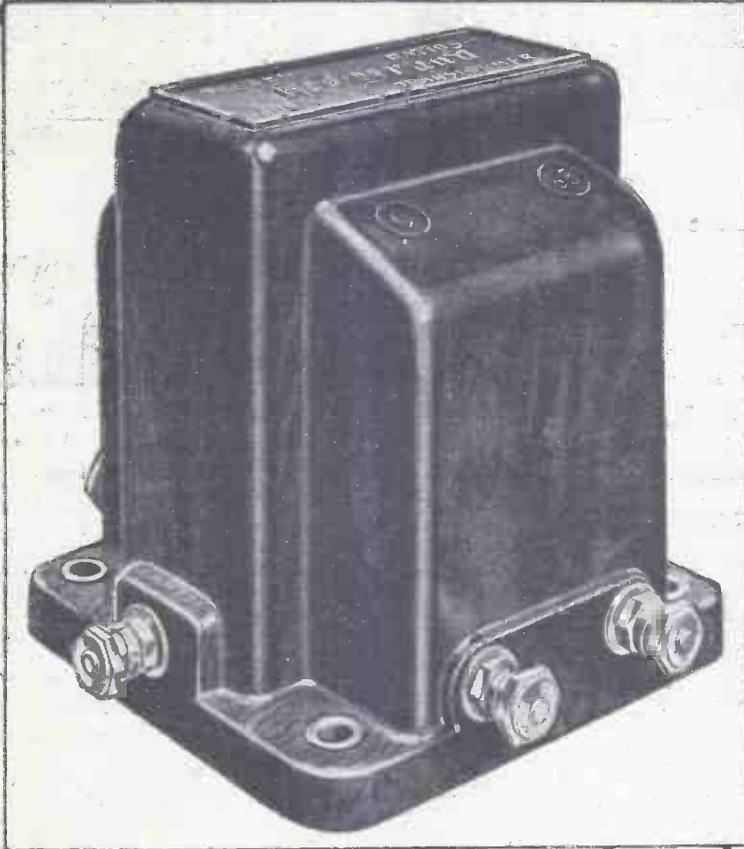
All Hardware and Ironmongery Stores also Fluxite, in tins, 8d., 1/4 and 2/8.

ALL MECHANICS WILL HAVE

FLUXITE

—IT SIMPLIFIES ALL SOLDERING

PERMANENT EFFICIENCY



TELSEN "RADIOGRAND" TRANSFORMER. Note new Earth Terminal, invaluable in two-transformer-coupled sets. Built for permanent efficiency. Ratios 3-1 and 5-1. Price each 12/6. Supr. Ratio 7-1. Price 17/6.

The "ACE" TRANSFORMER, has been specially designed for inclusion in all Portable Sets and where space is limited. Similar finish to the "Radiogrand." Price each 8/6. Made in ratios 3-1 and 5-1.

Built to give "LASTING SERVICE"

Mere novelty in transformer construction when not applied to progress holds no place in the "TELSEN" policy. The merits and properties of all metallurgical by-products have been exploited and we are firmly convinced that for natural reproduction and long service there are none to equal "TELSEN" Transformers. They are not made with a nickel alloy core, but are built on sound radio engineering principles which time has proved to be trustworthy ... and tests have proved them to be a fitting component for the highest grade receiver. "TELSEN" Transformers maintain their remarkable volume and clarity of reproduction throughout the entire musical score.

Bring your old set up to date ... Get volume with purity ... Get greater distance ... Get reproduction which is uncanny in its realism ... Change your transformers ... Try "Telsen" they are designed to give "Permanent Efficiency."

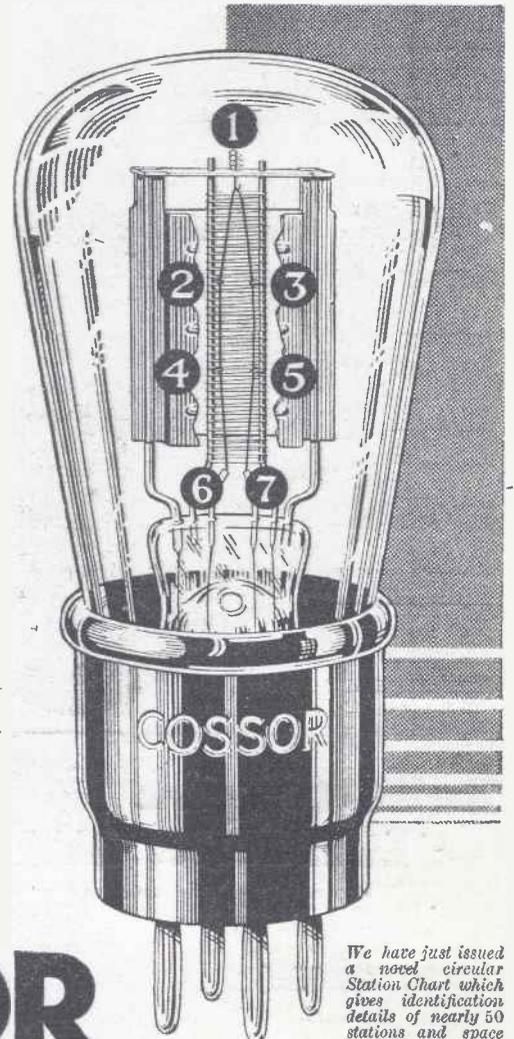
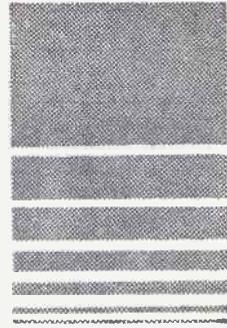
TELSEN

TRANSFORMERS

Microphonic noises
definitely eliminated by

Seven point suspension

THE cause of microphonic noises in a Receiving Set is generally to be found in a faulty Detector Valve. Usually it is due to filament vibration. The new Cossor Detector Valve (210 Det.) has been specially designed to overcome this fault. Filament vibration is rendered impossible by a new method of seven point suspension. The diagram shows the four insulated hooks which secure the filament in position and damp out any tendency to vibration. The use of this "steep slope" Cossor Detector Valve not only eliminates microphonic noises, but ensures great volume with exceptional purity of tone.



The New Cossor 210
DET., 2 volts, .1 amp.
Impedance 13,000.
Amplification Factor 15.
Mutual Conductance
1.15 m.a./v. Normal
working Anode Volt-
age 90-150.
Price **8/6**

THE NEW **COSSOR** DETECTOR VALVE

We have just issued a novel circular Station Chart which gives identification details of nearly 50 stations and space is provided for entering your own dial readings. Price 2d. each, they are obtainable from any Wireless Shop. In case of difficulty write us, enclose 2d. stamp and head your letter "Station Chart P.W."

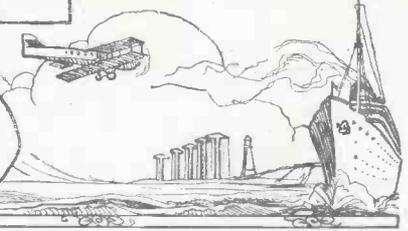
DEFINITELY FREE FROM MICROPHONIC NOISES

A. C. Cossor Ltd., Highbury Grove, London, N.5.

♥ 6660

Popular Wireless

LARGEST NET SALES



Scientific Adviser:
 Sir OLIVER LODGE, F.R.S.
 Chief Radio Consultant:
 CAPT. P. P. ECKERSLEY, M.I.E.E.
 Editor: NORMAN EDWARDS.
 Technical Editor: G. V. DOWDING, Associate I.E.E.
 Assistant Technical Editors: K. D. ROGERS,
 P. R. BIRD, G. P. KENDALL, B.Sc.,
 A. JOHNSON RANDALL.

LIVE AND LEARN.
 RADIO—LIFE-SAVER.
 BRASS AND BROADCASTING.
 RADIO'S LUCKIEST MAN.

OLD FRIENDS.
 THE ECONOMY THREE.
 OUR CONSERVATIVE NAVY.
 A GREAT CONSPIRACY.

RADIO NOTES & NEWS

We Live and Learn.

MR. S. (Lewes), who checks his watch by the syrens which are unintentionally broadcast from Birmingham at 1.55 p.m. and 2 p.m.—ever heard them yourselves?—amazes me by his revelation of the fact, apropos my comments about Guy Fawkes, that Lewes has no less than five Bonfire Societies, with adult membership, and I have before me the 1930 programmes of three of them. Can any town of the same size beat that? Judging from the descriptions of the proceedings I should think that here is a fine chance for the B.B.C. to do an O.B. next year.

A Golden Opportunity.

DID you spot the notice in "P.W." about this month's "Modern Wireless," with which eight sixpenny blue prints are issued free? If not, here is a timely word before all the copies have been sold. Those blue prints and the articles in the magazine give full descriptions of eight excellent sets and will furnish home constructors with all the work they need before the season of dark evenings is over.

"A Great Improvement."

THE "Catholic Herald" is considerably upset about the B.B.C.'s proposed Sunday talks on the relation of science to religion, and says that it is difficult to understand why the Editor of "P.W." should describe the feature as a great improvement. The "C.H.," being a sectarian organ, is bound to express views consonant with the general attitude of the sect it represents; but, nevertheless, the subject of these talks is of great moment to the present generation, which is brought up on science, one may say, yet which recognises the claims of religion to its earnest study. Just as physics is becoming almost metaphysical, so religious teaching is finding in science a powerful aid. One day the lion will lie down with the lamb in complete harmony.

Radio the Life-Saver.

WHENEVER a big marine disaster happens and the crew and passengers are saved through the medium of wireless, we realise that radio is responsible for the preservation of much human life, but it is perhaps not generally known how the loss of life at sea has been reduced since radio was applied to ocean travel. During

in the curtain rod business? (Heavens! is there such a biz?) Could they suggest a good eating-house where a dinner can be had for not more than two dollars? (That's eight bob odd in our money. The answer is, Yep!) Could they catch a balloon which was floating towards the transmitter? (Imagine Sir John Reith chasing a balloon round Brookmans!) Finally, from a couple married one week before, "Please play the Wedding March from 'Lohengrin.'" To stave off the divorcee for a week or so, I suppose!

NOT MUCH TO LOOK AT!



You wouldn't think that this dismal-looking building could be associated with the sparkle and gaiety of successful symphony concerts, would you? Yet it is, for this disused warehouse has been converted into the biggest studio in the world, with a floor-space of 4,000 square feet. Originally it was known as "Big Three Wharf" but it is now called "Studio No. 10" by the B.B.C., and it easily houses the 114 players of the National Orchestra.

International Courtesies by Radio.

THE broadcast expressions of sympathy with Great Britain over the R101 tragedy which were made by German stations must have gone straight to the hearts of British eavesdroppers, and the cancellation of certain German dance programmes was what the average Englishman would call "a jolly decent thing to do." I was glad to see that the B.B.C. did not lag behind in doing the right thing after the dreadful German mine disaster. War is all bunk—to put it mildly, more mildly than did General Sherman (U.S.A.)—and the League of Nations ought to have a large section devoted to the use of radio in bringing the peace determination to the peoples of the world. Amen! No collection!

The Luckiest Radio Man?

CONGRATULATIONS to Mr. Arthur Disney, the wireless operator of the unlucky R101, on his wonderful escape and his plucky conduct when, badly burnt and shocked as he must have been, he kept on his two feet until he had telephoned the awful news to the Air Ministry. In recognition of his conduct, Mr. Disney has been awarded the medal of the Civil Division of the Order of the British Empire for Meritorious Service.

All the best—and may his luck hold—is what we wish him.

(Continued on next page.)

the period 1871 to 1910, the average annual loss of life to passengers at sea was 231; for the period 1921 to 1928 the annual average was only 15, and in two of those years not a single passenger was lost! Wonderful, considering how sea travel has grown!

Brass and Broadcasting.

FOR pure brass I commend to you certain American citizens who, according to a contemporary, have written to certain American broadcasting stations. Here are a few of the requests in their letters: Could they broadcast for a partner

RADIO NOTES AND NEWS

(Continued from previous page.)

Old Friends.

WE have received too many letters from readers who still treasure "P.W." Booklets dating back six and seven years to deal separately with them, but here and now we express our pleasure that our work still lives. Some of the samples sent to us as proofs show signs of much use, and most are pocket-worn. We have even had a note from a man in Lisbon who cherishes two 1923 specimens. This little interlude has been deeply gratifying to us because it furnishes yet another proof that we have more than a certain number of readers—that we have a friendly following, which is a much more valuable and pleasant sort of contact.

Broadcast Advertisements.

ALTHOUGH the B.B.C. has declined to taint its programmes with paid commercial publicity, it is coming mighty near us. Radio-Paris does not disdain the coin chinking in the pocket of the man who has something to sell, and some very large and well-known British firms have used the Parisian ether. In the west, Dublin has begun to experiment with sponsored radio programmes, and has put out one programme punctuated with eulogies of somebody's tobacco! I should be sorry, on balance, if the B.B.C. ever starts in trade in this manner, and yet sometimes I think that it might do the Old Country a bit of good, especially if 5 S W were used.

The "Economy" Three.

INTEREST in this "P.W." set appears to be increasing. D.A.O'H and W.A.O'H, 15, Conaley Road, Hanwell, W.7—to take a typical communication—say that they have constructed this set, and on its first test logged, at full L.S. strength, National, London Regional, Midland Regional, Rome, Toulouse, and Turin. These gentlemen would be interested in reports from other readers concerning this receiver. Before I pass on to the next topic I should like to mention the "Olympia" Five. This we were sure was a winner, and the reports confirm our belief, most of them being similar to that of a Newry reader: "Just the slightest touch and the stations come in one after the other."

A Few Practical Tips.

REVEREND reader has been good enough to pass on to me the following fruits of his experience in his workshop: (1) A file "carder" laid on the bench is handy for cleaning a hot soldering iron. (2) An all-metal crochet hook (size 5), costing twopence with sheath, is A1 for lifting a strand of wire for tapping purposes. (3) Unwanted holes on a panel are best filled up with spare knobs. "I have eighteen knobs on my set, of which eleven are dummies, but very imposing." (*Good heavens!—Ariel.*) He asks us to publish an "efficient and complete list of ordinary broadcasting stations in good print." Noted!

The "Crystatube."

WHEN I see a reference to a crystal set I get a nasty 1910 feeling. That was the year I sacrificed my last eye-tooth to the dentist and had to struggle—in commercial work—with the awkwardest

mammoth of a crystal receiver ever conceived by a draughtsman in league with Mephistopheles! But G. W. D. (Swindon) keeps the "Crystatube" by him as a reserve set, because it gives him Brookmans Park (261'3 m.), Regional, Midland Regional and National, all at good strength. Crystal "die-hards" may therefore take this set to their bosoms in faith, hope, and—er—clarity!

Scottish Radio Show.

THE first Scottish National Radio Exhibition was opened on November 12th by the Lord Provost of Edinburgh. The show was in the Waverley Market and all the space was taken, so that success was assured. The B.B.C. exhibit was in the form of a complete studio from which broadcasting took place every day in full view of the visitor. I have been definitely forbidden to crack jokes about free samples,

SHORT WAVES.

NO WONDER!

An elderly correspondent writes from Birmingham asking why it is that, although she twists all the knobs on her set all day long, the only sound she can get is a frenzied hammering on the wall from her neighbour.

The whispering baritone's successor is the whispering cornetist.

So prospects of a whispering loud speaker are not entirely hopeless.—"Sunday Express."

A critic recently remarked that chattering among listeners drowns a lot of the sound during a radio broadcast.

Yes, but not nearly enough.

Wireless Expert: "Yes, sir, this is the very set for you. Absolutely foolproof!"—"Pictorial Weekly."

THIS WEEK'S CRUEL CRITIC.

The man who, on reading that, since radio was installed in hospitals, the average stay of the patients has been reduced by a week, writes: "Naturally. It's the rotten programmes that drive the poor beggars out."

A PLEA FOR SILENCE.

Look here, you're not a bad
Or evil-minded sort of lad,
But I would like to ask you how
A chap can work in such a row.
I wish you'd see if you can get
A silent kind of wireless set;
Piano thumping by your niece
Does not contribute much to peace;
Why don't you stop your gramophone?
I've got a good one of my own.
And lastly I am sick of barking
To constant and persistent barking.
Stop singing, please, and do it soon.
Don't cough, don't snore. Good afternoon!
"Daily Mirror."

What is the difference between an accumulator and an Aberdonian?
The accumulator can be overcharged.

etc., so here's luck to the show, which ends on November 22nd—and may the bawbees flow in!

Edinburgh Radio Society.

THIS is an appropriate place in which to introduce a wee note about that excellent Edinburgh and District Radio Society, whose "Transactions" are published in a bonnie booklet along with those of the Royal Scottish Society of Arts and four other important bodies. Its 1930-31 syllabus is attractive and diversified—and includes an auction sale! Its meetings will be held on Thursdays, and its Hon. Sec., Mr. E. I. Robertson, 33, Featherhall Avenue, Corstorphine, will no doubt be pleased to give further details to interested applicants.

The Gramophone Motor.

WITH the first snap of real cold my "grammy" began its old trick of refusing to run at the proper speed. so Dr. Roberts's article about those motors ("P.W." November 1st) came just in the nick of time. I found, however, that the less heavy grease in the outfit the better it ran—though I did not touch the spring. I wickedly soaked the friction pad of the governor with sewing-machine oil, and wiped and oiled various cogs, spindles, and bearings, after which all went as merry as a marriage bell. My next adventure will be with the soundbox; it gave a nasty snarl last night!

"Our Conservative Navy."

AS I anticipated when I wrote that note, the Navy has quickly found a champion. He comes in the form of H.A.C. (Leicester), who served in the R.N.V.R., and in 1916 found himself on one of H.M.'s fleet sweepers. The arrangements aboard this Packet appear to have been super-de-luxe, and included an electric soldering iron, flux paste, a bookcase, and a desk with an electric reading lamp complete with yellow silk shade! In the "silence cabinet" there was an electric air changer! But when H.A.C. asked for a razor he was told that sailors did not shave in Nelson's time—which is not true. H.A.C. does not say what the grub was like, I notice.

Licences in Germany.

STEADY progress continues in the land of Beethoven. On October 1st the total number of licences reached 3,241,725, an increase of 16,781 over the total three months earlier. In October, 1929, the total was 2,843,569; thus in a year they have put on 398,156 more licences, a 14 per cent increase. The Germans are home-loving folk like ourselves, and to that fact I partly attribute the popularity of radio in Germany and England, though the high standard of transmission and of the programmes deserves most of the credit.

The Great Conspiracy.

THE child life of America is now threatened with a new menace in the shape of a conspiracy between the parents and the radio companies. This is how the Terror will operate. Suppose that Sadie Snitzelbaum persists in the sin of drawing pigs on the wallpaper! Pa Snitz sneaks away and apprises the nearest radio station of the fact, and in due time the culprit's name and wickedness are blurted out of hundreds of loud speakers. But will this new corrective method work in the expected direction? May it not be, like Romance, "the Voice to kingly boys, to lift them through the fight"? May it not urge the perverse imps to notch sticks to record the radio denunciations they have suffered and to boast thereof at the street corner?

Those Terrible Wires.

KNOW all men that to the list of town councils who shrink from overhead wires must be added the names of Greenford and Ealing, where applications for authority to establish "radio exchanges" have been refused. This is the nation which hung on to its enemies for four awful years!

ARIEL.



CUT OUT THAT LOCAL!

Full details of the cheapest and easiest-to-make of all the "P.W." Brookmans Rejectors. It costs only a few shillings, and you can build it at home in no time. Yet it gives better results than any other interference eliminating device ever designed. It not only absolutely kills the most powerful local station, but it makes distant reception better than ever, and not worse like an ordinary wave-trap.

Designed and Described by the
"P.W." RESEARCH AND CONSTRUCTION
DEPT.

WHEN Brookmans Park first started business there was a terrible outcry against interference, and it seemed that everyone in the area with a "detector and low-frequency" set was finding life very hard.

The immediate result was such a flood of interference-eliminating devices, both commercial and in the form of designs for the

In this it differs radically from all other kinds of rejectors, wave-traps, and selectivity units. Indeed, it caused quite a revolution in people's ideas, for until then it had always been assumed that these devices *must* produce a lowering of the sensitivity or general selectivity (or both) of the associated receiver.

The reasons for this rather amazing characteristic of the Brookmans Rejector were simple enough, and really followed from the fact that it applied to the rejector circuit a method of coupling never previously explored.

This method uses capacities instead of inductances for coupling purposes, as you will see done for long waves in some of our recent sets using the new "P.W." coil unit. (See the "Interchange" Three.

of paper we might have called it "amazing," "incredible," "revolutionary," and "sensational," and been forgiven!

Seriously, though, the Brookmans Rejector is a very important factor in the interference problem, and should be the natural resort of anyone who has any difficulty in cutting out his local station.

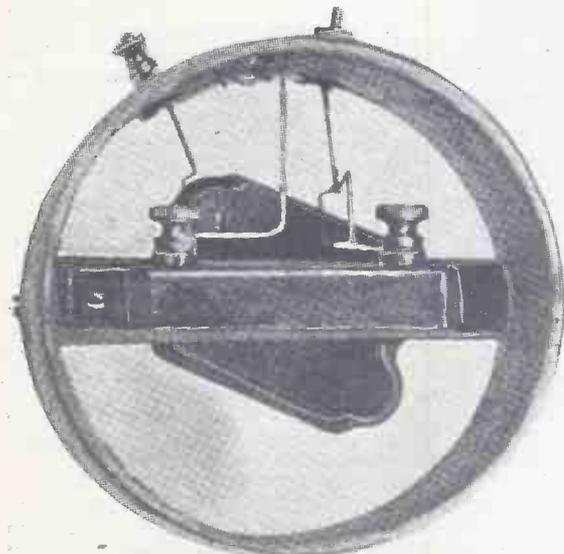
Cheap to Construct.

It is too good a thing to be allowed to drop, so we have just prepared a little design for one of a rather novel kind. It is intended to appeal particularly to the man who likes to make things up himself rather than just to assemble ready-made parts, from which it follows that it is particularly cheap to construct.

If anything, it works just a trifle better than the various models in which plug-in

(Continued on next page.)

SURPRISING SIMPLICITY



Only two components to buy! Here you see how the fixed condenser is tucked away inside the coil former.

home constructor, as we had never seen before. Some of them worked and some of them didn't, but among those which did there was little question as to which was pre-eminent. It was that remarkable "P.W." product, the Brookmans Rejector.

Really Remarkable.

We call it "remarkable," and for the benefit of those who have never had the intriguing experience of trying the device we will explain why we use the word. Well, we describe it thus because not merely does it eliminate an interfering station with a thoroughness and completeness previously unapproached, but it does *not* reduce the general efficiency of the receiver with which it is used.

Series Condenser.

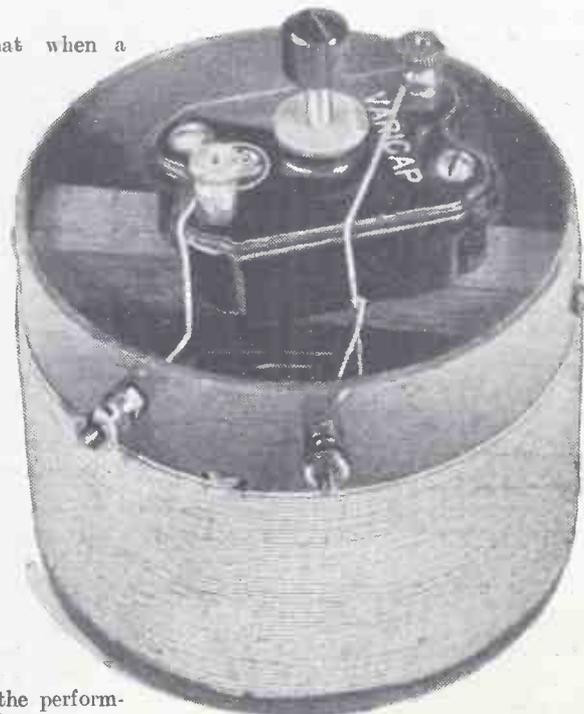
This means that when a Brookmans Rejector is placed in series in the aerial lead the only effect, apart from interference elimination, is to provide the receiver with a series aerial condenser.

If the capacity of that condenser were small, of course, it would reduce volume, but since the working capacity in a Brookmans Rejector is quite large that does not happen. What does occur is just the slight increase in general selectivity which is the natural outcome of the use of a fairly large condenser in the aerial lead.

Thus, you see, not merely does the Rejector shut out the interfering station with certainty and thoroughness, but it even improves a little the performance of your set on other stations!

Surely, "remarkable" was not too strong a word, was it? If "P.W." was that kind

WONDERFULLY EFFECTIVE



Only one adjustment! You turn the little knob and the interfering station disappears, while distant stations come in better than ever.

VOLUME VERSUS QUALITY

Some observations on the subject of the constitution of musical combinations for broadcasting.

SOMEONE, I think it was Victor King, once said that the B.B.C. always tended towards over-elaboration in its transmissions. What, said this someone, is the good of having an orchestra of one hundred and forty, when, for radio purposes, the odd forty could be made to give exactly the same effect?

I do not quarrel with the logic of that statement, but I do quarrel very violently with its sentiment. One could reply with that absurdly devastating, "What is the good of anything," but that takes you no forrarder.

You cannot measure such things as the

stimulus to improve, and improve, and keep on improving our reception.

Secondly, I fancy that everyone with any imagination at all must be stirred by the thought of the hundred or more musicians all lustily operating their instruments, even if he is unable to get a full measure of the tonal colours they produce.

As I sit in a comfortable armchair at home listening to one of the B.B.C. Queen's Hall concerts, I am very painfully aware of the inadequacy of the medium through which I hear it, but, at the same time, I get a thrill at the thought of that great arena occupied by banks of earnest-looking virtuosos.

How to Listen.

I visualise the conductor waving his baton and skilfully steering his vast host through passages rough and smooth. I see all around the vast audience tensely gripped by the artistic drama that is being enacted—perhaps a great pianist at the grand piano is caressing the tiny white keys with concentrated purposefulness.

No, we must not be too prosaic about

respect of their listeners, they are half way towards being able to hold their continued attention. Nevertheless, I, personally, wish they would devote as much thought, time and money to the lighter aspects of their activities as they seem to be devoting to their symphony orchestras and other such features.

G. V. D.

CUT OUT THAT LOCAL

(Continued from previous page.)

coils were used, and we strongly commend it to the notice of any one who is having a "spot of bother" with his local.

Here's how to make it. First get a piece of tubing of some good insulating material like Pirtoid or Paxolin, 3 in. in diameter and 2½ in. long.

In one end of this fit two small terminals (about ⅜ in. from the end) and cut a wooden cross-piece to fit snugly across inside the former.

This cross-piece can be of wood about ¾ in. square section, and it is to be secured in the tube by means of a small screw passing into each end through a hole bored in the wall of the tube. It is to be placed at the same end of the tube as the terminals, but don't fix it yet.

Quickly Made-up.

First screw to its underside a fixed condenser of .001-mfd. capacity, and to its upper side a compression-type adjustable condenser of .001-mfd. maximum capacity.

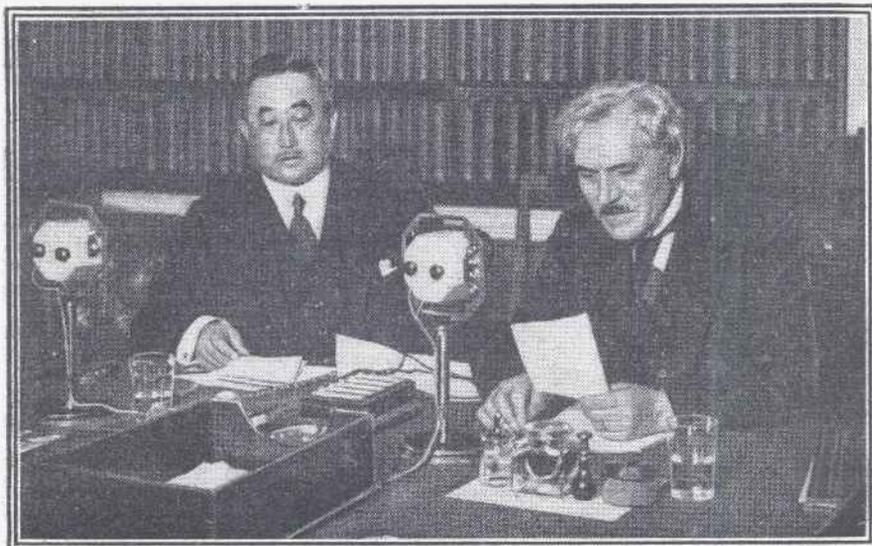
Put this part aside, and proceed to wind 45 turns of No. 24 D.C.C. wire (or 42 turns of No. 24 D.S.C.) on the tube in a single layer, starting about ⅛ in. from the end opposite to the one with the terminals. Leave a few inches of wire at start and finish sticking through holes into the tube for connections. (A 2-oz. reel of wire will be ample, by the way.)

Now fix your cross-piece in position, and wire up thus: Upper end of coil to one terminal and one side of compression condenser. Other side of compression condenser to other terminal and one side of fixed condenser. Other side of fixed condenser to remaining end of coil.

In use, proceed thus: Connect aerial to the second terminal, and wire the other to "A" on your set. Now very carefully adjust the compression condenser until you find the point at which the local station suddenly goes right down in strength and even vanishes (unless the set is very powerful it will do so). Check the point by noting that a variation either way lets the local through again, locate the exact rejection setting as accurately as you can, and then tighten the locking nut under the condenser knob.

That's all: exit the local!

"MIKE" VISITS DOWNING STREET



Mr. Ramsay MacDonald and the Japanese Ambassador before their respective microphones on the occasion of a recent broadcast from No. 10, Downing Street.

value of this or that method of artistic presentation and treatment by "rules of thumb." It is certainly true that the average receiving outfit makes little or no distinction between a small concert orchestra and a gigantic orchestra, except perhaps in respect to sheer volume. Anyway, two double basses skilfully disposed for the "Mike" would get over just as well as six double basses—mere apparent volume, however, must not be allowed to remain as the be-all and end-all of B.B.C. orchestral construction.

"Adequate" Broadcasts.

I can give you two very good reasons why the B.B.C. should aim at the biggest orchestral combinations of the highest possible quality. One is that it is their duty to set the best standard they can, irrespective of the limitations of our receiving outfits, so that there is always an incentive to progress, always something higher at which to aim in our reception technique.

If they are satisfied with merely adequate broadcasts, there would be lacking that

this broadcasting business. We must not take our programme at ear value. What matters it if a big lump is sliced off our bass and our high notes are pretty thin, surely there is an "atmosphere" for the imaginative to appreciate that provides compensation for the many missing frequencies?

To enjoy broadcast music to the full, you want to listen with great discrimination. Once you begin to use the radio merely "as a background," all broadcast music tends to sink to the level of a "pleasant noise," in your estimation. Mind you, I am no "high-brow," and I think that, on the whole, I prefer Gershom Parkington's cheery little Quintet to the vast new Symphony Orchestra.

But that would not lead me to say that Quintets are adequate for radio. If you restrict the material for technical reasons, you strip the B.B.C. of its aesthetic dignity. I maintain that it is vital that the B.B.C. should be able to provide the very best of every form of entertainment, etc., through their radio service.

If, in that way, they can command the

Eight Sixpenny Blueprints

are presented

FREE

with the November

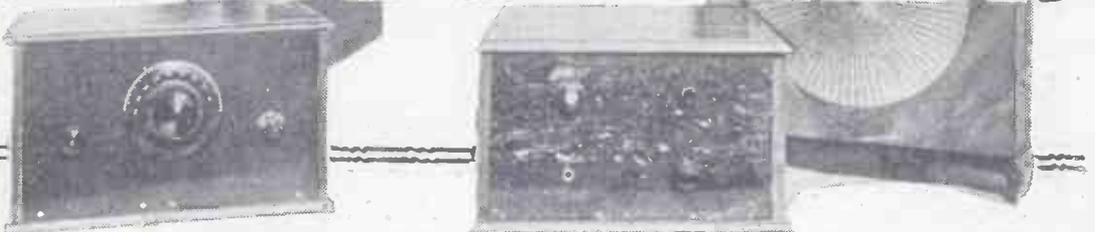
MODERN WIRELESS

Now on Sale

Price 1/-.

CONCERNING VALVE AMPLIFIERS

By
Capt. P.P. Eckersley
M.I.E.E.



WE find, that the voltage change at the valve's anode increases as the theoretical amplification factor of the valve is greater; as, up to certain limits, the value of Z_a compared to the impedance of the valve is greater, and of course as the volts change applied to the grid is greater.

But I do not wish to trouble you with algebra, simple as it is. What is better is to draw a very simple diagram to show how any valve performance may be graphically and quantitatively calculated.

As my introduction is finished, let me resume it. The valve as a valve means nothing. It is the design of the circuits round the valve for a purpose which counts.

Converter Generator.

A valve can be looked upon as a converter generator of comparatively high internal resistance. It converts mainly the high-tension energy. To do so it must contain an impedance of some sort in the anode circuit.

Last week I showed how a valve should be considered as a "converter generator." The valve takes power from a high- and low-tension source of E.M.F. and can be used to convert this rather mediocre supply into alternating current of any frequency whatsoever. The efficiency, as we shall see, is not great in some cases, but the convenience of the device is paramount.

I now want to bring to your notice a diagram which should considerably help anyone interested in designing their sets (as apart from making them) to get a quantitative appreciation of the various factors involved.

Let us consider a valve having a pure D.C. resistance in its anode circuit, and consider the changes of voltage at the anode when the grid-filament difference of potential is varied.

Characteristic Curves.

To help us consider this point it is convenient to possess a set of valve characteristics. But such characteristics must be different from those usually supplied. Nearly every valve manufacturer supplies a set of grid-volts anode-current characteristics for various anode voltages.

Thus, go and find the latest valve carton and have a good look at the characteristics. You will see that the anode voltage has been kept constant while the grid voltage has been varied. The anode current has

Our Radio Consultant - in - Chief is outlining the general theory of the valve in an exclusive series of "P.W." articles. Read this second one, and we are sure you will make a special point of ordering "P.W." so that you do not miss the others.

(2.) CALCULATING CHARACTERISTICS.

been read and hence the various curves for different fixed anode voltages.

Now turn to Fig. 1, where instead of varying the grid voltage we keep this

These anode-volt anode-current characteristics are seldom supplied by makers I cannot understand why. I can never do anything with the other kind. Perhaps that is why they are supplied!

What Happens?

Now consider the conditions when we place a resistance in the anode circuit of the valve which has given us the characteristics of Fig. 1. Obviously, if we fix a certain steady grid voltage, the anode voltage will take up a certain value (less than the high-tension supply voltage because of the drop of volts in the anode resistance), and we must be able to find some point (P) which represents the steady condition.

By steady condition I mean that there is so much steady grid voltage, so much steady H.T. supply, and so much (less) steady anode to filament voltage. Let all this condition be represented by the point (P₂).

Now change the grid voltage from its steady value (-3_g) (see Fig. 1), to (-4_g). Obviously less current flows for a given voltage on the anode, because we have increased the negative in the grid. But since less current flows, there will be less volts drop in the anode resistance.

Things will balance up, and we can represent the condition of affairs by the point P₄. Similarly, by increasing the grid negative to (-5_g) the current through the anode circuit and the volts from anode to earth may be represented by P₅.

Without laboriously going through the whole process, a little consideration will surely show that the line P₀, P₁,

P₂, P₃, P₄, P₅, P₆ is the locus of all the points showing the condition of affairs as the grid voltage is swung from a value of 0 to -6_g.

Total Grid Swing.

Now (0) is zero grid volts (-3_g) is the steady grid voltage applied, and (-6_g) is the maximum negative swing. So the total peak grid volts is the difference between 0 and -6_g.

(Continued on page 541.)

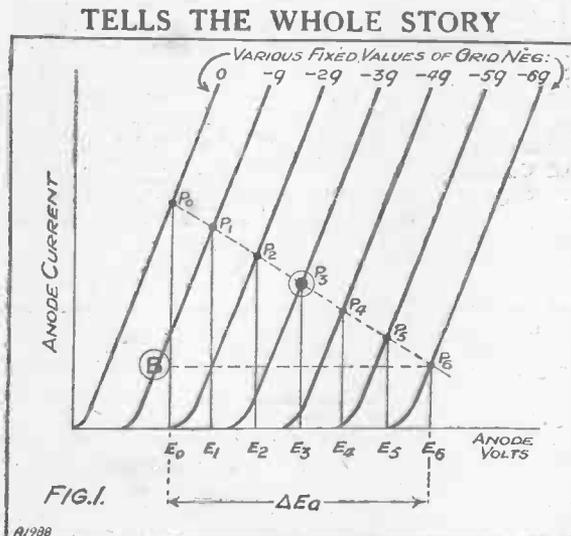


Fig. 1.—When you have a chart like this, you can see, almost at a glance, every working characteristic of the valve. It shows the "load line" plotted on an anode-volts anode-current curve.

constant and vary the anode voltage and find the corresponding anode current. We arrive, then, at a series of anode-volt anode-current characteristics. These are much easier to understand.

By fixing the grid voltage for each curve the valve behaves in some ways as a pure D.C. resistance. True, this resistance has a peculiar habit of becoming infinite below a certain voltage applied to it, but otherwise notice that it behaves as a pure resistance within certain limits;

LATEST BROADCASTING NEWS.

XMAS BROADCASTING PLANS

ST. HILARY AND CAROLS— THE SILVER KING—RUGBY COMMENTARIES.

CHRISTMAS DAY this year falls on Thursday, so that we shall have a rather longer holiday than usual—Wednesday night until the following Monday morning for most of us. At least we hope so.

The B.B.C. generally makes a whole week of this Christmas business so far as the programmes are concerned. The festive spirit must not come upon us suddenly or we might not notice its passing. Psychology and broadcasting are well-known to each other.

This is it that the music on Sunday for National listeners will be quite Christmassy, both in the band concert relayed from Manchester during the afternoon and again in that played by Tom Jones at Eastbourne in the evening.

St. Hilary and Carols

Monday, December 22nd, brings the Nativity Play which, for some years round about Christmas, has been relayed from St. Hilary, where it is performed by unsophisticated Cornish folk. Surely by this time these hardy villagers must be realising how important they are in the scheme of things. After their play, comes an hour of vaudeville.

Tuesday should be really interesting with two slabs of relays from a theatrical production. It is too early to give any details of this, in fact the whole of this note is merely a summary of the programme builders' ideas. Later on we shall give full details, well in advance, as we always do.

Christmas Eve—Carols, of course, as usual sung by Mr. Stanford Robinson's Wireless Singers in Whitechapel Church. And later on, at 10.30, just before we go to bed, a ghost story.

Pantomime is the order of things for the early part of the evening programme of Christmas Day. Then a spot of appropriate orchestral music, a programme of reminiscences, and dance music until 1 a.m.

The Silver King

Friday, December 26th, Boxing Day, and a continuation of merry moments in vaudeville and light tuneful melodies. The week closes on Saturday with a play, "The Silver King," and puffing and blowing by Walton O'Donnell's Military Band.

Now for a glance at the London Regional arrangements. Carols of the modern sort, sung by the Wireless Singers, are down for Sunday afternoon, December 21st, and a Symphony Concert the same evening. The religious service this evening will come from the College of St. Nicolas, Chislehurst.

Monday, December 22nd, looks good, but not exciting, with the Victor Olof Sextet and the Wireless Military Band, but December 23rd, should be more the thing with dance music at 8 p.m., and a feature programme called "A Christmas Miscellany" at 9.45.

A Brass Band Concert from Newcastle, a pantomime (just a bit too early perhaps) and more military band music gives a

pleasing contrast to the National programme on Christmas Eve. So, too, will items by the Parkington Quintet, Callender's Band and more than an hour of vaudeville on Christmas Night.

On Boxing Day the play "The Silver King" will be given its try-out performance, followed by dance music, which, by the way, will be almost continuous from 10.15 until 1 a.m.

Saturday, December 27th, will bristle with light stuff—cinema organ music, dance tunes and the best to wind up a jolly week. Look out for the full details of these festive programmes which will be published in our columns in due course.

Rugby Commentaries.

Mr. H. B. Brennan, formerly a member of the staff of the B.B.C. at Savoy Hill, who assisted in giving many running commentaries on sporting events, will be associated with Capt. H. B. T. Wakelam in describing the Oxford v. Cambridge Rugby Football Match which takes place at Twickenham on Tuesday, December 9th. The commentary will go out from the London Regional Station between 2 and 3.45 p.m.

A running commentary will also be given on the Rugby Match between Leicester and Waterloo which is to take place at Leicester on Saturday, November 29th. This broadcast, which is for Midland Regional listeners, will be carried out by Mr. Maurice K. Foster.

COMING SHORTLY:

THE "P.W." CHEF D'ŒUVRE!

NEXT WEEK:

THE "NEW-COIL" FIVE.

ALSO

MABEL CONSTANDUROS

IN

"RADIO STARS AT HOME,"

Order YOUR
Copy Now!



"The Foursomes"—A Secret Disclosed

The B.B.C. has not yet announced the names of "The Foursomes," the artistes, who, as already stated in these columns, are to assist regularly in future vaudeville entertainments from the London Studio. They are Olive Groves, Hermione Gingold, Bernard Clifton and Ernest Sefton, all of whom are thoroughly acquainted with microphone work.

Manchester City v. Arsenal.

The Secretary of the Manchester City Football Club points out that the date of the Arsenal v. Manchester City match relay is not Dec. 25th—as stated in "P.W." a fortnight ago—but Boxing Day, Dec. 26th.

FOR THE LISTENER.

By "PHILEMON."

A critical survey of some of the recent programmes, with frank comments on the fare provided and the way it is served up.

"Djinn and Bitters."

I AM afraid I do not know whether a gin-and-bitters improves or not by allowing it to stand; but I felt that "Djinn and Bitters" had not improved since it was first presented.

Gordon McConnell's production was good enough, and Anona Winn had her amusing moments; but the whole thing was not nearly so entertaining as the all-too-brief excerpt from "The Roosters" which preceded it in the alternative programme. Are we passing through a time of dearth in comic material; or are we becoming blasé?

Topical Talks.

I make a point of always listening to the Topical Talks. They are often more interesting than those arranged months ahead.

Mr. J. C. M. Fairlie told us a lot about

"The Gangsters" in America. These gentlemen have been having a very good Press lately.

It was good to learn that, in spite of the gunmen, Chicago is as safe for the ordinary person as London or Paris. They shoot straight, thank goodness!

Al Capone makes £400,000 a week out of beer. A week! My ghost!

Sea Symphony.

Honour to whom honour is due; and in my judgment Vaughan Williams' "Sea Symphony" is as good a piece of choral and orchestral music as anyone need wish to hear.

Luckily I happened to be familiar with the poems of Walt Whitman upon which the Symphony is based; and that, I think,

(Continued on page 543.)

The NEW GRAMOPHONE BROADCASTS



Some exclusive, hitherto unpublished behind-the-scenes details of this aspect of broadcasting are given. The B.B.C. has recently overhauled its record-broadcasting arrangements, and here the new apparatus is described by a Special Correspondent.

NO doubt listeners have marked the improvement in the quality of the gramophone record broadcasts during the last month or so. The B.B.C. engineers have been working on the pick-up and amplifier arrangements, which it is generally admitted were far from satisfactory, and now they claim to be able to give practically perfect gramophone broadcasts—as I learned when at Savoy Hill the other day.

This gramophone broadcast business goes right back to the early days, when the musical associations' ban on many artistes—added to the all-too-frequent studio breakdowns—made it essential to have the gramophone as a standby.

The engineers of the British Broadcasting Company, (as it then was) copied the American idea of using an ordinary gramophone in the studio and picking up the sound in the microphone in the ordinary way.

This is as it is still done by several big New York stations, despite the popularity of pick-ups over there. But quite early on the B.B.C. found out several little troubles in this arrangement.

A Big Disadvantage.

For one thing, when the gramophone was going, the studio had to be silent as when an ordinary artiste was broadcasting. This was a big disadvantage, because the gramophone was in the early days of broadcasting used in practically every case of breakdown, and when matters in the studio generally reached a furore, with the engineers and announcer at their wits' end as to how to carry on the programme. And then it was no easy matter to keep the studio quiet.

For another thing, Captain Eckersley, heading the group of "purists" at Savoy Hill, ordained that the quality of the transmissions must improve, and direct gramophone reproduction was nothing like so good as electrical reproduction with a pick-up.

The first B.B.C. effort at electrical reproduction was carried out with a modified H.M.V. gramophone, having an old-type Marconi pick-up on the ordinary tone-arm—not at all ideal.

Then Mr. Christopher Stone showed the big-wigs the necessity for giving a proper

gramophone record service, with renderings of all the new records of the month, and the engineering department was ordered to make up a console for Mr. Stone's use.

This consisted of a big cabinet carrying two spring motors and turntables, and, of course, two pick-ups and tone-arms. There was a switch in the middle so that at the extreme right-hand or left-hand positions one or the other of the turntables could be brought into use, while in the centre position the studio microphone was switched on.

Nasty Snags.

There were snags about this. The switching arrangements necessitated the announcer having to walk from the console to the microphone in order to read out label titles of records, and of course it entailed a slight delay before he could get back and put on the next record. Furthermore, trouble was experienced with the pick-ups and with the tone-arms—which latter were the normal acoustic gramophone tone-arms.

At this point I suspect the engineers of having tired of trying to get the gramophone broadcasts quite right. I know that for many months the pick-ups were working without even a scratch filter in circuit. Anyhow, the new gramophone console is now being used, and yet another is in the making.

The New Console.

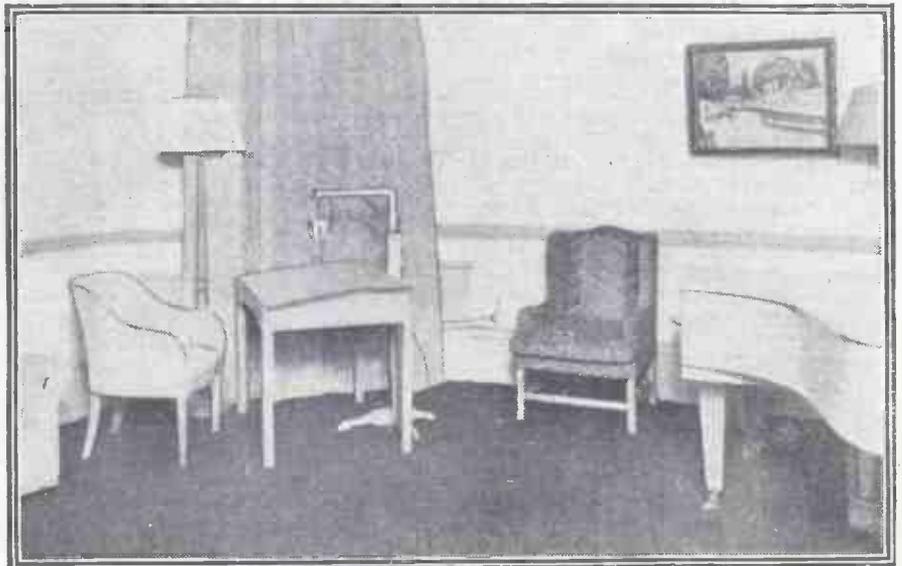
The new console is housed in the Number Six studio, the studio which is also used at present for most of the talks that are broadcast from Brookmans Park. The reason for this is that the console is now about only thirty feet away from the first amplification stage, whereas the old console in the Number Three studio had very long connecting leads.

The console has two spring-driven turntables in a weathered oak cabinet that matches the futuristic scheme of the new Number Six studio, which also houses a weathered-oak grand piano. Between the turntables is a reading-desk and a Reisiz microphone. In front is the change-over switch—actually not a switch but a fader potentiometer.

Thus, without a second's delay, the announcer can give out the record title

(Continued on next page.)

WHERE THOSE TALKS ORIGINATE



Here you see Number Six studio at Savoy Hill, in which the gramophone broadcasts take place. This studio is also famous (or, in the opinion of some listeners, infamous) for the many talks that are given from it.

DO WE WANT BASS?

By H. A. R. BAXTER.

A point where the ideals of the B.B.C. engineers and the requirements of listeners may clash.

THIS is by no means a new question. It has been dealt with from various angles by many other writers. Nevertheless, it is quite apparent that bass is very much in the minds of listeners—if not in their cars!

At the last show, for instance, one could hear hardly anything else in the vicinity of demonstrating moving-coil loud speakers except such remarks as "Hear those drums!" "What wonderful bass!" etc.

"Boomy" Receivers

And I have the idea that those radio outfits that tend to be boomy in their reproduction sell much better than the technically cleaner, but thinner sounding, affairs. That is a pity, because the ideal of the listener should be to achieve the closest possible approach to an entirely distortionless output.

But should this be the ideal of the B.B.C. engineers also? At present, as has been pointed out several times in "P.W.," an absolutely straight-line transmission is aimed at. As you will read in another article on this very page, they deliberately smooth off the rising parts of their pick-up outputs that occur towards the bass end.

Personally, I think that that is a crime, in view of the fact that ordinary radio receiving outfits fall away very badly on the low notes.

There seems to be everything in favour of a transmission that has a certain amount of bass and treble "lift" to compensate for the failings of radio receivers.

But let us look at the B.B.C.'s side of the matter. Their practice is to send out as straight a line as possible. And, in the circumstances, they manage to achieve wonderful results.

Correction is Costly.

Having done this they are able to say, in effect, we have accomplished the initial step; it is now up to the set designers, loud-speaker designers, etc., to obtain "straight-line" receiving outfits.

No doubt the B.B.C. engineers fully realise how comparatively inefficient the average set of to-day is, despite the fact that it is probable that the only receivers

they themselves ever handle are the best that modern radio science can devise.

However, they also probably consider that it is far better that any correction given should be in the receiver than in the transmitter. But if they do think this they are, of course, thinking in terms of those super-outfits that are miles too costly and far too complicated for the great majority of listeners.

You cannot apply anything approaching adequate correction to a small two- or three-valve set; there are very definite limitations imposed.

Not a Good Case.

No, on the whole, I do not think that the case for the B.B.C. is a good one. Their job is to provide those things that most of their listeners need—although at times it would seem that this vital fact is lost sight of!

If listeners want a little extra bass and an exaggeration of high notes, then there seems little reason why they shouldn't have it. Those sets already able to give fairly straight-line outputs (and there aren't many) can quite as easily correct for a new condition of over-emphasised bass and treble.

IRELAND'S OWN EXHIBITION



The Lord Mayor of Dublin at one of the stands at the Dublin Radio Exhibition.

PRACTICAL POINTERS

Some hints and tips relative to reception in general and batteries in particular.

The proper way to test the voltage of a high-tension battery is to join a high-resistance voltmeter across the battery when it has been in action for about an hour.

If the quality of your programme is bad and you are certain that the trouble does not lie in your own set, do not blame the B.B.C., because the probability is that another listener is oscillating from a nearby aerial.

For all practical purposes the quality of the B.B.C. transmissions may be regarded as

THE NEW GRAMOPHONE BROADCASTS

(Continued from previous page.)

and then switch back to one or other of the turntables. And while one record is playing the next can be put on and the other motor wound up.

It seems that the winding-up business will never be overcome. They tell me that practically every electric turntable drive has been tried, and while the better makes do not themselves cause interaction, the old Savoy Hill building is already so much a network of wires that it is asking for trouble to bring mains leads within a few feet of the pick-ups.

After a deal of experiment, the Burndept needle armature pick-ups are used, the B.B.C. engineers finding that the characteristics of this type of pick-up are well suited to the standard "A" and "B" amplifiers.

Many Complaints.

This pick-up has a slightly rising curve towards the bass, which means that without a filter there might be more bass than usual—just what the average amateur desires. But the B.B.C. has not a "50-cycle" complex, and a filter is used to correct the pick-up in conjunction with the standard amplifiers.

The gramophone engineer told me that whereas many commercial gramophones give a "boomy" bass, ideal for dancing, the B.B.C.'s intention is to give strictly true record transmissions without undue accentuations of bass or "top."

Many letters have been received complaining that the B.B.C. transmissions are not up to perfection, because there appears to be no bass, and the B.B.C. engineers blame this on to "bass-complex" which new gramophone lovers have developed from listening to home radio-gramophones.

Free Publicity!

But surely if listeners prefer bass to "true" reproduction they should be given bass. It seems to be the old Sunday programme argument over again.

There is a new console in the B.B.C. workshop, and the chief improvement in this is a special handy-container arrangement for the records. Some eighty records are broadcast each week, and the new filing idea allows the announcer to pick on the different classes of records without delay.

Somewhere in the basement at Savoy Hill is a store-room for the gramophone records and for the dictaphone records of broadcast impromptu speeches and special events. The gramophone record store is a standing proof of the death of the hostility between the B.B.C. and the record manufacturers.

After all, it is free publicity!

perfect. Jarring or distorted notes should be attributed to faulty reception and not to dud transmission.

Usually an L.T. battery requires recharging after the lapse of four or five weeks, even if the voltage has not fallen to the safety limit

AT HOME WITH RADIO STARS



Here we have the second of a brilliant new series of articles. These sketches from real life will give you exclusive and intimate sidelights on practically all the leading radio artistes and personalities.
(2.) CLAPHAM AND DWYER.

THE telephone rang furiously. I lifted the receiver and a cheery voice, booming in my ear, quite settled the little problem as to which of the happy pair—Clapham and Dwyer. "Yes, this is Dwyer speaking," said a voice. "I hear you want to interview Clapham and Dwyer at home, eh?" I said that that was my most earnest desire.

Dwyer Dashes Out.

"You won't find Cissie with us," he said—I urgently thanked him for that assurance—"and we're most frightfully busy just now, so you'd better make it snappy. If I'm not at home you'd better—"
Brrrr—Brrrr—Brrrr!
The *Brrrr*-ing was the 'phone cutting off, so without more ado I decided to risk it and make straight for the Clapham and Dwyer ancestral seat!

But such is the way with taxis and tube trains that I was *not* in time. The housekeeper at Dwyer's neat flat assured me on that point.

"Mr. Dwyer had to dash out and keep an appointment only ten minutes ago, sir," she said; "but, of course, you might catch him if you hurry."

I asked if Clapham and Dwyer were often at home, or if they had always to be dashing about keeping appointments. It seemed that home life with Clapham and Dwyer and Cissie-the-Cow must be something of a farce, and that my ambitious attempt to be "at home with Clapham and Dwyer" would be futile in the end.

The housekeeper encouraged me. She said that Dwyer was keeping an appointment at the A— Club. And if he wasn't there, well, he might be at the B— Club. Or, if he wasn't at the B— Club, he might even be at the B.B.C.—"The broadcasting place, you know." I said I did know, thank you!

"Run to Earth."

Then a dash to the A— Club, where a polite commissioner said: "No, he had just parted company with Clapham, and he, Dwyer, had gone to the B— Club."

Then a dash to the B— Club, where another polite porter said: "If yer 'urry, sir, maybe yer'll find 'im at ther British Broadcastin' place in Savoy 'ill."

So to "Savoy 'ill" it was, and as I stopped to nod to the military commissioner at the door there—who is an old friend of all Press men, and who has been with the B.B.C. since it was a company—

a man hurried down the steps, cannoned into me and quite upset the rake of my bowler, and I his.

It was Dwyer, coming out. He saw that he had been "cornered," so arm in arm we went back up the steps into the sumptuous drawing-room at Savoy Hill—a real treat for nervy artistes—and there we chatted about "Clapham and Dwyer at home."

"I can't tell you about Clapham," he said. "He's an irresponsible lad to whom home *may* only mean a source of clean shirts and a parking place for one sleeping body, once nightly. But, of course, I don't know, so I won't do him an injustice."

"Well, if not Clapham, then," I begged, "what about Dwyer? What about yourself?"

"Don't start by being biassed, my dear old grid," he said. "Broadcasters can never be home birds. Of course, the wireless isn't

"On the wireless it's rehearsal after rehearsal until one positively loathes the idea. Rehearsals are tiring things, and then it is that one is glad to get back to the jolly old home and plonk down in an easy chair, forgetting the microphone and its irritating little bothers."

No Time for Listening.

"And what about listening-in at home?" I inquired.

"Never do—well hardly ever, unless somebody blows in with a portable set. I haven't a set of my own, but I shouldn't have the time to use it if I had one."

"But don't imagine that I never listen-in. For instance, there's that" he pointed to the loud speaker in the corner of the B.B.C. drawing-room. "I often hear that going, and sometimes Clapham and I listen on stray loud speakers like that just for the sake of hearing what other artistes sound like."

"But I wouldn't do it at home, for it would be too much like work. After all, you don't want public entertainment in the house if you yourself are a public entertainer, and have your own ideas. If you were a bank-clerk I mean, you wouldn't want to go 'banking' all over the place in your spare time, would you?"

I assured him I would not!

Future Experiments.

"By the way," said he, changing the subject, "did you hear that a farmer has found that a loud speaker near his crops keeps the birds away, and that another uses the wireless because he swears the waves make the corn grow?"

"Well, when I retire, I'm thinking of carrying out some agricultural experiments on those lines with dear old Cissie to lend a hand?"

"But you can't do it at home," I said, thinking of the utter respectability of the district.

"No," said Dwyer. "I can't do it at home."

"And what about Clapham?"
"He is one of the experiments I should carry out—probably the first one. Good-bye!"

OY! OO! OH! HI!



Clapham (left) and Dwyer—the irrepressible microphone mirth-makers.

as bad as stage work, for one is rarely free from the theatre till nigh on midnight, which means that one doesn't see much of home, or care much about it. But the microphone is kinder. The B.B.C. goes to bed early, you know!" He chuckled.

"With a stage turn lasting, say, for a week, one rehearsal does for the six days, and then one can go elsewhere and do the same thing for another six days (if lucky!) without the need for an extra rehearsal.

FROM THE TECHNICAL EDITOR'S NOTE BOOK.



Tested and Found—?

FROM FERRANTI'S.

I HAVE to chronicle the arrival of three further Ferranti-publications, and these deal respectively with the Ferranti Dynamic Speaker, Ferranti Radio Components, and Ferranti Two-valve A.C. Mains Set. These brochures are beautifully printed on art paper of the highest quality.

USEFUL DEVICES.

It would be hard to conceive of two more useful devices than the Polyscope and Valve Test Plug due to the Standard Battery Company. The Polyscope, which sells at 3s., is designed for use in conjunction with a Wates meter. It consists of an insulating container which has metal ends, into which is placed an Ever-Ready No. 8 or similar dry battery, price 4½d.

It has a long connecting point at one end and a split socket at the other. This split socket is for providing a connection to the plug or the end of a flexible lead of a test meter, such as the Wates Three-in-One. With such an assembly you can then measure resistances between 50 and 2,000 ohms, test valve filaments, short circuits, the insulation of condensers, and do other such important tasks.

The Wates Valve Test Plug, which retails at 2s. 6d., enables you instantly to connect in series with a valve anode circuit a milliammeter for checking anode current and performance. You remove from the set the valve to be tested, insert the adaptor, and then put the valve into the adaptor. You then connect any ordinary milliammeter to the two terminals provided.

AN ALL-ELECTRIC SET.

The complete kit of parts for a three-valve all-electric set at £9.10s. 0d. seems to me to form an attractive proposition. That is what the Wholesale Wireless Company are asking for an A.C. Screened-Grid and power or pentode outfit.

It is supplied with panel and screen drilled, and with a full-sized blue print. No soldering is necessary and there is everything in the kit down to the smallest screws. This receiver has one-knob control, an illuminated pilot dial, ganged condensers, switch for gramophone pick-up, and one for connecting and disconnecting the mains, and many other refinements.

Of course, any set would be dear at any price if it did not work properly. But this Wholesale Wireless receiver gives excellent results. An assembled kit was tested in

the Research Department and sensitivity and selectivity were both well above the average.

The quality was good and there was no hum. It is certainly a set that mains enthusiasts would do well to bear in mind.

MAGNUM PRODUCTS.

We have received copies from Messrs. Burne-Jones & Co., Ltd., of their new season's leaflets dealing with Magnum radio receiving sets and components. These are well produced and "P.W." readers should make a point of securing copies.

NEW MARCONI VALVE.

Two-volt valve users are again catered for by the Marconi Company with their new H.2. This is a very fine valve of the H.F. type. It has a mutual conductance of 1

Manufacturers and traders are invited to submit radio apparatus of any kind for review purposes. All examinations and tests are carried out in the "P.W." Technical Department, with the strictest of impartiality, under the personal supervision of the Technical Editor.

We should like to point out that we prefer to receive production samples picked from stock, and that we cannot guarantee their safe return undamaged, as it is our practice thoroughly to dissect much of the gear in the course of our investigations!

And readers should note that the subsequent reports appearing on this page are intended as guides to buyers, and are therefore framed up in a readily readable manner free from technicalities unnecessary for that immediate purpose.

and this is, of course, outstandingly good for that particular type of valve.

It takes a filament current of .1 amp and its amplification factor is 35, its impedance being 35,000 ohms. The price is 8s. 6d.

It is claimed that it is definitely non-microphonic and our tests confirmed this.

In view of its economy and the excellent performance it gives, it should prove particularly valuable to portable sets users. Improvements in two-volters are so consistent and so marked that no ordinary receiver these days loses much in being confined to this class of valve. But there, I think I have said something very similar to that on a good many previous occasions!

EDISWAN RADIO APPARATUS.

"Radio catalogue R.584" is the official description of this season's radio catalogue issued by the Ediswan Electric Co., Ltd. Inasmuch as this covers Ediswan, B.T.H.,

and Metro-Vick products, it is a catalogue that should be in the hands of all constructors.

RED DIAMOND SWITCHES.

The Jewel Pen Co., Ltd., recently sent me samples of their R.D.49 and R.D.47 switches. The first is of the three-spring type, and the second a simple make and break. They are perfectly straightforward jobs, and are robust both in construction and operation.

I particularly like the substantial and accessibly placed terminals. These "Red Diamond" switches—for that is the trade mark by which they are known—give one the impression that they will never let you down.

A BATTERY CARRIER.

I have received a sample from Beaufoy & Co., Ltd., of Vauxhall Park, S.W.8, of the "Andy" battery carrier. This is an ingenious collapsible affair which compacts itself into a very small space when not in use. It also adapts itself to practically any size of accumulator. It is a considerable improvement over the box method of conveying accumulators.

GAMBRELL RADIO.

Publications dealing with the 1931 Gambrell range of radio gramophones and radio receivers are being circulated.

GAS-FILLED GRID LEAK.

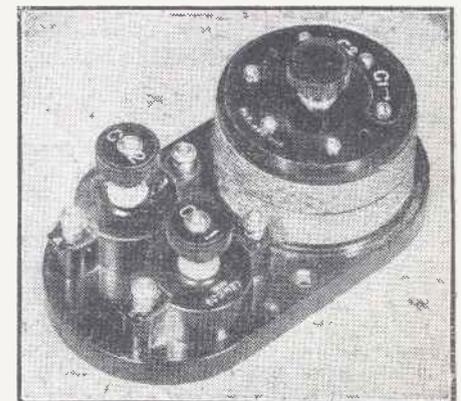
One of the most interesting radio components I have heard of for a very long time is a gas-filled grid leak which Rotor Electric, Ltd. are now marketing. As far as I can make out, it consists of a small glass tube embodying a resistance element and filled with a special gas.

I am not quite sure what advantage the gas has over a vacuum in preserving a consistency of value, but perhaps it has something to do with the building up of the necessary resistance. However, no doubt we shall hear more about this item in due course.

AN EFFECTIVE WAVE-TRAP.

The Lewcos Double Rejector Wave-trap is a particularly attractive proposition. You pre-set it to any two medium wave-lengths and you can switch it to one or the other as required.

There are just the two little condenser adjustments, one for each wave-length, and these are quite independent controls. The device works excellently, and is effective for Brookmans Park at close ranges.



The Lewcos Twin Rejector Wave-trap.



The WIRELESS AGE

BY G. H. DALY

WHAT is the future of wireless, apart from such obvious things as television and greatly improved wireless communication generally?

That the human race will some day send all their merchandise across the world by wireless waves is distinctly possible; the articles will be converted into electrical particles—transmitted as wireless waves at their constant speed of 186,000 miles per second, and then reconverted back to their original form at the receiving end.

The embryo stage of this is seen in the case of electro-plating, where the particles of silver travel through the liquid to the article which is being electro-plated.

“Like Little Suns.”

It is even possible that in some future time man himself may travel as a wireless wave in the same way—converting himself into electrical particles at the transmitting end and being reconverted back again at the receiving station.

As Marconi foreshadows, all future communications of the world are bound to be by wireless. All Nature's methods of communication are by the wireless or ether rays, as we can see in the case of the heat and light rays from the sun; there are no electric lighting or power lines connecting the earth to the sun. We get our light and power by wireless.

All our great electrical power stations of the future will be like little suns—radiating their light and power by wireless, and gone for ever will be the present-day electric light and power lines and wires. Nor will there be any overhead or underground telephone or telegraph wires, for every house will have its own wireless telephone for use in the same manner as the ordinary wire telephone of the Post Office to-day.

Waging War with Robots.

Certain types of wireless waves will enable us to control the weather, rid the air of fog and smoke; other rays will fertilise the ground and make crops grow twice as quickly as at present—already this has been done in the infant science of electro-culture, as it is called.

While humanity may still continue to wage war for many centuries to come, it is likely that owing to the facilities provided by wireless control, no human being will actually take part in them; in fact an international law may make it illegal for human beings to fight in the flesh, and all wars will

Radio control of transport, and even travel by radio, are proclaimed as possibilities of the future in this fascinating and far-seeing article.

have to be fought via the medium of wireless controlled battleships, tanks and aeroplanes.

These man-less battles will be directed from control rooms in the capitals of the countries engaged. Crew-less battleships will be manœuvred by wireless control and television from Whitehall. Big guns will have disappeared from the decks of the vessels, and in their place wireless death rays will spit forth, melting hostile craft and boiling the sea with their intensity.

Chess-playing by wireless is the beginning of this.

All our transport will some day be wireless controlled. Huge liners infinitely larger than any present day ocean greyhound may cross the Atlantic without a captain or chief engineer—and only a skeleton crew—both the course of the vessel and its engines being controlled by wireless from ports like London or New York. The Indian Air Mail pilot, instead of accompanying the machine, will sit in the control tower of the super-Croydon of to-morrow and control the course and destinies of the plane more safely and securely than if he were actually holding the joystick with his hands.

Startling and Wonderful!

In the realm of medicine and surgery, wireless possibilities are just as great.

X rays, radium rays and ultra-violet light are merely wireless rays of the same family which give us concerts.

Just as some wireless rays will kill, others will bring life and health; certain wireless rays may revive the drowned or those who, by accident, might die of shock in the usual way.

The complete interior of the earth will be surveyed by wireless, and we shall know exactly how much gold, silver, copper, coal, water and radioactive substance there is in the earth. Anyone will be able to go into a shop and buy a map of the world showing all mineral deposits and their location. Radiogeography, as this new science is called, is now well advanced.

And beyond all these possibilities lie others far more startling and wonderful, for we are only at the dawn of the wireless age—the full light of day has yet to break forth in all its glory.

ANOTHER BRADMAN “RECORD”



Don Bradman has returned to Australia, but he leaves behind him a record (Columbia) of unusual interest. On one side he gives advice to budding cricketers, and on the other he plays a couple of piano solos, the recording of which was being done when this photo was taken.



RADIOTORIAL

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

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

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

QUESTIONS AND ANSWERS

GRID SWITCHING AND GRID BIAS.

L. M. (Staines).—"When cutting out an L.F. valve by switching the power valve's grid to an earlier stage, is it **always** necessary to alter the power valve's grid bias as well? For instance, in the 'Power Change Amplifier,' if the grid lead is put in socket 1, should the G.B. neg. 1 be increased to suit the power valve?"

Certainly. It is always necessary to give the valve in use its correct bias. In some circuits this is automatically arranged for, but if the grid bias is not switched over with the grid the plug formerly feeding the first L.F. valve and now feeding the power valve should be placed at a higher G.B. negative voltage.

Remember, too, that grid bias should not be changed when the set is working. *Always* switch the set off until the change-over has been made.

RADIO IN PICTURES.

F. H. (Willesden, N.W.), and others, have raised several points in connection with "P.W.'s" recent series of articles called "Radio in Pictures." And here are "Pentode's" comments:

(1) "In 'How L.F. Amplifiers Work' (November 8th issue of 'Radio in Pictures'), the grid circuit of the detector is left incomplete (just as is the anode circuit of the L.F. valve), because it is not relevant to the article. I had hoped it would be clearer so."

(2) "An L.F. valve coupled by a resistance-capacity coupling has a grid leak and condenser just like a detector valve, although they do different tasks. You also find a grid leak and resistance in R.C. coupled H.F. amplifiers, in tuned anode H.F. amplifiers, and in choke-coupled amplifiers, both H.F. and L.F."

(3) "The second (right-hand) valve in the second illustration is the L.F. valve, although the grid bias which is usually used is not shown."

USING A CENTRE-POINT EARTH.

C. T. (Leeds).—"I have four 1-mfd. fixed condensers tested to high voltage, but even with these I have not succeeded in completely cutting out the hum. But there is one

(Continued on page 538.)

HOW IS THE SET GOING NOW?

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

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

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

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

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

SPECIAL ANNOUNCEMENT TO LONDON LISTENERS

You would doubtless like to be spared the constantly recurring expense of Dry Batteries and the poor reception caused by the gradual voltage drop. The many unquestionable advantages of Wet H.T. Accumulators can be yours—without the problems of initial cost and re-charging. Our unique hire service offers you the famous CAV High Tension Accumulators fully charged and ready for immediate use.

They are delivered to your door (anywhere within 12 miles of Charing Cross) at convenient intervals: and at an inclusive charge which represents a vast saving over your present expenditure, and definitely guarantees better reception than partly discharged Dry Batteries.

Over 11,000 London Listeners testify to the excellence of this unique service, which

caters for every possible High and Low Tension wireless accumulator requirement, either by our hire service or the maintenance of your accumulators. Write for interesting Price List NOW.

RADIO SERVICE (LONDON) LTD.
105c Torriano Ave., Kentish Town, N.W.5.
Telephone: NORTH 0623 (3 lines).

IMPORTANT TO ADVERTISERS

OUR ISSUE FOR DECEMBER 6th will be the specially enlarged

XMAS NUMBER

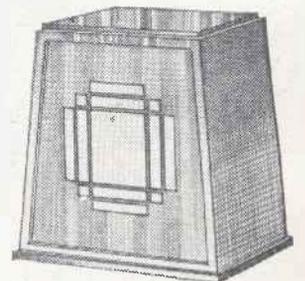
With Charming Cover in full colours
SECURE YOUR SPACE NOW!
PRICE THREEPENCE AS USUAL
NO INCREASE IN ADVERTISEMENT RATES.

INSTALL YOUR SPEAKER in a SCIENTIFICALLY-CONSTRUCTED CABINET

- In polished oak £1:1:0
- " " mahogany £1:2:6
- " " walnut £1:3:6

Write for our List of other Radio and Gramophone Specialities.

GEO. BLAKEY & SON LTD., National Works, WAKEFIELD.
Telephone 2518.

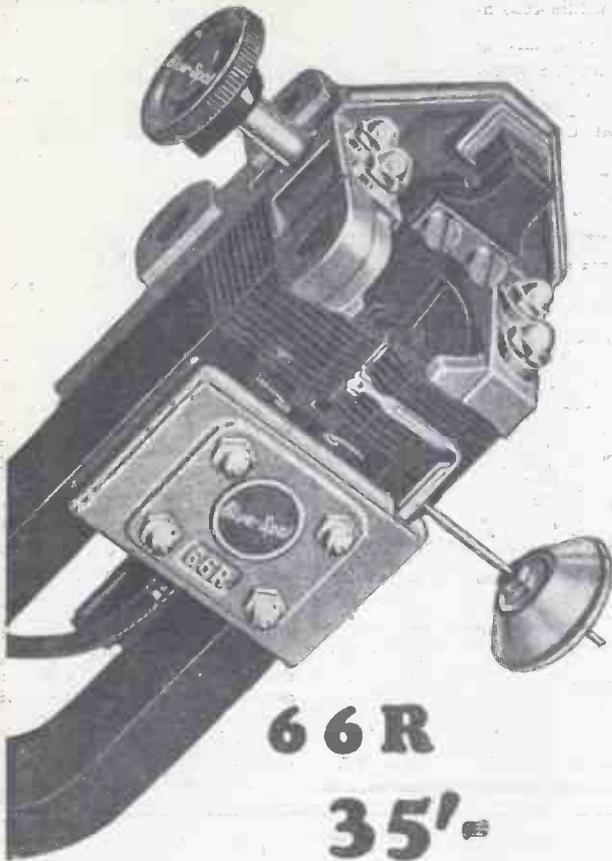


WHICH DO YOU PREFER

66R

or

66P?



66R
35'6



66P
27'6

Here for you to choose from are the two units acclaimed the best in Europe by the trade, the press and the public. Which is your choice? Visit your dealer and make the test for yourself. Choose between the two most famous units of a very famous range—whichever you choose you'll have chosen well.

• THE BRITISH BLUE SPOT COMPANY LTD. •

BLUE SPOT HOUSE, 94/96, ROSOMAN STREET, ROSEBURY AVENUE, LONDON, E.C.1

Phone: CLERKENWELL 3570.

Grams: "BLUOSPOT, SMITH, LONDON."

Distributors for Northern England, Scotland and Wales: H. C. RAWSON (Sheffield and London) LTD., 100, London Road, Sheffield: 22, St Mary's Parsonage, Manchester: 183, George Street, Glasgow.

RADIOTORIAL QUESTIONS AND ANSWERS.

(Continued from page 536.)

way I have not tried, apparently, and that is "centre-point earth." How is this carried out with four condensers?"

One very good method of reducing hum is to join two large condensers in series between the positive and negative leads, and earth the centre-point, and we presume it is to this method that you refer.

With four condensers all you would have to do would be to join two of them (in parallel) with the other two, so that they give you two "2 mfd." instead of four "1 mfd." condensers. The complete connections would then be the following:

Negative mains lead to one terminal on each of two condensers. The remaining two terminals on these two condensers joined to one terminal on each of the remaining pair of condensers, and to earth.

The positive main is then joined to the remaining terminals of the second pair of condensers. This completes the connections.

WAS IT GRAZ?

L. G. R. (Colchester).—"On two occasions I have picked up a foreign station just below London Regional which uses a very fast ticking clock. It is almost exactly the same reading as the 'Regional,' and I have been told it was Graz, Austria.

"I think it must be some station beginning with K, as I have heard the letter K sent out in morse with great distinctness. Are there any new stations testing there, or is this a regular station?"

Undoubtedly it was the Graz, Austria, programme that you heard, as this station does send out the letter K as an interval signal, and it employs a fast ticking metronome, beating 200 to the minute.

A SIMPLE WAVE-METER.

R. H. F. (Southsea).—"For quickly finding foreign stations I should like to make a simple wave-meter, but up to the present I have not been able to find details of a suitable instrument.

"I want something not too expensive or difficult to build and, in particular, I want full details of the method of calibrating it. My idea is to have a sort of home-made transmitter which will give me a buzz or some indication on any wave-length within reasonable limits.

"It seems to me this is the ideal way of testing newly-made coils, etc., for the wave-length ranges they will cover, but I have not yet seen details of a suitable instrument giving the necessary technical data. Can you put me on to one?"

You will find exactly what you want in the July issue of "Modern Wireless," where, under the title, "A Novel Wave-meter," a particularly interesting

and effective design is described. It is quite easy to make, extremely easy to calibrate, and full details are given.

Yet another advantage of this particular form of oscillator is that by connecting a pick-up or a microphone between its grid and filament it can be used to send out a modulated wave, so that it forms, in fact, a miniature transmitter.

Back numbers of "Modern Wireless" are obtainable from your newsagent or direct from the publishers, Amalgamated Press, Ltd., Back Number Dept., Bear Alley, Farringdon Street, E.C.4, price 1s. 3d., post free.

SELECTIVE COUPLING.

E. J. S. (Cassiobury).—"I have had no end of trouble in order to get sufficient selectivity because I am forced to use a rather long aerial.

I want long-distance reception, although I am situated near Brookmans Park, and consequently ought to use quite a short aerial from the point of view of reasonable selectivity.

"However, after no end of trouble, I have a circuit of a unit which is to be added in front of my set. This circuit arrangement consists of an ordinary tuning coil and variable condenser, with aerial and earth terminals.

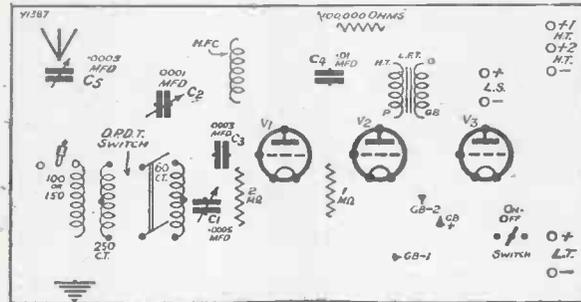
"But between the aerial terminal on the unit and the aerial terminal on my set is a coupling condenser with a minimum capacity of two micromicrofarads. This condenser is causing all the trouble.

"On ordering same I find that the dealer says no such capacity is used, the smallest being a neutralising condenser. So I tried a neutralising condenser. Still I do not get

(Continued on page 540.)

POPULAR "WIRELETS" No. 24

CAN YOU "WIRE UP" THIS CIRCUIT?



These are the "components" necessary to build a Det. and 2 L.F. employing a "Hartley" circuit. (Such a receiver is not selective enough to cut out a powerful local station, but will be of interest to readers who live more than fifteen miles from their "local.") Can you "wire up" the circuit so that normally a "Hartley" circuit is obtained, but when the aerial plug is placed in the right-hand socket a separate aerial primary is used for long waves?

LOOK OUT FOR THE ANSWERING DIAGRAM NEXT WEEK.

TUNGSRAM

A.C. VALVES

INDIRECTLY HEATED VALVES, 9/6. A.C. POWER VALVES 8/-.
 Tungram Photo Electric Cells. Nova E. £2.17.6. and Nova B. £3.3.0

TUNGSRAM ELECTRIC LAMP WORKS (Great Britain) Ltd., Radio Dept., Commerce House, 72, OXFORD ST., W.1
 FACTORIES IN AUSTRIA, CZECHO-SLOVAKIA, HUNGARY, ITALY, POLAND. BRANCHES IN BELFAST, BIRMINGHAM, BRISTOL, CARDIFF, GLASGOW, LEEDS, MANCHESTER, NEWCASTLE, NOTTINGHAM, SOUTHAMPTON.

VOTED THE FINEST ALL-MAINS UNITS AT OLYMPIA

BY winning the first place in the "Wireless World" Competition, the already famous "ATLAS" ALL-MAINS Units are voted the finest value obtainable at any price. Two variable Tappings, unrivalled power, small size, and the Westinghouse Metal Rectifier are among the outstanding features that lift Model A.C. 188 far above the level of all competitors.

Ask your dealer for Folder 35, or write direct to the makers.

H. CLARKE & CO. (M/CR) LTD.,
Old Trafford, Manchester.

MODERNISE YOUR SET WITH

CLARKE'S
"ATLAS"

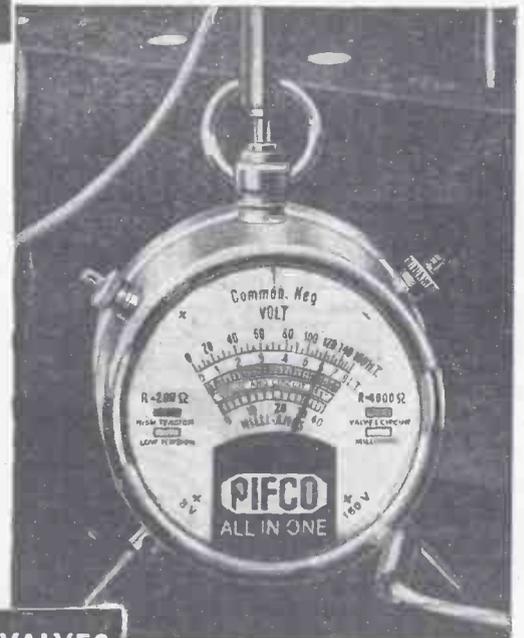
MODEL A.C. 188



CASH PRICE
£6
OR 10% DEPOSIT
& BALANCE IN EASY
MONTHLY PAYMENTS



As Easy To Read As Clock Time!



TESTS VALVES
FILAMENT · ·
ANODE & GRID
COMPONENTS
AND CIRCUITS
H.T. AND L.T.
MILLIAMPS
Everything!

HAVE YOUR SET 100% EFFICIENT

Have you ever built a set that wouldn't work? Has a mysterious fault in wiring or component eluded your most thorough search? How many hours have you wasted and how many valves have you burnt out when you have

had trouble—how many times have you given up in disgust?

Well, from now on you can say goodbye to all that! The All-in-One Radiometer will test valves components, circuits, batteries, everything—quickly, safely and with absolute certainty.

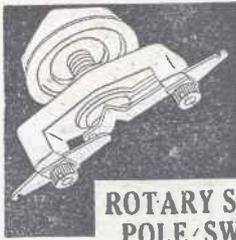
For 12/6 you can have a wireless expert at your beck and call. You may be a radio fan or the veriest amateur, it matters not a scrap—the All-in-One will help you out. You can be sure of everything before you turn on the juice! The steady readings given on the dial are as easy to follow as the hands on your watch, and the instrument gives perfect accuracy—it has a beautifully finished calibrated mechanism that cannot let you down.

Ask your dealer for our Booklet or write direct to Pifco Ltd., Pifco House, High St., Manchester.

12/6

PIFCO
A ALL IN ONE
RADIOMETER

Colvern's new lines

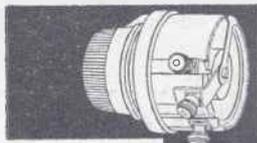
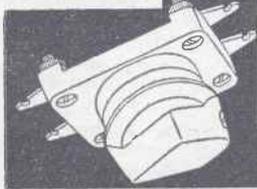


ROTARY SINGLE-POLE SWITCH.

A make-and-break switch. Smooth rotary movement, spring action, self-cleaning, pressure contacts.
Price 1/3

ROTARY DOUBLE POLE SWITCH.

Action as above. Suitable for wave-changing and adaptable for ganging. One-hole fixing.
Price 2/6

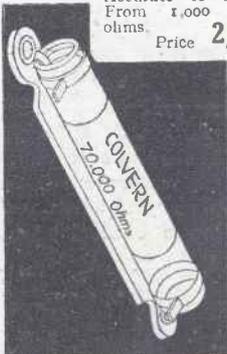


VARIABLE COLVERSTAT.

Wire wound, smooth, silent movement, constantly variable. 1,000, 5,000, 10,000, 25,000 and 50,000 ohms.
Price 5/6

COLVERSTAT.

Wire wound, spaced single-layer resistance on glass. Accurate to within 2%. From 1,000 to 100,000 ohms.
Price 2/6 & 3/6



COLVERN : RADIO :

Adv. of Colvern Ltd., Mawneys' Road, Romford
THE COLVERN BOOK SENT FREE ON REQUEST

RADIOTORIAL QUESTIONS AND ANSWERS

(Continued from page 538.)

sufficient selectivity, although the N.C. is put at the minimum position.

"I feel that if I could get less capacity I should be O.K."

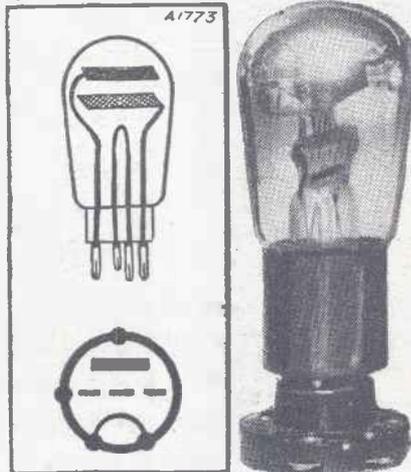
"I would take some of the plates off the neutralising condenser, but then I am afraid I should not easily be able to change back to a stronger coupling for other wave-lengths." Is there any other method?"

Your dealer is wrong, many neutralising condensers go down below .000002 mfd. But if yours is too large, there are several methods available, one easy one being to buy another neutralising condenser of the same type as the first, and connect it in series with its fellow.

This would reduce your coupling capacity by 50 per cent, and is probably the most satisfactory method of overcoming your difficulty.

"INSIDE" INFORMATION

No. 6.



THE VALVE

consists of an air-evacuated glass bulb, inside which is a filament wire, a plate and (between them) a mesh or "grid."

The theoretical diagram (bottom left) shows all these essential details.

The external connections are made by means of the pins.

The New "P.W." "Diagraphs."

Alternatively you could make a sufficiently small capacity from ordinary insulated wire, such as "systoflex." Take a length of several inches, cut it in two, and then twist it neatly and tightly together.

If now you bare two of the ends of the twist and connect them to the circuit (leaving the other ends free) you will find that you have made a small "condenser" from the wire, with the insulation of it acting as a dielectric.

Different lengths of twist will, of course, give you different capacities, and as it is so easy to make you can easily fix up half a dozen of these different capacities and arrange to bring them into circuit by sockets and plugs.

To do this you want the aerial terminal on your set to terminate in a flexible lead and plug, and a number of sockets should be arranged, each socket connected to one side of a "twist."

The other sides of all these "twist" condensers are then joined together and taken to the aerial terminal on the new unit, thus giving you a variety of condensers to choose from according to the position of your plug. Join one side of your present neutralising condenser to a socket similar to the others and you can arrange to bring either that or one of the other capacities in circuit as desired.

BROWNIE

Not just a 'box of tricks'—but a really superb all-electric 3-valve receiver in a handsome, richly polished, solid walnut cabinet—that's the wonderful new Brownie DOMINION MAINS S.G.3. It's the modern set for the modern home... no batteries, no accumulators... no bother, no expense! Just switch it on—and then sit back and enjoy at last—the perfect broadcast!



DOMINION MAINS S.G.3

Price, including royalty £18 10 0 or and valves

Ask your dealer to demonstrate the new Brownie DOMINION MAINSETS. In any case, write now for illustrated catalogue of the complete range of mains and battery operated receivers.

BROWNIE WIRELESS COMPANY (G.B.) LTD., Dept. V, Nelson Street Works, London, N.W.1

32'3 DOWN

POSTAL BARGAINS

A FEW OF OUR LINES.

- D.P.D.T. Switches, Porcelain, with Safety Gap 1/3
- Guaranteed Valves, Power 7/3, Super Power.. 8/-
- Tested Plug-in Coils Nos. 25, 30, 40, 50, 60, 75 ea. 1/3
- Loudspeaker Bobbins, each 1,000 ohms, per pair 1/9
- Telephone Bobbins, each 1,000 ohms, per pair 1/6
- Aluminium Panel Brackets, per pair .. 9d.

Cash with Order.

I. DRUCE, 159, Goswell Road, London, E.C.1



Something for nothing..!

If your requirements are wireless, you will find the 1931 WILL DAY Catalogue indispensable. Complete details of all leading sets and components have been carefully listed, priced and illustrated. The Catalogue is entirely free to callers. Post free, 6d.

WILL DAY LTD.

(The Best in the West),
19, LISLE STREET, W.C.
Phone: Regent 0021 and 0022.

THE PICTURE PAPER WITH THE MOST NEWS -SUNDAY GRAPHIC-

MAKE A GRAMOPHONE

at a quarter shop prices, or buy a kit for Wireless. Order Set as shown. British double spring motor, 12 in. velvet turntable, swan arm, metal sound-box, amplifier, needle cups, for £11/6 p.p. and build your own cabinet. Portable Gramophones from 15/6, postage 1/6. Motors from 7/6. Lists free. 64-pp. Catalogue No. 218/219. Drawing, and How to Make Gramos 3d.

REGENT FITTINGS CO. (P.W.), 120, Old Street, London, E.C.1.

CONCERNING VALVE AMPLIFIERS.

(Continued from page 513.)

But obviously the point P_3 shows an anode voltage of E_3 , the point P_6 shows an anode voltage of E_6 . The difference between E_3 and E_6 is the total change of anode volts ΔE_a . We can immediately see from this that the voltage change of the grid ΔE_g (0 to $-6g$) divided into ΔE_a is the practical voltage magnification of the valve.

This is the first useful part of the diagram. By ruling a line between a point in the characteristic giving zero grid volts and the maximum peak negative grid volt characteristic we can immediately read off ΔE_a (see Fig. 1) the total change of anode voltage.

No Anode Resistance.

So far we do not see what slope that line should take up. If we fix the point P_3 as representing the steady state, what determines the slope of the curve? Quite obviously if there were no resistance in the anode, the line P_3, P_6 would be vertical.

The anode voltage cannot change with grid voltage if there is no anode resistance (see previous article). Again if the anode resistance were almost infinite there would be hardly any current change through the valve, because the change of resistance of the valve would be as nothing compared with the steady resistance of the anode circuit.

In this case the line P_3, P_6 would be horizontal. From this we can argue that the slope of the curve must be proportional

GET YOUR NOVEMBER MODERN WIRELESS WITH ITS 8 SIXPENNY BLUE PRINTS BEFORE IT IS TOO LATE

to the anode resistance. We may see this another way by realising that P_3, P_6, B is a triangle, the vertical part P_3, B , being a current change, and P_6, B , being a voltage change. Thus the slope of the curve, which is a resistance, is a voltage divided by a current.

The 'Slope' of the Valve.

Thus we have arrived at the following conclusion. If we take a set of anode-current anode-volts characteristics for a given valve, we can find a line which represents the locus of the points representing the corresponding anode volts and anode current as the grid volts are varied. If there is no resistance in the anode the line is obviously vertical, since the anode volts do not vary.

If there is an infinite resistance, the line is horizontal since in this case the current cannot vary. Thus the slope of the curve is a measure of the resistance in the anode circuit. Furthermore, by knowing the total grid swing applied we can read off the total anode voltage change and so obtain the voltage magnification of the valve.

This may all seem a little difficult. Next week, therefore, I shall take an actual case of a valve and work more empirically with actual figures.

ONLY 4 WEEKS TO CHRISTMAS

START RIGHT with an approved PILOT RADIO KIT



It's complete . . . it's better . . . it's cheaper

Success Guaranteed. Every specified component for your new set, down to the last screw, in an attractive carton, including The Famous Pilot Test Meter, without which no set is complete. No delay—immediate dispatch service. Strict Privacy guaranteed to all Easy Payment orders.

IMPORTANT NOTE. KIT "A" is ess valves and cabinet. KIT "B" with valves and cabinet. KIT "C" with valves and cabinet.

ALL ORDERS CARRIAGE PAID

SEND NOW FOR THE PILOT CHART

There is a specially prepared Pilot Radio Kit for every P.W. Set.

PETO-SCOTT CO. LTD.

FIRST IN 1919—FOREMOST TO-DAY.

- 77, City Road, London, E.C.1. Phone Clerkenwell 9406-7-8.
- 62, High Holborn, London, W.C.1. Phone Chancery 8266.
- 33, Whitelaw Road, Chorlton-cum-Hardy, Manchester. Phone Chorlton-cum-Hardy 2028.
- 7, Albany Road, Newcastle, Staffs.

PLEASE SEND ME Your latest Pilot Radio Chart by return of post.

NAME.....
ADDRESS.....

P.W. 22/11/30

Buy by Post—it's quicker

EXACT TUNERS

250 to 2,000 metres. Thousands of these tuners are in use, and we can strongly recommend them. No further coils are required. Send P.O. for particulars and circuits—FREE.

THE EXACT MANUFACTURING CO.,
Croft Works, Priory Street, Coventry.

YOU CAN BUILD A 40 GRAMOPHONE WITH OUR SCALE DRAWINGS FOR 40/-

Book of instructions 3d. Catalogue of Motors, Tone-arms, Sound boxes, latest internal Amplifiers, Gramophone: or Cabinets Free. Cash or terms.

V. BURT, 185, High St., Deptford

GRIPSO
STANDARD PUSH-PULL INDICATING SWITCH

ADAPTABLE DOUBLE DIAL READINGS ON AND OFF-ON AND SHORT WAVE ROBUST CONSTRUCTION LISTS FROM HARRIS

THE GRIPSO COY.,
52, VICTORIA STREET, LONDON, S.W.1

ONE HOLE FIXING 1/6 EACH

DX THE STANDARD PLUG-IN COIL

Sold everywhere from 1/-

DX COILS LTD., LONDON, E.8

REMEMBER! "POPULAR WIRELESS" HAS THE LARGEST SALE OF ANY WEEKLY WIRELESS JOURNAL



MAINS UNITS

McMichael, Rees-Mace, Selectors and other leading British Set Manufacturers recommend Regentone Combined Mains Units (A.C. and D.C.) for their own sets. Two years ago Regentone recommended the use of A.C. Valves rather than smoothed L.T. Units. To-day other manufacturers are following their lead.



MAINS COMPONENTS

Westinghouse specify them in every circuit of the "All-Metal Way 1931." Experts recommend them, and discerning constructors everywhere use them because of their efficiency and reliability.



MAINS RECEIVERS

The Regentone 4-Valve A.C. All-Electric Receiver excels any other receiver in performance, smoothness of operation, reliability and reserve of power—exactly as a six-cylinder car surpasses the performance of a four-cylinder. And the outward appearance is worthy of a receiver of such excellent performance.



ALL-ELECTRIC RADIO

If you are interested in All-Electric Radio, whether Mains Units, Mains Components or Mains Receivers, the new Regentone Art Booklet "The Simple Way to All-Electric Radio" contains much valuable information.

Write TO-DAY for your FREE COPY.
REGENTONE RADIO SUPPLY CO.,
 REGENTONE HOUSE, 21, BARLETT'S BUILDINGS,
 HOLBORN CIRCUS, LONDON, E.C.4.
 Telephone: CENTRAL 8745 (5 lines).
 Irish Free State Distributors—Kelly & Shiel Ltd.,
 47, Fleet Street, Dublin.

THE "INTERCHANGE" THREE (Continued from page 528.)

That done, all that remains is to connect certain of the pins to the appropriate terminals on the dual-range unit. It is an easy enough bit of work, but those who like to simplify matters as much as possible might note that it is possible to obtain the dual-range coil already mounted up on the six-pin arrangement from certain of the coil makers.

For the benefit of readers who already have a dual-range coil, or who prefer to buy a standard one and make the six-pin fitting themselves, we have prepared a little article with the necessary diagrams to make the details of the work quite clear. This will appear next week, and will provide also the winding data for the short-wave coil.

We could not find space for all this in the present article, in which we must confine ourselves to the details of the set proper. However, it is only a week to wait, and meanwhile you can get the parts together and build the receiver itself.

For Exceptional Selectivity.

You will find the diagrams and photos will make the whole process quite clear to you if you have had any previous experience of set construction. (We think we are safe in assuming that the "Interchange" will appeal to the more advanced reader by reason of its short-wave feature.) Selectivity is very good as the set stands, but if you live within about 12 miles of a "Regional" or perhaps 5 or 6 miles of an ordinary main station you will want still more.

To get it is quite simple: just put a compression-type adjustable condenser with a maximum capacity of .001 mfd. in series in your aerial lead. There is room to put this inside the set if you like, between the six-pin base and the terminal strip.

If you decide to do it in this latter fashion, omit the lead shown between A₂ and No. 1 on the six-pin base. Instead, wire A₂ to one side of your compression condenser, and the remaining terminal of this condenser to No. 1 on the six-pin base. Then you adjust the condenser as required for selectivity (unscrew for sharper tuning, but don't go further than you must).

Working Data.

Now you just want the working data for the finished set. The general use of the controls you will already have gathered, except that we must make clear the operation of the wave-change switch: knob pulled out for medium wave-band, pushed in for long-waves, left anywhere for short-waves.

The valves should be one of the H.F. or special detector type in the first holder, an L.F. in the second and a power or super-power in the third position.

The H.T. voltages are a little unusual, because the detector in this circuit will probably work best with a fairly high voltage. Therefore try voltages of the order of 80 to 100 on H.T. + 1, and then adjust the potentiometer to get smooth reaction and good volume.

The usual 100 to 120 volts or so, should be applied to H.T. + 2, which feeds the two amplifying valves. Grid bias, of course, will be adjusted according to the valve-maker's instructions

SMOOTH FIRM TUNING

Truly logarithmic and definitely to the capacity stated, the Lotus Logarithmic Condenser ensures smooth firm tuning. Ample spacing is allowed to prevent any possibility of short circuiting of vanes.

Price from 5/-
 From all Radio Dealers.

LOTUS LOGARITHMIC CONDENSERS

Write for illustrated Catalogue to
 GARNETT, WHITELEY & CO., LTD., LIVERPOOL.

"RECTOR" DUAL WAVE COIL

This is a well constructed coil, covering wavelengths. Air-spaced windings on ribbed low-loss ebonite former 4 3/4" long. Terminals and Tags for contacts. Suitable for horizontal or vertical baseboard mounting.

Wavelengths 180 to 2,000 metres.
 Price 6/-

RECTOR SWITCHES 2-way 2/6. 3-way 3/-

"Liontron" STATION SEPARATOR and Ton^o Clarifier. Excellent for valve or crystal sets, 2/6- The "AUTO-SELECTOR." Clears the air of unwanted stations. Gets the station you want clear of interference, 2/-.

KINGSGATE PERMANENT DETECTOR
 Only selected crystals used, 1/9.
 REFILLS for all makes of Permanent Crystal Detectors. Mounted in cups. Guaranteed, 1/- per pair.

"WATCO"
 Non-corrosive Tags. Pliable for L.T. & H.T. 6d. Per Pair.

All Goods Post Free.

KINGSGATE SUPPLY CO.,
 56, Bro'r Felde Road London, S.W.4

EASY PAYMENTS

The first firm to supply Wireless parts on easy payments. Five years advertiser in "Popular Wireless." Thousands of satisfied customers. Send us a list of the parts you require, and the payments that will suit your convenience, and we will send you a definite quotation. Anything wireless

H. W. HOLMES, 29, FOLEY STREET,
 Phone: Museum 1414. Gt. Portland St., W.1

Make
THE DAILY SKETCH
 YOUR Picture Paper

FOR THE LISTENER

(Continued from page 514.)

increased both my understanding of the music and my pleasure in it. The singing of the Philharmonic Choir was superb alike in tone and colour.

The soloists had subordinate parts; one could not be too grateful for the clearness with which Roy Henderson sang the great words; and at times Dorothy Silk's magnificent voice rose like a star.

The Orchestra goes from strength to strength, and soon one will be beggared of adjectives by which to praise adequately this truly splendid company of players. The "Sea Symphony" was preceded by Beethoven's Concerto in D, in which Adolff Busch played brilliantly on the violin.

He was glorious in the Rondo.

Just now, in the programmes, Wednesday is the night of nights!

The Passing of the Veil.

I had always imagined that the relation between Turkey and ourselves was chiefly financial. The other night, however, Halide Efib Hanum, a Turkish lady with a delightful voice and speaking beautiful English, persuaded me that there was more in it than that.

Turkey is beginning to take her place in Western civilisation; and, oddly enough, seems to be nearer to ourselves in temper and outlook than to the peoples of Southern Europe. They have probably yet a long way to go.

There appear to be two kinds of Turks; the Macedonian Turk who is fanatical and unscrupulous; and the Anatolian Turk who is the creator of the present republic with its democratic government, its disestablishment of religion, its emancipation of women, and the rest of it.

For purely sentimental reasons I regret the passing of the veil. It was an alluring dress. It helped to maintain one's ideals!

Dogs and Dog-Lovers.

When an enthusiastic dog-lover complains about his dog it is always engaging to hear him. It is like a devoted lover calling his lady "You little devil!"

It was delightful to hear Mr. Harold Nicolson talking about his cocker spaniel, Henry, and telling tales out of school. We could all tell such tales, but perhaps not so charmingly.

I can pay Mr. Nicolson no higher compliment than to say he called to my mind Anatole France and "Riquet." Henry was listening-in.

"Pompey the Great."

This play, by the Poet Laureate, has some fine lines in it and some excellent poetry. The dramatic management at Savoy Hill believe that this poetical type of play makes good broadcasting material.

Maybe; but I don't think "Pompey" has proved it.

I have now heard it three times. I remain firmly of the opinion that it will ultimately be found that the best Radio Play will be a play which would be good in any other medium.

"Pompey" is a good reading play, but not a good acting play; cut it, and it is worse still. For all the brave efforts of the cast I thought it did not come to life.

You can use Six-Sixty A.C. Valves in almost any Battery Set

and get added range, power and selectivity. These already famous additions to the Six-Sixty range can be fitted without trouble by means of the



SIX-SIXTY A.C. ALL-MAINS CONVERSION EQUIPMENT

Takes no more room than existing batteries. No internal wiring alterations. Nothing to run down just when you want to listen—even grid bias taken from the mains! Complete Conversion Equipment, including specially selected Six-Sixty A.C. Valves, from £8:5:0. Mains Unit only (H.T., L.T. & G.B.) £6:6:0.

Write to-day for the Free Booklet

It is interesting and informative. It gives full details of the whole Six-Sixty range as well as the Conversion Equipment.

SAY

SIX-SIXTY

(B.V.A. RADIO VALVES AND EQUIPMENT).

Six-Sixty Radio Co., Ltd., Six-Sixty House, 17/18, Rathbone Place, Oxford Street, London, W.1. Telephone: Museum 6116/7.

LOUD SPEAKERS REPAIRED, 4/-

(Blue Spot a Speciality.)

Transformers 4/6, Headphones 4/6, all repairs magnetised free. Tested, guaranteed and ready for delivery in 24 hours.

Discount for Trade. Clerkenswell 9069

E. MASON, 44, EAST ROAD, N.1.



WET H.T. BATTERIES

Solve all H.T. Troubles.

SELF-CHARGING, SILENT, ECONOMICAL

JARS (waxed), 2 1/2" 1 1/2" sq. 1/3 doz

ZINCS, new type 10d. doz. Sacs 1/2 doz

Sample doz (18 volts) complete with

bands and electrolyte, 4/1 post pd.

Sample doz 6d. illus. booklet free

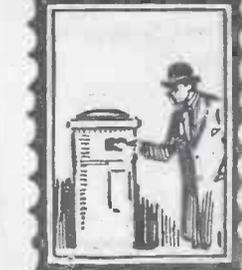
main list free.

AMPLIFIER, 0.1, 5va ve set. £5

P. TAYLOR, 57, Studley Road,

STOCKWELL LONDON.

ALL MANUFACTURERS' GOODS



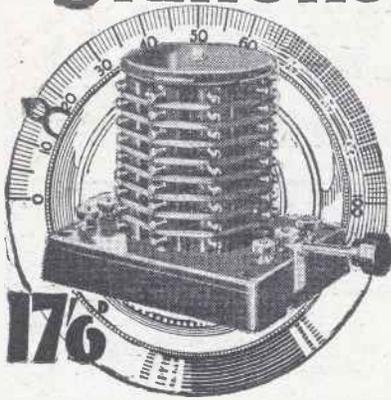
advertised in "Popular Wireless" can be obtained by post from Young's.

All goods guaranteed. Send a note of your requirements TO-DAY and pay the postman.

YOUNG'S
(Glasgow) Ltd.,
40, Stockwell Street,
GLASGOW.

ALL APPLICATIONS for Advertising Space in "POPULAR WIRELESS" must be made to the Sole Advertising Agents, **JOHN H. LILE LTD., 4, LUDGATE CIRCUS, LONDON, E.C.4.**

Separate those Stations



This is a Wave Trap as well as a Tuner. It gives sharp tuning and eliminates interference. Its special winding, designed to give loose aperiodic coupling, explains the life and definition which it gives to the tuning of any circuit in which it is incorporated.

The Watmel Universal Dual Range Tuner, beautifully finished in mottled Walnut (Bakelite) and incorporating wave-length switch. **17/6** Complete

THE WATMEL BINOCULAR H.F. CHOKE

gives maximum efficiency, very low self-capacity and an extremely restricted field.

TYPE DX3

Inductance - 200,000 m.h.
Self Capacity - 1.6 m.mfd.
D.C. Resistance 1,400 ohms.

Price 6/-

TYPE DX2

Inductance - 40,000 m.h.
Self Capacity - 1.2 m.mfd.
D.C. Resistance 450 ohms.

Price 4/-



If you cannot get these Watmel products at your dealers, send remittance and order direct to us, and the article will be dispatched by return.



WATMEL WIRELESS CO., LTD.,
Imperial Works, High St., Edgware.

Telephone: EDGWARE 0323.

M.C.12

TECHNICAL NOTES.

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

Mains Sets.

THE tendency to electrify both the radio receiver and the gramophone is quite a natural one. In view of the great convenience it affords, it is a direction of development which was inevitable from the start.

I refer, in the case of the radio set, to so-called all-electric or mains-operation, and in the case of the gramophone to the electric drive. I am not referring at the moment to the electrical pick-up and "electrical reproduction."

Electrically-driven gramophones, in which an electric motor takes the place of the conventional spring-driven motor, are becoming increasingly popular; but I suppose the vast majority of gramophones in use must still be of the spring-driven type.

I have never been able to obtain any reliable figures with regard to this, but I

HAVE YOU GOT YOUR EIGHT 6d. BLUE PRINTS?

They are being given away with the current issue of

MODERN WIRELESS

should imagine that the spring-driven motors must comprise considerably more than 90 per cent of the total.

Is Electric Drive Efficient?

In the earlier days of electrically-driven gramophones there was a certain amount of prejudice against them, as it was thought that they did not rotate the record at an absolutely constant speed.

This was, in my opinion, more imaginary than real; but to whatever extent the defect may have existed, it was, no doubt, due to improperly designed electric motors, and was not a trouble in any way inherent in electrical drive for gramophones.

More recently several very excellent gramophone electric motors have been placed upon the market, and it can no longer be said that an electrically-driven gramophone is in any way inferior as regards performance to a spring-driven one.

On the other hand, the electric motor has the great advantage that it requires no attention beyond switching it on and off, and the bugbear of having to re-wind the gramophone is entirely obviated.

A Combined Motor.

In some cases gramophones have been made with a combined electric and spring motor, the electric motor supplying the power, and this power being delivered to the turntable via the spring arrangement.

This system is claimed to retain all the advantages of the spring motor, as regards

(Continued on next page.)

INEXPENSIVE MODERN PUBLIC ADDRESS and Speech and Music TRANSMISSION MICROPHONE



This thoroughly efficient Microphone has been designed for use with small Valve Amplifiers, and with Wireless Sets which have connections for a Gramophone Pick-up. When connected to 2 L.F. Stages through a Microphone Transformer, this Microphone is GUARANTEED to transmit Speech and Music without distortion, and with ample volume to fill a large Hall.

Complete on Stand, 10 in. high, spring suspension and terminals fitted, every part nickel plated, as illustration,

18/-

Microphone only, fitted with hooks and terminals springs supplied, all nickel plated.

12/6

Full Directions and Diagram of connections free.

Microphone Transformer for the above instrument, 6/-

FREDK. ADOLPH, Actual Maker,
7, FITZROY STREET, LONDON, W.1
Phone: Museum 8329.

You must hear this speaker

"GRASSMANN" MOVING COIL



is spoken of by the Technical Press as being definitely superior to nearly every other make. Confirm this yourself by asking your dealer to demonstrate. You will immediately appreciate its sensitivity, even response, ability to handle volume, richness of tone and absolute fidelity. Its price and performance sets a world standard of sound reproduction.

PRICES:

6 v. 110 v., 240 v. D.C., £4:17:6
Universal A.C. 110 v., 125 v., 220 v., £3:5:0.

ROTOR ELECTRIC LTD.,
2/3, Upper Rathbone Place, London, W.1.
Telephone: Museum 2641-2.

WIRELESS BARGAINS

New 5 Valve Portable Sets, Radio-Grams, etc., for disposal by Liquidator of well-known Wireless Company. Sets ready for immediate use and may be bought singly.

P. G. LAMBIRTH, Chartered Accountant,
4, BROAD STREET PLACE, E.C.2.
London Wall 7120.

PLEASE MENTION "POPULAR WIRELESS" WHEN REPLYING TO ADVERTISEMENTS.

TECHNICAL NOTES.

(Continued from previous page.)

uniformity of rotation, with the advantages of the electric drive as regards freedom from attention. Personally, although I see nothing against this apparatus, I regard it as rather an unnecessary complication.

External Winding Motors.

There is another arrangement which is applicable to existing spring-driven gramophones, and which in many ways is very convenient, but which does not seem to be very widely known, and that is the attachment of a "winding motor"—an electric one—to the exterior of the gramophone.

In some types of this device you simply switch on the winding motor (which can be done from a distance by means of a length of flexible wire) until the gramophone is wound up and the electric motor appears to be "labouring," when you switch off. The best arrangement, however, is one in which the motor switches itself off automatically when the torque which it is called upon to exert upon the winding shaft exceeds a pre-determined value.

Automatic Operation.

This value—or, rather, the setting of an adjustable switch, which setting depends upon the value—is arranged by trial. In some of these winding motors the motor is switched on automatically when the gramophone spring has unwound to a definite extent, and is automatically switched off when it has re-wound the gramophone motor to a definite degree.

These re-winding motors, several examples of which I have examined at different times, are very convenient and perfectly effective. Some of them are apt to be rather noisy, however, but this is not a very serious matter if the motor is not of the type which automatically operates during the actual running of the record. If it is of the hand-switched type, it may, of course, be put into action only when a record is not being played.

Question of Price.

There is a further point to be noted, however, and that is the price. You will appreciate that the re-winding motor has to exert a very much larger torque than an ordinary electric motor used within the gramophone for rotating the turntable.

Putting this in another way, the re-winding motor has to do in a few seconds as much work as the internal electric motor or the spring motor does in, perhaps, five minutes. Consequently, it requires to be a larger and more powerful motor, and the cost is correspondingly greater.

Nevertheless, I recommend these re-winding motors to the attention of any of my readers who may desire to do away with the nuisance of re-winding a spring-driven gramophone.

If you happen to have an expensive pedestal or cabinet gramophone of the spring-driven type, it may be well worth while to consider the question of fitting one of these electric re-winders to it.

Skill and Selectivity.

Notwithstanding the improved and inexpensive types of vernier or slow-motion dials now available, many receivers are still

(Continued on next page.)

The Easy Way TO PERFECT RADIO

ONLY 4 WEEKS TO XMAS!

The following are the most representative, and we ask you to fill in the coupon or send us a list of your requirements for a quotation by return.

- Send **10/-** **COSSOR EMPIRE MELODY MAKER KIT, 1931 Model, S.G.,** Detector and Power. Cash, £6.17.6.
- Only Balance in 11 monthly payments of 12/9.
- Send **23/6** **1931 OSRAM MUSIC MAGNET KIT, 2 S.G.,** Detector and Power. Cash, £11.15.0.
- Only Balance in 12 monthly payments of 18/6.
- Send **12/9** **LISSEN S.G. THREE KIT, S.G.,** Detector and Power. Cash price, £6.19.0.
- Only Balance in 11 monthly payments of 12/9.
- Send **7/4** **PKCO 3P.20 H.T. ELIMINATOR,** 20 m/μ, Tappings for S.G. 60 volts and 120/150 volts. For A.C. Mains. Cash price, £3.19.6.
- Only Balance in 11 monthly payments of 7/4.
- Send **8/6** **EXIDE 120-VOLT W.H. TYPE ACCUMULATOR,** in Crates. Cash price, £4.13.0.
- Only Balance in 11 monthly payments of 8/6.
- Send **6/5** **LAMPLUGH INDUCTOR SPEAKER,** for perfect reproduction. Unit and Chassis complete, ready mounted. Cash price, £3.10.0.
- Only Balance in 11 monthly payments of 6/5.
- Send **8/3** **EPOCH PERMANENT MAGNET SPEAKER, Type B.4.** Cash price, £4.10.0.
- Only Balance in 11 monthly payments of 8/3.
- Send **39/6** **THE ADAPTAGRAM—the instrument which converts your existing radio receiver into a modern radio gramophone.** Garrard gramophone motor, B.T.H. Pick-up and Tone arm, and Frost Volume Control included. Takes any set up to a panel size 21" x 8", or baseboard depth 16". Cash price £11.19.6.
- Only Balance in 11 monthly payments of 20/-.

EVERYTHING RADIO FOR CASH OR EASY TERMS WITH SERVICE AFTER SALES

- Send **14/8** **MULLARD 1931 ORGOLA THREE VALVE KIT, S.G.,** Detector and Power. Cash price, £8.0.0.
- Only Balance in 11 monthly payments of 14/8.
- Send **32/6** **MULLARD 1931 ORGOLA FOUR-VALVE KIT, 2 S.G.,** Detector and Pentode. Cash price, £13.12.6.
- Only Balance in 11 monthly payments of 24/-.
- Send **10/6** **DYNAPLUS SCREENED THREE KIT, S.G.,** Detector and Power. Cash Price, £5.14.6.
- Only Balance in 11 monthly payments of 10/6.
- Send **10/9** **REGENTONE W.5 COMBINED H.T. ELIMINATOR & TRICKLE CHARGER, 1 S.G., 1 variable and 1 fixed tapping for H.T. E.T. charging for 2, 4 and 6 volts. For A.C. Mains. Cash price, £5.17.6.**
- Only Balance in 11 monthly payments of 10/9.
- Send **7/6** **STANDARD WET H.T. BATTERIES, 144 volts, 20,000 m/μ.** Cash price £4.2.0. Balance in 11 monthly payments of 7/6. Other voltages and capacities available; detailed prices on application.
- Send **7/9** **BLUE SPOT MODEL 51R CABINET SPEAKER.** Cash price, £4.4.0.
- Only Balance in 11 monthly payments of 7/9.
- Send **12/4** **B.T.H. P.K. PERMANENT MAGNET SPEAKER.** Unit only. Cash price, £6.15.0.
- Only Balance in 11 monthly payments of 12/4.
- Send **15/-** **THE VOXIT CONSOLE COMBINED SET AND SPEAKER CABINET.** Takes any set up to a panel size of 18" x 8", or baseboard depth 12". In mahogany or oak. Cash price £4.4.0 (oak). Balance in 9 monthly payments of 2/6. Other prices on request.

All above Kit prices include valves and cabinet.

IMMEDIATE DELIVERY

STRICT PRIVACY GUARANTEED to Easy Payment Orders

ALL ORDERS CARRIAGE PAID

PETO-SCOTT CO. LTD.

OUR NEW CATALOGUE

describing ALL THE LEADING MAKERS' Receivers, Components, Radio Gramophones, Pick-ups, etc. A veritable guide to Radio. Get your copy to-day. LONDON: 77 City Road, E.C.1.

Phone: Clerkenwell 0406-7-8. 62, High Holborn, W.C.1. Phone: Chancery 8266. MANCHESTER: 33, Whitelaw Road, Chorltoncum-Hardy. Phone: Chorltoncum-Hardy 2028. NEWCASTLE. STAFFS: 7, Albany Road.

PLEASE SEND ME FREE YOUR 1931 EASY WAY CATALOGUE BY RETURN OF POST.

NAME.....
ADDRESS.....
P.W. 22/11/30.

FIRST IN 1919—FOREMOST TO-DAY

POWER CHOKES guaranteed twelve months.

substantially built, for smoothing circuits in eliminators dealing with currents 100 to 300 milliamperes, inductance 30 henries, post free. 8/6 C.W.O.

REPAIRS

Any make of L.F. Transformer, Loudspeaker (except Blue Spot) or Head-phones repaired and despatched within 48 HOURS—TWELVE MONTHS' GUARANTEE with each repair. 4/- Post Free. Cash with Order. Terms to Trade.

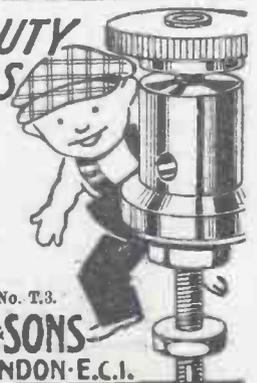
TRANSFORMER REPAIR CO Dept. R., 953, GARRATT LANE, LONDON, S.W.17.

TREBLE DUTY TERMINALS

TAKES THREE DIFFERENT TYPES OF CONNECTION ON ONE TERMINAL ASK FOR THE 'EELEX'

Write for List No. T.3.

J.J. EASTICK & SONS Bunhill Row LONDON E.C.1.



Buy by post—it's quicker. Post this Coupon NOW

REMEMBER!

"POPULAR WIRELESS" HAS THE LARGEST SALE OF ANY WEEKLY WIRELESS JOURNAL.

RAYMONDS

27 & 28a, LISLE ST.,
LEICESTER SQUARE, Back of Daly's Theatre.
Telephone: Gerrard 2821.

100 SPECIAL BARGAINS
PART OF LARGE BANK-
RUPT STOCK PURCHASE

Only obtainable at RAYMONDS

(Post orders can only be supplied by C.O.D.,
send no money, pay the postman).

NOW IS YOUR OPPORTUNITY
EVERY ARTICLE FULLY GUARANTEED

7YE, 110 Henries CHOKES, 12/6 List	Our Price 5/11
MARCONI 6-1 L.F. Transformer, 25/- List	Our Price 8/11
EXIDE 20/40 Non-spillable Jelly Acid Accumulators,	
12/6 List	Our Price, 10/5
UNDY, Pick-Up & 1one Arm 3/6 List	Our Price 3/6
Oak Loud Speaker Cabinets, 15" x 15"	4/11
Oak Loud Speaker, to fit Blue Spot, R. or P.	10/6
Chassis, to fit Blue Spot, R. or P. large type 16"	6/11
Dual Range Coils, panel mounting	4/11
Dual Range Coils, baseboard mounting	4/11
Differential Condensers, 00015	2/6
Reaction Condensers 0001	1/11
Baseboard Neutralising Condensers	1/11
S.L.F. Variable Condensers, 0005	2/6
S.L.F. Variable Condensers, 0003	2/6
Valve Holders, with terminals, each	5d.
Baseboard Rheostats, 6 ohm. or 30 ohm. each	6d.
Marconi 6-1 Transformers	8/11
Eye 110 h Chokes	4/11
100 H.T. Batteries, fully guaranteed	6/11
60 H.T. Batteries, fully guaranteed	3/11
4.5 Pocket Batteries, per doz.	3/6
Special Juvenia H.T. Battery, to fit portable	
sets, 100 volts	7/11
6-Pin Basca	10/6
Earth Tubes	1/6
1 mid fully guaranteed Condensers	1/6
2 mid fully guaranteed Condensers	2/6
3 mid fully guaranteed Condensers	3/6
Triotron Cone Units, latest model	7/11
Triotron T.D., 2 valves	4/6
Triotron Z.D., 2 valves	5/6
Fuller 2-v 60 Accumulators	6/11
12" Cone Chassis, take any unit	2/11
15" Cone Chassis, take any unit	2/11
12" x 7" Oak Cabinet, complete with polished	
panel	8/11
14" x 7" Oak Cabinet, complete with polished	
panel	9/11
18" x 7" Oak Cabinet, complete with polished	
panel	10/11
Dr. Nesper Trickle Chargers, 2- or 4-v. Accumu-	
lators	25/-
Dual Range 6-Pin Coils	4/6
200-700 metres 6-Pin Coils	3/6
Sovereign Dual Range Coils, panel mounting	6/11
Titan Coils, Dual Range	9/11
New Ormond Geared Dial	2/6
New Ormond Log Condenser	4/-
New Ormond Log Condenser, with double dial	6/-
Hegra Dynamic 8-Pole Speaker	39/11
Hegra Trickle Charger	23/11
Undy 8-Pole Units	18/9
Undy 8-Pole Units and Chassis	3/6
Pifco "All in One" Voltmeter	12/6
Dead-Beat Voltmeters	3/9
Accurate Hydrometers, float or ball reading	2/6
Newey S.M. Condensers and Dial, complete	3/11
100 ft. Enamel Aerial, 7/22	2/9
100 ft. Aerial, 7/22 Copper	1/9
Gramophone Pick-Ups guaranteed British Made	7/6
Panel Brackets, per pair	6d.
H.F. Chokes, reliable	1/11
Telsen L.F. Choke	7/6
Telsen H.F. Choke	2/6
Panel Rheostats, 6 ohm. or 30 ohm., complete	
with knob, each	6d.
00015 Brookmans Condensers, complete with	
knob	1/10
Miniature 0005 Condensers, complete with	
knob, suitable for portable sets	1/11
3 m.m. Rubber Flex per yard	1d.
S.F.D.T., Porcelain Switches	10/6
B.F.D.T., Porcelain Switches	10/6
14 x 369 Red and Black Flex per yard	1d.
Fuse Bulb Holders, each	9d.
"Undy" Volume Controls, 0.3 meg.	2/11
Hiophone 3 gns Speaker, cabinet model	16/11
Connecting Wiro, insulated all colours, per 10	
ft. coil	3d.
Fully Guaranteed 5-1 or 3-1 Transformers	4/9
Set of S.W. Coils, Nos 2, 4, 6, 9, per set	0/8
Plug-In Coils, Nos 35, 50, 60, 75, each	1/3
Plug-In Coils, Nos 100, 150, 200, 250, each	2/3
60x Coils, 1.9-60 C.T., each	1/4
250x Coils, 3.6-250 C.T., each	2/9
Wall Plugs, complete	8d.
Linen Double Chassis, solid oak frame, Linen	
fixed and stretched complete with dope and	
brush, etc	5/11
10" x 6" Aluminium, with 1/2" bend	1/3
18" x 7" Aluminium plain panels, each	1/9
Single Coil Plugs, with terminals, each	6d.
400 ohms, B.B. Potentiometers, each	1/4
Spring Indoor Aerials, with Insulators, each	6d.
Ebonite Grid Leak Holders, each	3d.
Suitcase Portable Cabinets, Rexline finish	19/6
Pair of 5xx Coils, suitable for 1930 Cossor	9/11
"Daily Mail" (Sigsbee) Catstraps	2/11
Pair of B.B.C. Coils for 1930 Cossor	5/11
Aconic 2-Valve All Mains Set, complete with	
Speaker, one only	8 gns.
9-v. Grid Bias Batteries, each	11d.
5-Way Battery Leads, complete with Plugs	
and Spades; excellent quality, per set	1/6
7-Way Leads, per set	1/11
Harley Wavetraps each	10/6
Watmel Dual Range Coils, Type 3	15/11
Excellent Ione Cabinet Cone Speakers	19/11

IMPORTANT: All communications must be addressed to
K. RAYMOND, L.T.D.,
27 & 28a LISLE STREET, LONDON, W.C.2
The name of the street is not sufficient.

TECHNICAL NOTES

(Continued from previous page.)

fitted with the old style direct dials in positions where the use of a slow-motion dial would be a great advantage.

With the increase in selectivity and also with the need for very fine control of reaction, the use of a slow-motion dial becomes practically essential.

The principle of slow-motion dials as most of you know perfectly well, is simply that of a step-down gear wherein a small or pinion wheel rotates a larger wheel, several complete revolutions of the small wheel being necessary for one revolution of the large one.

It is clear that the skill required in adjusting a knob attached to the small wheel is very much less than that required in manipulating the large wheel direct, since a movement of perhaps 6 or 8 degrees of the small wheel is equivalent to a rotation of only 1 degree of the large wheel.

Tuning and Reaction.

It is hardly necessary to say anything about tuning or reaction control by means of a dial of this type, as it simply resolves itself into the fact that with the slow-motion dial your skill in adjustment is, so to speak, magnified by anything from four to eight times and so you are able to get the advantages of reaction without the danger of running into oscillation.

In the same way in tuning, especially where the set is very selective and can bring in stations which come very close together on the dial, you may be able to single out stations in this way which would be all mixed up, or perhaps completely missed, with an ordinary dial.

Mechanical Troubles.

On the other hand, nothing is more aggravating than a dial of this type which moves irregularly or slips. I have a small four-valve receiver in which a dial of this kind gave me endless trouble, until finally in desperation it was removed and a satisfactory one substituted. In this particular case the large wheel had a rubber tyre by which it engaged with the metal surface of the small wheel.

Owing to slackness and bad fit generally, as well as to quite inexcusable irregularities in the depth of the rubber tyre, the pair would engage at some points but would scarcely engage at all at other points, and unless you kept an eye on the dial you would find yourself solemnly turning the knob of the small wheel whilst nothing whatever was happening to the dial!

In buying a dial of this sort, therefore, you should take great care to ascertain beforehand that it is positive and reliable in action.

Amplifier Troubles.

I have recently had rather a curious experience with an amplifier, an account of which may perhaps save some of my readers trouble at some time. The amplifier in question is a large and rather powerful one with parallel valves in the output stage.

It was fitted up with rather a lot of wires running in various directions, as the H.T. supply had to be brought from a special H.T. mains unit in an adjacent room, whilst

(Continued on next page.)

SCRAP THAT DUD

That cheap pocket 30 ohms-per-volt meter; that several-in-one affair that ruined your H.T. battery with its 30 m.a. load per volt-reading.

You want one of the
**MULTI-RANGE
DIX-ONE METER**



The extensive sale and increased use has enabled a reduced price to be offered below the already exceptionally low price.

DIX-ONEMETERS are now 50/- only, a remarkably small price for a meter worth £10 in comparison with others.

Latest Model. To 1st Grade Brit. Eng. Standards Mirror Double Scale. Moulded Base. The finest Precision Multi-measuring instrument is the DIX-ONEMETER, the acknowledged Radio standard beloved by Expert and Amateur. Imitations of its Bakelite case and mirror scale are inferior. They lack the 50 Multiplier Ranges, the Precision, the Duplex Scales, Knife-edge Needle, Accurate Bearings, and High Figure of Merit. Remember that the DIX-ONEMETER is as nearly electro-static in its tiny load and can be used at 2,500 ohms per volt. On 100 volts the high value of 250,000 ohms can be used. Micro-Amps., Milli-Amps., and Amps. to 20A. Milli-Volts and Volts to 2,000V. Resistances from 50 ohms to 50 million ohms. All these are measured with ease on the versatile and finely-made DIX-ONEMETER.

DIX-ONEMETER 50/- ONLY
Range Multipliers 6/6 each
Electrical and Radio Test Booklet Free.
ELECTRADIX RADIOS,
218, Upper Thames Street, E.C.4
Telephone: City 0191.

'QUICK' Service

**EXPERIMENTERS!
CONSTRUCTORS!**

Get your wireless accessories from us. All well known makes, delivered by return. Carriage paid and C.O.D.

Get this out for future reference.

THE ELECTROCET RADIO CO.
(Retail Department),
SOLIHULL, BIRMINGHAM.

PAREX

COILS & COMPONENTS
Products PAREXcellence
for the

"INTERCHANGE 3"
SPECIAL 6 PIN COIL . . . 15/-
Differential Condenser . . . 5/-
Neutralising Condenser . . . 4/6

"P.W." DUAL COIL
as used in the

"NEW COIL" TWO
A most beautiful and efficient 12/6
component

Direct from
E. PAROUSSI,
10, Featherstone Bldgs., London, W.C.1.
Phone: Chancery 7010.

PLEASE be sure to mention
"POPULAR WIRELESS"
when communicating with
Advertisers. THANKS!

TECHNICAL NOTES

(Continued from previous page.)

the L.T. supply was brought from some batteries in another room at a little distance away.

Furthermore, the leads to an electrical pick-up were parallel and very close to some leads carrying electric-light current at 220 volts A.C. In addition to all this, there were further leads carrying current to a small A.C. motor.

Of course, a good deal of trouble was at first experienced owing to the pick-up leads passing on the A.C. hum; but this was finally got over by earthing various points and also by the judicious and generous use of large-capacity condensers. That is quite a story in itself, but is not what I wanted to refer to more particularly.

The whole arrangement was, finally got into a form in which it operated extremely well. Then one day it was found to give crackles in the loud speaker, exactly the sort of thing one gets sometimes in a radio set when a nearby electric lift is working. This certainly suggested that the electric motor might be at fault, but as this had not been changed it seemed quite unlikely.

"All Quiet - - -"

I remembered then that I had slipped the pulley off the shaft of the motor and substituted another one, but one would hardly have thought that this simple mechanical operation would have accounted for the disturbance of the electrical conditions.

It was not until another motor of the same type was connected in that the cause of the trouble was discovered. The second motor behaved in the proper way, exactly

as the first one had done originally. I then found that in the process of removing the pulley of the first motor the shaft had been shifted about a little in its bearing (longitudinally), and this had in some way grated one of the carbon brushes, with the result that when the motor was started up there was considerable sparking.

It was this sparking that gave me such trouble with the amplifier. When the brush was put right all was again quiet on the amplifier front.

A Curious Case.

I have a letter before me now in which a reader tells me that he used to use seven pieces of 7/22 wire in parallel for his earth lead, and in an emergency he had to substitute a length of single 22-gauge wire.

He found that it was quite impossible to detect any difference whatever either in the tuning or the output from the receiver, and he concludes: "Does it follow, therefore, that what I have been told in the past regarding large aerial conductors for earth wires no longer holds good?"

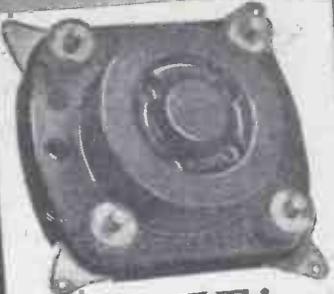
It simply shows that there is often a good deal of exaggeration in the advice given by one amateur to another; it is far more important to have the aerial of the right size and capacity, correctly placed at a good height and well insulated.

If all these points are attended to, particularly the height and the insulation, it is really immaterial whether the wire be single or stranded.

And Another.

Another reader relates rather a curious experience which he had with his aerial;

(Continued on next page.)



MIKE!

THE micro impulses passed on from the tuner to the grid of your H.F. or Detector valve will not be efficiently passed on to the amplifier if your valve makes poor contact in its holder.

The one-piece grip-contact and soldering lug in the Benjamin Vibroder ensures excellent contact with either solid or split pins. Verib Sap.

Write for Catalogue No. 1142.

THE BENJAMIN ELECTRIC LTD.

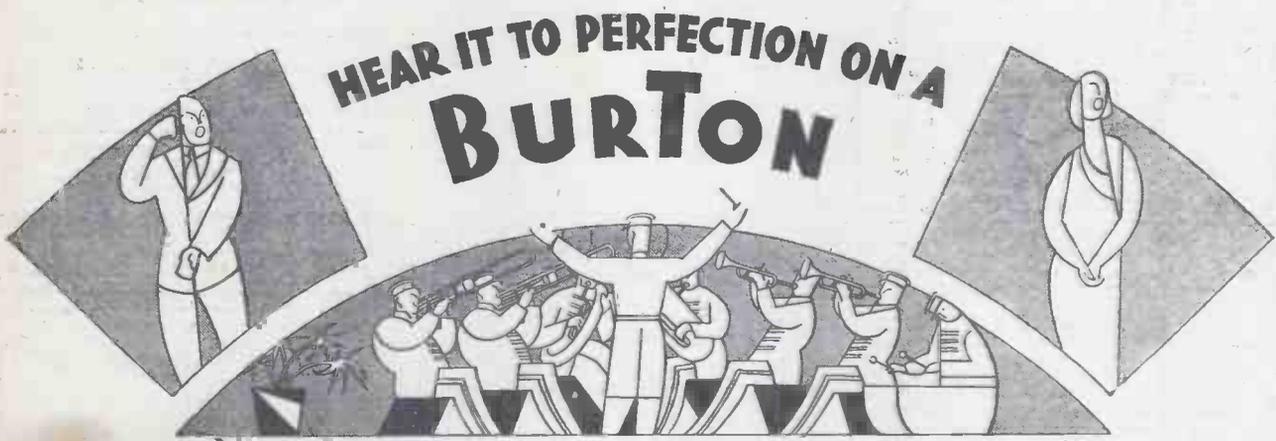
Tariff Rd., Tottenham, N.17

Tottenham 190.

1/6

BENJAMIN

READ
MODERN WIRELESS
Britain's Leading Radio Magazine.
ON SALE EVERYWHERE



HEAR IT TO PERFECTION ON A
BURTON

As it is said, sung, or played, so you hear it on a BurTon Receiver; eloquence and artistry are portrayed with equal faithfulness. For performance, appearance and value every BurTon Receiver is a masterpiece in its respective class.

Send for latest lists, or ask your dealer to show you—



- THE BURTON EMPIRE TWO, Battery model, in moulded Bakelite case, Price 57/6
- THE BURTON EMPIRE THREE, SCREEN GRID, Battery model, here illustrated, Price £8 12 6
- THE BURTON ALL-MAINS TWO, A.C. model, Price £10 10 0
- THE BURTON ALL-MAINS THREE, A.C. model, Price £14 0 0
- THE BURTON EMPIRE THREE, Battery model, Price £5 10 0

Made by—C. F. & H. BURTON, PROGRESS WORKS, WALSALL, ENG.

ENGINEERS!

Can't we get together?



WRITE FOR THIS BOOK TO-DAY IT'S FREE!

All we ask is the chance to prove that you can earn £300, £400, £500 per year or more. Other men are doing it and you can do the same.

We have an unrivalled and world-wide organisation waiting to help you, whether you be novice or expert. If you wish for something more than a "bread and butter" job you owe it to yourself to investigate our service.

Our handbook, "Engineering Opportunities," has pointed the way to better things to over 20,000 of your fellows. It contains details of A.M.I.Mech.E., A.M.I.E.E., A.M.I.C.E., A.M.I.A.E., A.M.I. Struct.E., London Matric, C. & G., G.P.O., etc., Exams., outlines home study courses in all branches of Electrical, Mechanical, Motor and Wireless Engineering, and explains our unique guarantee of

NO PASS—NO FEES

In a brilliant foreword Prof. A. M. Low shows clearly the chances you are missing. "Engineering Opportunities" and our advice are quite FREE. Don't neglect this offer—give vent to that "upward urge" and send a postcard NOW, stating Branch, Post, or Exam. which interests you. **British Institute of Engineering Technology, 101 Shakespeare House, 29/31, Oxford Street, W.1**

"BUILD YOUR OWN BATTERIES"
"THE CELLS THAT SATISFY."

We supply complete Kits for making super-capacity, Grid Bias Block Type, Pocket Lamp, Wet Type and Bell Batteries. You can build a 60-volt Wet Battery for 15/-. We supply a Standard Size 120 Dry Battery for 12/-. All Batteries guaranteed. Send 3d. for the Leyton Booklet, "Build Your Own Batteries," to: **THE LEYTON BATTERY CO., 305, Church Road, Leyton, E.10.**

"KLEER-KUT"

Coils for clear reception. Mounted on best quality plugs of British manufacture.

25, 30, 35, 1/-; 40, 50, 1/2; 60, 75, 1/3; 100, 125, 150, 1/6; 175, 1/9; 200, 2/-; 250, 2/3; 300, 2/6. Centre Tapped 6d. extra. X Coils 1/- extra. All post free.

L. BRUCE, 47a, Stanley Gardens, N.W.3
7th year of Coil Manufacturing.

"EVERYTHING WIRELESS"
ON
EASY TERMS

COSSOR EMPIRE MELODY MAKER, MULLARD ORGOLA, OSRAM 4, All Mains Sets, EKCO H.T. Eliminators, Loud Speakers, etc.

COMPONENTS FOR ANY CIRCUIT.

Send for our quotation for everything you require in Wireless. We pay carriage on all cash orders for delivery in U.K. or N. Ireland.

The P.D.P. CO., LTD. (Dept.)
46, WATLING ST., LONDON, E.C.4.

Phone Central 4468

ALL APPLICATIONS for ADVERTISING SPACE in "POPULAR WIRELESS" must be made to the Sole Advertising Agents, **JOHN H. LILE, LTD., 4, LUDGATE CIRCUS, LONDON, E.C.4.**

TECHNICAL NOTES.

(Continued from previous page.)

he uses a large outdoor aerial and was obliged to have a fairly long lead-in through the house.

Whilst actually listening one evening he noticed an increase in the selectivity of the receiver on the Brookmans Park transmissions, although the volume remained the same.

On investigating, he found that, due to some accident, the outside part of the aerial was disconnected and reception was being made only on the indoor lead. As results were actually better, he naturally continued with the same arrangement and did not re-connect the outside aerial.

At first this seems very peculiar, but it is simply a good illustration of what I have already told you with regard to the importance of having the correct size and

TECHNICAL TWISTERS

No. 36.—CALIBRATION.

CAN YOU FILL IN THE MISSING LETTERS?

A set is said to be calibrated when the numbers on its tuning dial (or dials) bear a known relation to covered, and thus enable stations received to be identified.

Alternatively, a calibrated set may be adjusted to any desired by means of its tuning-chart or calibration

The latter shows the on the plotted against the by means of a

LOOK OUT FOR THE MISSING WORDS NEXT WEEK.

Last week's missing words (in order) were Plate (or Anode). Plate (or Anode). Screening (or Auxiliary) Grid. Cathode. Positive.

capacity of aerial. It is obvious that in the case in question the aerial was too large with the outside part connected, but when this was disconnected the remaining part of the aerial, that is, the indoor part, was more nearly suited to the receiver, consequently the selectivity was improved.

"HOW TO MAKE YOUR OWN COMPONENTS AND ACCESSORIES"

is the title of a magnificent book Presented Free with the December

"WIRELESS CONSTRUCTOR."

Now on Sale. Price 6d.

No. 2 of the NEW

LONDON MAGAZINE

at the NEW PRICE

6^d.

Full of suggestions for **CHRISTMAS GIFTS**

The amazing success of the first issue of the NEW LONDON—the bigger, brighter and better LONDON—has more than justified the confidence with which the Editor introduced the re-birth of an old favourite to the public. Readers have realised that here is indeed wonderful value for sixpence—splendid fiction, fascinating articles, yes, and a beautiful FREE plate. And No. 2 worthily maintains the standard. Look at the contents list.

Brilliant Stories by:

- E. BARRINGTON**
- GILBERT FRANKAU**
- DENIS MACKAIL**
- DON PORTBURY**
- SELWYN JEPSON**
- A. J. ALAN**

Fascinating Articles include:

- "Housekeeping for a Genius"
- BY MRS. EDGAR WALLACE
- "Behind the Scenes of a Great Paris Costumiers"

AND ALL SORTS OF IDEAS FOR XMAS GIFTS

FREE

FLOWER PAINTING IN FULL COLOUR BY H. DAVIS RICHTER, R.B.A.





For all round service in a domestic receiver, the combination of a screened grid high frequency amplifying valve, a detector and a pentode output valve cannot be bettered. In a correctly designed receiver, these three valves give results definitely superior to the best 5-valve set of a few seasons ago, from the point of view of range, sensitivity and quality—and for a

very much lower expenditure of both low and high tension current.

Such a combination, even in the hands of the merest novice, should render possible the reception, at good speaker strength, of a reasonable number of foreign transmissions as well as the local stations.

The following types should be employed in a screened grid, detector and pentode combination:—

L.T. Supply	Mullard Screened Grid	Mullard Detector	Mullard Pentode
2-volt accumulator	P.M.12	P.M. 2DX	P.M.22
4-volt accumulator	P.M.14	P.M. 4DX	P.M.24
6-volt accumulator	P.M.16	P.M. 6D	P.M.26
A.C. Main	S.4V or S.4VA	354V.	P.M.24 or P.M.24A

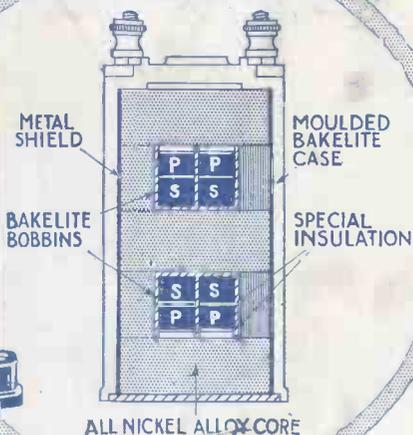
Mullard

THE MASTER VALVE

Advt. The Mullard Wireless Service Co., Ltd., Mullard House, Charing Cross Road, London, W.C.2.

LOOK INSIDE THE

Big Nikalloy 3



RI revolutionised the standard of design, construction and performance in Transformers and Chokes by the introduction of NIKALLOY.

The Amazingly Improved Reception that the HYPERMU, HYPERMITE and HYPERCORE give prove that the association of efficiency with bigness and outward indications of construction, as with older types is fallacious.

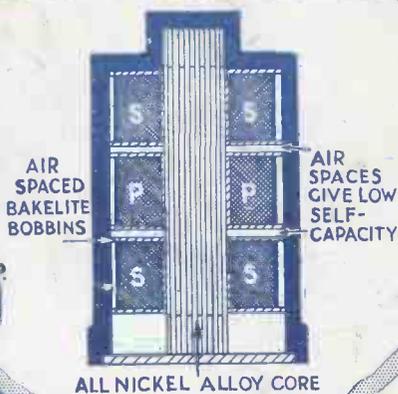
These Modern Compact Components yield positively unequalled results. The insulated bakelite cases that conceal them have been imitated in part by other makers but the interiors are inimitable.

Don't buy a transformer unless the inductance is given, and full details of its performance are available.

R.I. give these details because they inspire confidence and are a guarantee that you are getting the best value for money.

The HYPERMU

The highest and most uniform amplification between 25 and 7,000 cycles of any transformer in existence. Primary inductance 85 henries. Ratio 4/1. Weight 13 ozs. Incontestably the world's best transformer... **21/-**

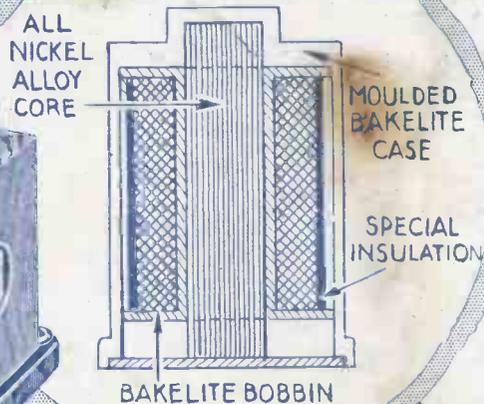
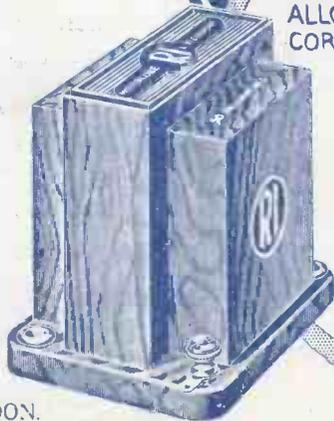


The HYPERMITE

The most efficient transformer in existence for its size and weight. Primary inductance over 50 henries. Ratio 3 1/2/1. Weight 7 ozs. Used by many of the largest set manufacturers in this country... **12/6**

The HYPERCORE

The first nickel iron choke for use as an output filter or smoothing choke. Low self-capacity with high inductance ensures brilliance in reproduction. Inductance 30 henries. Will carry up to 75 milliamperes. Weight 18 ozs.—A brilliant example of British Radio enterprise... **17/6**



Ask your dealer for the leaflets dealing with the R.I. Nikalloy Three—Hypermu, Hypermite and Hypercore.

R.I. LTD., MADRIGAL WORKS, PURLEY WAY, CROYDON.